THE DYNAMICS OF FINANCIAL AND MACROECONOMIC DETERMINANTS IN NATURAL GAS AND CRUDE OIL MARKETS: EVIDENCE FROM OECD/GCC/OPEC COUNTRIES

A THESIS SUBMITTED TO
THE INSTITUTE OF SOCIAL SCIENCES
OF
YILDIRIM BEYAZIT UNIVERSITY

BY

MERVE KARACAER ULUSOY

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY
IN
THE DEPARTMENT OF BANKING AND FINANCE

This study supported by YBU Scientific Research Project Coordination Unit under Project number: 1604 as a PhD thesis

MARCH 2016

Approval of the Institute of Social Sciences

Assoc. Prof. Dr. Mesut Murat ARSLAN

Manager of Institute

I certify that this thesis satisfies all the requirements as a thesis for the degree of Doctor of Philosophy in Department of Banking and Finance.

Assoc. Prof. Dr. Ayhan KAPUSUZOĞLU

Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Doctor of Philosophy in Department of Banking and Finance.

Assoc. Prof. Dr. Ayhan KAPUSUZOĞLU

Supervisor

Examining Committee Members

Assoc. Prof. Dr. Ayhan KAPUSUZOĞLU	(YBU, Banking and Finance)	
Prof. Dr. Nildağ Başak CEYLAN	(YBU, Banking and Finance)	
Assist. Prof. Dr. Erhan ÇANKAL	(YBU, Banking and Finance)	
Prof. Dr. Mehmet Baha KARAN	(Hacettepe Uni., Management)	
Assoc. Prof. Dr. Mustafa İBİCİOĞLU	(TCMB)	

PLAGIARISM PAGE

I hereby declare that all information in this thesis has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work; otherwise I accept all legal responsibility.

Name, Last name: Merve KARACAER ULUSOY

Signature :

ABSTRACT

THE DYNAMICS OF FINANCIAL AND MACROECONOMIC DETERMINANTS IN NATURAL GAS AND CRUDE OIL MARKETS: EVIDENCE FROM OECD/GCC/OPEC COUNTRIES

Karacaer-Ulusoy, Merve

Ph.D., Department of Banking and Finance

Supervisor: Assoc. Prof. Dr. Ayhan KAPUSUZOĞLU

March 2016, 390 pages

This study analyzes the countries in the Organization for Economic Cooperation and Development (OECD), Gulf Cooperation Council (GCC) and Organization of the Petroleum Exporting Countries (OPEC) within the data period to test whether there is long-term or short-term relationship between world's oil and natural gas consumption and the economic growth in the relevant countries. This analysis is undertaken in relation to the variables of world energy prices (Brent, West Texas Intermediate, Dubai, Henry Hub, Japan and Russia) and the liquidity level, stock market and industrial production of the target countries. Within the framework of this study, Augmented Dickey Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) unit root tests, Johansen cointegration and Granger causality analyses are implemented. The empirical findings of this thesis indicate that there are multidirectional relationships between the above-mentioned variables. These relationships can be explained by the factors that each country group owns within the framework of their energy sources, financial markets, economic conditions and geographical positions. The data accrued and analyzed in this thesis is presented as a contribution to guide policymakers, global investors and researchers in constituting an extensive country specific energy, macroeconomic and financial policies.

Keywords: energy consumption, oil and natural gas prices, financial and economic developments, cointegration, causality

ÖZET

DOĞAL GAZ VE PETROL PİYASALARINDA FİNANSAL VE MAKROEKONOMİK ETKENLERİN DİNAMİKLERİ: OECD/GCC/OPEC ÜLKELERİ ÜZERİNE AMPİRİK BİR ÇALIŞMA

Karacaer-Ulusoy, Merve

Doktora, Bankacılık ve Finans Bölümü

Tez Danışmanı: Doç. Dr. Ayhan KAPUSUZOĞLU

Mart 2016, 390 sayfa

Bu çalışmada enerji, finansal ve makroekonomik değişkenler arasında kısa ve uzun dönemli olarak çeşitli ilişkilerin varlığı araştırılmıştır. Bu doğrultuda, Ekonomik Kalkınma ve İşbirliği Örgütü (OECD), Körfez Arap Ülkeleri İşbirliği Konseyi (GCC) ve Petrol İhraç Eden Ülkeler Teşkilatı (OPEC) grubunda yer alan ülkelerin toplam enerji, doğalgaz ve petrol tüketimi ile ilgili ülkelerin ekonomik büyümeleri arasındaki ilişkinin var olup olmadığı incelenmiştir. Çalışmada ele alınan diğer bir boyut ise, dünya petrol (Brent, West Texas Intermediate ve Dubai) ve doğalgaz (Henry Hub, Japonya ve Rusya) fiyatlarındaki değişimin OECD, GCC ve OPEC grubunda yer alan ülkelerin likidite seviyeleri, hisse senedi piyasaları ve sanayi üretimleri üzerinde etkili olup olmadığıdır. Araştırma sürecinde son olarak, çalışma kapsamında yer alan ülkelerinin finansal gelişmeleri ile ekonomik büyümeleri arasında kısa ya da uzun dönemli ilişkinin varlığı incelenmiştir. Çalışma kapsamında Augmented Dickey Fuller (ADF), Phillips-Perron (PP) ve Kwiatkowski-

Phillips-Schmidt-Shin (KPSS) birim kök testleri, Johansen eşbütünleşme ve Granger nedensellik analizleri gerçekleştirilmiştir. Elde edilen bulgular değerlendirildiğinde; yukarıda bahsedilen değişkenler arasında çok yönlü ilişkiler olduğu gözlemlenmiştir. İlişkilerdeki bu farklılıklar her ülke grubunun sahip olduğu enerji kaynakları, finansal piyasalar, ekonomik şartlar ve coğrafi konumlar arasındaki farklılık olmasından kaynaklanmaktadır. Tezde ele alınan verilerin ve uygulanan analizlerin politika yapıcılara, küresel yatırımcılara ve araştırmacılara ülke bazlı olmak üzere enerji, makroekonomi ve finans politikaları kapsamında katkı sağlayacağına inanılmaktadır.

Anahtar Kelimeler: enerji tüketimi, petrol ve doğal gaz fiyatları, finansal ve ekonomik gelişme, eşbütünleşme, nedensellik

TO MY FAMILY

ACKNOWLEDGMENTS

I would like to extend my special thanks to;

…to my thesis advisor, Assoc. Prof. Dr. Ayhan Kapusuzoğlu for his enlightening guidance, advice, encouragement, support and patience throughout my research.

…the examining committee members, Prof. Dr. Mehmet Baha KARAN, Assist. Prof. Dr. Erhan ÇANKAL, Prof. Dr. Nildağ Başak CEYLAN and Assoc. Prof. Dr. Mustafa İBİCİOĞLU for their precious contributions and criticisms.

…my friends for their support and encouragements.

I would also like to extend my sincerest gratitude and appreciation to;

…my all family members for guiding me to academic world and for their invaluable love, support and encouragements.

…AND to my dear husband Serkan ULUSOY for his efforts, technical assistance, encouragement, love and patience.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller Test
BP	British Petroleum
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
HH	Henry Hub
IEA	International Energy Agency
IMF	International Monetary Fund
KPSS	Kwiatkowski-Phillips-Schmidt-Shin Test
OECD	Organization for Economic Co-operation and Development
OPEC	Organization of the Petroleum Exporting Countries
PP	Phillips-Perron Test
UAE	United Arab Emirates
UK	United Kingdom
USA	United States of America
VAR	Vector Autoregressive Model
VECM	Vector Error Correction Model
WTI	West Texas Intermediate

CHAPTER

1 INTRODUCTION

Energy and its sustainability is one of the most important issues of today's world. The increased consumption of fossil fuels such as oil, coal and natural gas amplified the importance that should be given to energy issues. Within the process of globalization it cannot be denied that economic activity and energy consumption are interdependent. According to Sari, Ewing, and Soytas (2008) energy is a final good for end-users besides being an input in the production process of business sector. Yıldırım, Sukruoglu, and Aslan (2014) revealed that energy consumption and economic development are interdependent since energy is the key component in production process therefore, when a country's production process depends on energy, energy conservation policies may restrict its economic activities. Economic growth represents the level of a country's welfare; thus it is highly critical to understand the causal relationship between energy consumption and economic growth and the factors that affect economic growth (Apergis & Payne, 2010b; Apergis & Payne, 2010c; Kraft & Kraft, 1978; Squalli, 2007; Payne, 2010).

Energy sources have a very important place in national economies but due to globalization the required inputs and outputs may not be in the same region. Furthermore, in the situation when there is a disruption of oil and natural gas supplies world oil and natural gas prices are affected, and this impacts on the countries' status as an importer or exporter, in addition this can significantly affect various financial and macroeconomic aspects.

From 1948 to 1972, oil prices were less than $3.50 per barrel then following the 1973 oil supply shock, by 1974 oil prices had risen, globally, to $12 per barrel. This dramatic increase resulted from the oil embargo declared by Organization of the Petroleum Exporting Countries (OPEC) in response to the United States army supporting Israel in

Arab-Israel War. The embargo restricted the export of petroleum and introduced a cut in oil production. The later oil supply shock of 1979 was a result of the Iranian Revolution after which Iran cuts oil production and exportation and once again oil prices rose. These rises in oil prices provided higher profit margins for OPEC countries however, they led to recession for oil-dependent countries. In 2008 the financial crisis led to a recession and a fall in oil prices. The war in Libya in 2011, led to a decrease in oil production and prices rose to the 2008 level of approximately $91. At the beginning of 2014, the price of Brent oil reached $108 per barrel. Then, a small change in China's level of oil demand and a strong shock to the global supply, in 2015 oil prices dropped by approximately 50% which is expected to result in loss in revenue for oil exporting countries. The current Brent oil price level (approximately $29) is under the 2008 price level. This fall in prices may continue however, a new oil shock may also occur in the near future. In such a case, the data presented in this study can guide policymakers, global investors and researchers in designing effective and less costly tools to mitigate the effect of oil price shocks.

The volatility of oil prices has drawn attention to the importance of the effects of energy prices on macroeconomic activities. These effects have been considered using two different approaches. Many researchers have researched the effects of the oil prices shocks of the 1970s and 1980s on macroeconomic variables such as gross domestic product (GDP), inflation, interest rates, industrial production, productivity or liquidity. Numerous other researchers have investigated channels through which energy prices can affect macroeconomic variables (Burbidge & Harrison, 1984; DePratto, De Resende, & Maier, 2009; Ferderer, 1997; Hamilton, 2008; Kilian, 2008).

Theoretically, the increase in oil prices can have various effects four of which are given below. First, there is the supply-side effect in which in the case of increased energy prices, the input cost of the company increases while productivity and accordingly profitability decrease this in turn might force organizations to reduce new capital investments or use energy-efficient capital. Second is the demand-side effect. This refers to the income transfer from the oil importing countries to the oil exporting countries, which damages the aggregate demand in oil importing countries since the decrease in purchasing power of oil importing countries is higher than the increase in purchasing power of oil exporting countries. Third, the real-balance effect which is namely that increased energy prices have both direct and indirect effects on inflation. Initially, the increased energy prices will slowdown economic activities and cause inflation. Then, due to the higher prices of oil products (such as gasoline and heating-oil) the price of alternative energy sources will also increase. Thus, an indirect effect occurs due to the behavioral responses of companies and their workers, this is also called a second round effect. In this case firms can reflect the increased input costs in the prices of non-energy products. Furthermore, with the increased cost of living, workers can demand higher wages. A corruption in price-wage loop can damage the wealth of households, by reducing consumption and output. The fourth way that higher energy prices affect the economy is through the monetary policy channel. Increased energy prices decrease consumption, investment and stock prices, increase unemployment and construct new production methods which are less dependent on oil inputs (Cologni & Manera, 2008; Kumar, 2005).

It has been observed that the increases in oil prices cause recession especially in industrialized countries, slowdown the productivity and growth, besides cause inflation (Barsky & Kilian, 2004; Hamilton, 1983; Mork & Hall, 1979). On the other hand, the effects of oil price changes differ depending on countries level of development, stage of economy and its organizational structure. For example; in oil-importing countries the increase in oil prices raises inflation and input costs, which effect manufacturing and transportation industries, besides leads to a decrease in demand of non-oil products; reflecting the lower purchasing power. Furthermore, a slowdown in economic growth leads to a reduction in labor demand; in other words employment level. On the fiscal side, government expenditures rise on the one hand and tax revenues drop on the other, leading to an increase in the budget deficit and interest rates (Yıldız & Karacaer-Ulusoy, 2015).

These macroeconomic issues and their important impact on the financial system have also been discussed in the literature over many years (Lucas, 1988; Patrick, 1966; Robinson, 1952; Schumpeter, 1911). In particular, after 1980; the outcomes of financial liberalization regarding the financial system began to achieve prominence. The financial system plays a crucial role in encouraging the development of economic activities since the system includes financial markets, insurance companies, security markets, banks, other financial intermediaries and the supervision of these intermediaries. Knowledge acquisition, the costs of the execution of contracts and transactions have led need for financial contracts, markets and intermediaries. The differential costs due to administrative, legal and tax differences have led to the creation of district financial contracts, markets and intermediaries between countries (Levine, 2004). There are several views about the direction of the causal relationship between financial development and economic growth. A common view is that financial liberalization increases the shared risk; which in turn lowers the cost of equity while raising the borrowed money, capital accumulation, investments besides the demand for energy, and ultimately improves economic growth (Greenwood & Jovanovic, 1989; Sadorsky, 2010). On the other hand, others believe that financial liberalization may have negative effects on the countries that do not have strong legal institutions. According to those supporting this view, the high level of liberalized financial markets causes the total real credits of domestic firms to decrease, which in turn results in a slowdown of investments and economic growth (Samargandi, Fidrmuc, & Ghosh, 2014).

The importance of the energy sources and their effects on the financial and macroeconomic factors are the motivation for this research. This study is the one of the first that focuses on energy consumption and prices (oil and natural gas), economic performance (economic growth, industrial production and liquidity) and financial development (stock market). For that purpose, it investigates the relationship between energy consumption, energy prices, the stock market index and the economic performance in the OECD, GCC and OPEC.

The first tested hypothesis during the selected data period is whether causality exists between the global total energy, oil and natural gas consumption and economic growth in the target countries. The second hypothesis to be tested is whether there is an evidence of causality between the world energy prices (Brent oil, West Texas Intermediate (WTI), Dubai, Henry Hub (HH), Japan and Russia) and the stock market, liquidity level and industrial production of the selected countries. Finally, the existence of causality between financial development and the economic growth of the target countries is tested.

This study provides comprehensive and detailed evidence within the scope of the target countries (OECD; GCC and OPEC) revealing which factors have a greater impact within the international arena. The factors and the relationships will be presented separately for each country. This study contributes to the existing literature by offering policymakers, global investors and researchers a deeper understanding of the relationship between the oil and natural gas markets and macroeconomic activities. Furthermore, this study aims to fill a gap in the literature by presenting more information on the financial development and the economic growth of an extensive number of country groups.

The thesis is organized as follows. Chapter II provides information about world oil and natural gas markets by presenting statistics about production, consumption, importation and exportation. Chapter III contains the theoretical framework and empirical literature concerning energy and energy consumption, energy prices and liquidity, energy markets and financial/economic variables, and financial development and economic growth. The data set, econometric models are utilizes in the analyses and the empirical results obtained from these analyses are introduced in Chapter IV. The final chapter discusses the policy implications of the findings.

CHAPTER II

2 WORLD OIL AND NATURAL GAS MARKETS

Theoretically, crude oil and natural gas prices are associated because they are used as substitutes in consumption and complements in production (Figure 1). For example, Villar and Joutz (2006) indicate that there is a long-term cointegrating relationship between HH and WTI prices, while Brown and Yücel (2009) also prove that crude oil prices have an important and significant effect on natural gas prices of the United Kingdom (UK) and the east coast of the United States of America (USA).

Figure 1 Henry Hub and West Texas Intermediate Prices (1997-2015)
Source: Energy Information Administration, Short-Term Energy Outlook (2016)

This section provides historical and statistical information about global oil and natural gas markets. The historical information was obtained from Hamilton's (2011) study, the historical crude oil chart (Figure 2) and statistical information of crude oil and natural gas was taken from International Energy Agency (IEA, 2014) and British Petroleum (BP, 2015).

2.1 THE HISTORY OF OIL

The West Coast Gasoline Famine of 1920 was the first oil-related shock of the 20^{th} century. According to Hamilton (2011), the real economic importance of oil emerged in the 20^{th} century. There was an incredible increase in demand for oil and the production capacity of the USA was unable to meet this demand. The increased production level in 1920 together with the reduction of demand with the Great Depression of 1929 caused oil prices to decrease and resulted in a second oil shock.

Hamilton (2011) investigated the oil shocks that occurred after World War II. Between 1945-1947 period the US demand for oil products had increased by 12%, which led to an 80% increase in oil prices. In 1952-1953, Iran's oil was nationalized, in response to this act a world boycott to Iranian oil began which resulted in oil supply disruptions and raised oil prices. The oil shock of 1956-1957 occurred as a result of the Suez Crisis in which Egypt nationalized (the English French company that operated the) Suez Canal. This action created chaos for Israel, UK and France. The closure of Suez Canal formed many difficulties for Europe, which mainly meets its oil demand from Middle East and this reduction in the demand for oil caused oil prices to increase.

According to Hamilton (2011) the price increases of 1969-1970 period are mainly response to the inflationary pressures of the 1970 period. Hamilton (2011) categorizes the oil price shocks that occurred between 1973 and 1996 as the age of OPEC. In 1973-1974, Syria and Egypt attacked Israel and in response, OPEC announced an oil embargo on the countries that supported Israel against the armies of the Arab countries. This embargo restricted the export of petroleum to the USA and west countries, while introducing a cut in OPEC's total oil production. As a result of this embargo, there was an extreme rise in oil prices. As stated by Hamilton (2011) OPEC's action demonstrates the importance of geopolitical events as well as economic factors on the oil market.

In 1979 the Iranian Revolution and the country cutting its oil production and export creating another oil crisis. In this case, the majority of the lost Iranian oil production was met by Saudi Arabia. Following the Iranian Revolution in 1980, the Iran-Iraq war began and oil prices continued to increase. According to Hamilton (2011), this process that began with the Iranian revolution, can be considered as an oil shock. While these rises in oil prices provided higher profit margins for OPEC countries; they led to recession for oil-dependent countries. As a result, the aggregate demand for oil started to decrease causing oil prices to collapse in 1986. Hamilton (2011) indicates this fall as an oil shock for producers. On the other hand, the invasion of Kuwait by Iraq in 1990 initiated the first Persian Gulf War and thus, there was a new oil shock due to the increased oil prices.

Hamilton (2011) calls the period of 1997-2010 the new industrial age. In this period, the world economy had shown a significant growth, especially with the growth of the economies in the Middle East, China and Asia. In 1999, the Asian crisis erupted and with the decrease in the demand for oil, prices started to fall and reached a more reasonable level. Then financial crisis of 2008 led to a worldwide recession and consequently oil prices fell dramatically from $134 per barrel in June 2008 to $39 per barrel in February 2009. In 2011, the civil war in Libya caused a decrease in oil production and oil prices rose to the 2008 level.

At the beginning of 2014, the price of Brent crude oil was $108 per barrel. In 2014, the most important expansion was on the supply side with the USA recording the largest increase in oil production from shale reserves. However, demand was weaker compared to supply because although the production of non-OPEC increased, OPEC did not cut its oil production in order to protect its market share. In this period, excluding the financial crisis of 2008, global primary energy consumption was at its lowest since the 1990s. With a small change in China's level of demand and a strong global supply shock, in 2015 oil prices decreased by approximately 50% and dropping to $47 in January 2015. Baumeister and Kilian (2015) gave the reason for the oil shock of 2014 as being the sudden decrease of oil prices associated with the decline in global real economic activities. However, the production of shale gas by the USA should be ignored when considering the recent oil shock in 2014.

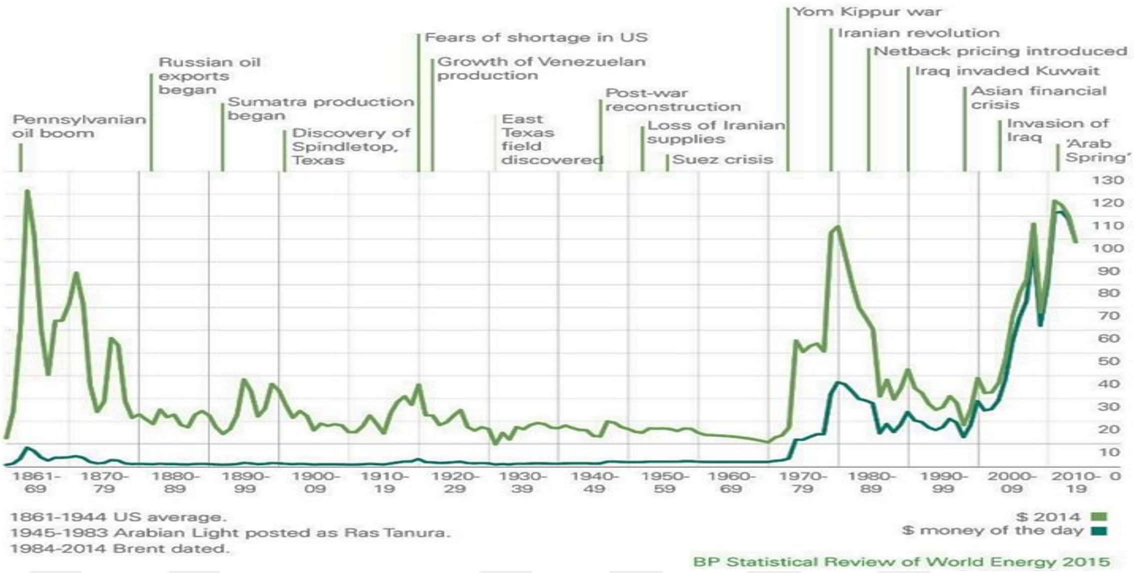

Figure 2 Crude Oil Prices 1861-2014

2.2 OIL PRICES

According to Energy Information Administration (EIA, 2016) the most used global crude oil prices as a benchmark are Brent, WTI, Dubai and Nigerian oil. Figure 3 indicates that there is a strong co-movement among these four crude oil prices, which makes it easier for both buyers and sellers without exposing them to huge crude oil price differences.

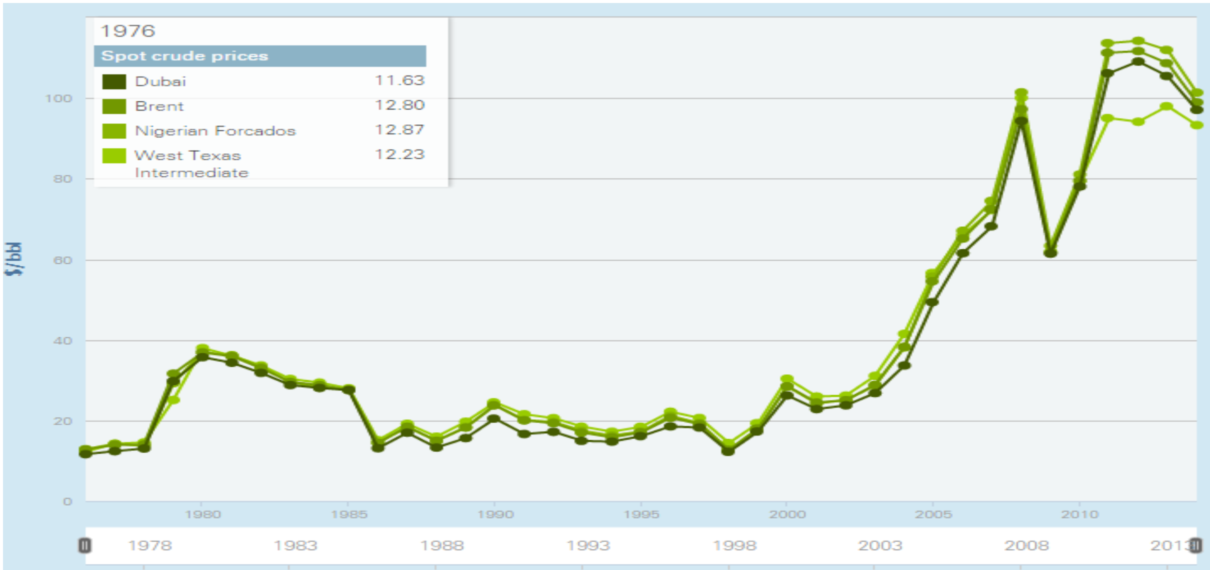

Figure 3 Spot Prices for Selected Benchmark Crude Oils (1976-2013)

Source: BP, Energy Charting Tool

Brent is a benchmark for light, sweet crude oil that is produced in the North Sea; Brent and Forties, Ekofisk and Oseberg. In 2013, the loadings of Brent oil were about 1% of the world's total crude oil production. It is used to price the crude oil produced and traded in Europe, Africa, the Mediterranean and Australia. As it is light and sweet it is efficient for diesel fuel and gasoline refining. One big great advantage of Brent oil is that it is easy to transport to distant locations.

WTI is a light, sweet oil that is produced in the American states of Cushing and Oklahoma. It is also efficient for gasoline refining.

Dubai is medium sour oil, and is mainly used to price the oil produced in the Middle East. It is the main benchmark for Persian Gulf oil which is exported to the Asian market.

Nigerian Forcados crude oil is a light crude oil and a benchmark for Nigeria.

2.3 NATURAL GAS MARKETS

Natural gas is believed to be one of the most important energy sources that will meet the global energy demand in the near future. The prospects of EIA (2014) indicate that the production of natural gas will be higher than the production of any other energy sources in the USA (Figure 4). The gas is transported as liquefied natural gas (LNG) at -260 degrees Fahrenheit through pipelines to a liquefaction facility, which is generally located next to a port or railhead. LNG is then loaded onto a ship or a railroad car to be delivered to the facility destination where it is re-gasified and sent to the required destination through pipelines (Kapusuzoglu, Liang, & Karacaer-Ulusoy, 2015).

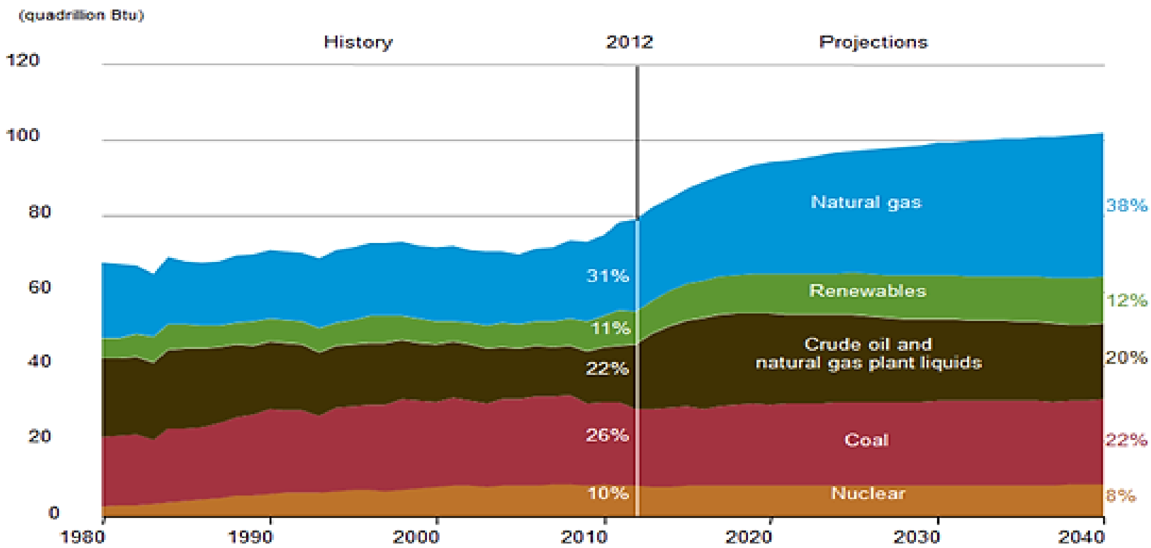

Figure 4 USA Energy Production by fuel, 1980-2040

Source: EIA, 2014

There are three basic regional natural gas markets; North America, Europe (including Russia and North Africa) and Asia which links to the Persian Gulf. North America mainly imports from Canada and Mexico, Europe primarily imports from Norway, Russia and Algeria and Japan/South Korea primarily imports from Indonesia, Australia, Malaysia and the Middle East (Siliverstovs, L'Hégaret, & Von Hirschhausen, 2005).

These markets have different price structures. In USA there is gas-on-gas competition and an open access to pipeline transportation whereas Asia takes crude oil as a benchmark while pricing natural gas (MIT Energy Initiative, 2011). Europe is secured with long-term, oil-indexed contracts whereas in the UK market pricing has been adopted which occurs at a virtual trading location, called the National Balancing Point (NBP).

2.4 NATURAL GAS PRICES

From the beginning of the gas trade, the natural gas prices had been linked to oil indexation. The 1990s, marked the beginning of the liberalization of Europe's natural gas markets, and this provide the opportunity for gas to be priced at the hub cost which provides flexibility especially for long-term contracts. A trading hub is a physical or virtual place where the exchange of natural gas can be implemented by market participants. A physical hub has storage capacities, such as LNG stations or gas pipelines, whereas trading in a virtual hub gas occurs within the regional or national transmission grid system. At a virtual hub, quantities of gas are transferred from a transmission system operator to an exit network operator. Each day, both the entry and exit quantities have to be balanced.

According to BP (2015), the most frequently used global natural gas hubs as a benchmark are USA (Henry Hub), Canada (Alberta) and the UK (NBP). On the other hand, the most used contract prices are the Japan and German imports from Russia which are represented by LNG imports. Figure 5 shows that there is a strong co-movement between these four natural gas prices until 2008, then after the financial crisis, there seems to be a co-movement between Japan, German and UK with the activity of the USA (Henry Hub) being different.

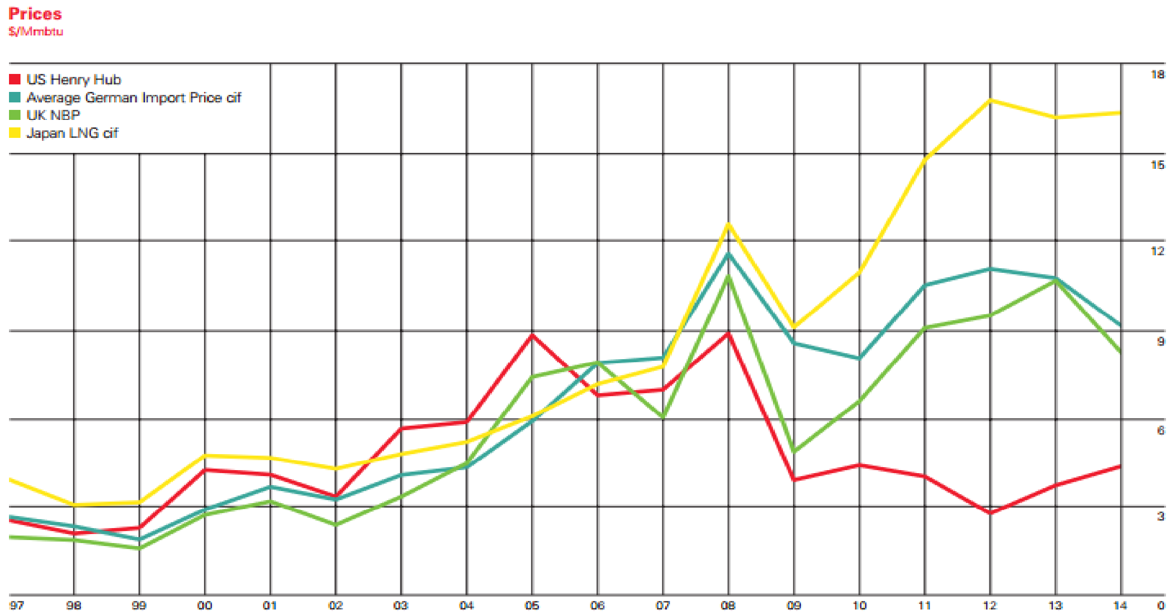

Figure 5 Natural Gas Prices in Japan, German, UK, USA and Canada (1997-2014)

Source: BP Statistics, 2015

2.5 PRODUCERS, CONSUMERS, NET EXPORTERS AND NET IMPORTERS OF CRUDE OIL

The data related to crude oil production, consumption, import and export are given in Table 1. According to the results; the amount of total production of the first three crude oil producing countries is more than 30 percent of world crude oil production distributed as follows; Saudi Arabia 12.9%, Russia 12.6% and USA 12.1% production levels respectively. The total consumption of the first three crude oil consuming countries is more than 30 percent of world crude oil consumption, comprising USA 19.9%, China 12.4% and Japan 4.7%. The total net export amount of the first three crude oil exporting countries is more than 30 percent of world crude oil exports as follows; Saudi Arabia 19.5%, Russia 12.2% and United Arab Emirates (UAE) 6.5%. The total net import amount of the first three crude oil importing countries is more than 40 percent of world crude oil imports, comprising; USA 19.6%, China 14% and India 9.5%.

The results show that most of the crude oil producing and exporting countries are members of OPEC and GCC; while most of the crude oil consuming and importing countries are OECD members. The results also draw attention to other points; firstly, Saudi Arabia and Russia are the two countries that produce and export most crude oil. This may be because as they have oil fields they produce crude oil more than they consume. Secondly, the first four countries that mostly consume and import crude oil are the same; USA, China, Japan and India; they are not in the list of first 10 world countries that export crude oil. Thus, the USA, China, Japan and India are consuming crude oil more than they produce.

Table 1 Producers, Consumers, Net Exporters and Net Importers of Crude Oil

Producers*	**%**	**Consumers***	**%**	**Net Exporters****	**%**	**Net Importers****	**%**
Saudi Arabia (GCC, OPEC)	12.9	USA (OECD)	19.9	Saudi Arabia (GCC, OPEC)	19.5	USA (OECD)	19.6
Russia	12.6	China	12.4	Russia	12.2	China	14
USA (OECD)	12.1	Japan (OECD)	4.7	UAE (GCC, OPEC)	6.5	India	9.5
China	5	India	4.3	Iraq (OPEC)	6.1	Japan (OECD)	8.9
Canada (OECD)	5	Russia	3.5	Nigeria (OPEC)	5.6	Korea (OECD)	6.2
Iran (OPEC)	4	Saudi Arabia (GCC, OPEC)	3.4	Kuwait (OPEC)	5.3	Germany (OECD)	4.6
Iraq (OPEC)	3.8	Brazil	3.4	Canada (OECD)	5.2	Italy (OECD)	3.3
Kuwait (GCC, OPEC)	3.8	South Korea (OECD)	2.6	Venezuela (OPEC)	5.1	Spain (OECD)	3.0
UAE (GCC, OPEC)	3.7	Germany (OECD)	2.6	Angola (OPEC)	4.4	France (OECD)	2.8
Venezuela (OPEC)	3.6	Canada (OECD)	2.4	Mexico (OECD)	3.2	Netherlands (OECD)	2.7
Others	33.5	Others	40.8	Others	26.9	Others	25.4
World	100	World	100	World	100	World	100

Source: 2015 Key World Energy Statistics; IEA, * 2014 data, **2013 data***BP Statistics, 2015

2.6 PRODUCERS, CONSUMERS, NET EXPORTERS AND NET IMPORTERS OF NATURAL GAS

The data related to natural gas production, consumption, import and export are given in

Table **2**. According to the results; the amount of total production of the first three natural gas producing countries is more than 40 percent of world natural gas production distributed as follows; USA 20.7%, Russia 18.3% and Iran 4.8%. The total consumption of the first three natural gas consuming countries is more than 40 percent of world natural gas consumption, comprising; USA 22.7%, Russia 12.0% and China 5.4%. The total net export amount of the first three natural gas exporting countries is more than 40 percent of world natural gas exports as follows; Russia 21.4%, Qatar 14.2% and Norway 12.8%. The total net import amount of the first three natural gas importing countries is more than 30 percent of world natural gas imports, comprising; Japan %15.7, Germany 8.3% and Italy 6.9%.

The results show that most of the natural gas producing and exporting countries are OPEC members; while most of the natural gas consuming and importing countries are members of OECD. The results also reveal various aspects; USA and Russia are the two countries that mostly produce and consume natural gas; Russia exports the most natural gas. On the other hand; while USA is not in the export list of first 10 world countries it ranks eighth in the import list. Thus; Russia is produces more than it consumes, and the USA consumes more than it produces.

Table 2 Producers, Consumers Net Exporters and Net Importers of Natural Gas

Producers*	**%**	**Consumers*****	**%**	**Net Exporters***	**%**	**Net Importers***	**%**
USA (OECD)	20.7	USA (OECD)	22.7	Russia	21.4	Japan (OECD)	15.7
Russia	18.3	Russia	12.0	Qatar (GCC, OPEC)	14.2	Germany (OECD)	8.3
Iran (OPEC)	4.8	China	5.4	Norway (OECD)	12.8	Italy (OECD)	6.9
Canada (OECD)	4.6	Iran (OPEC)	5.0	Turkmenistan	6.8	China	6.1
Qatar (GCC, OPEC)	4.5	Japan (OECD)	3.3	Canada (OECD)	6.7	Korea (OECD)	6.0
China	3.7	Saudi Arabia (GCC, OPEC)	3.2	Algeria (OPEC)	5.4	Turkey (OECD)	5.9
Norway (OECD)	3.2	Canada (OECD)	3.1	Indonesia (OPEC)	4.1	France (OECD)	4.7
Turkmenistan	2.5	Mexico (OECD)	2.5	Netherlands (OECD)	3.6	USA (OECD)	4.0
Saudi Arabia (GCC, OPEC)	2.4	Germany (OECD)	2.1	Nigeria (OPEC)	3.0	UK (OECD)	3.9
Algeria (OPEC)	2.3	UAE (GCC, OPEC)	2.0	Australia (OECD)	3.0	Spain (OECD)	3.4
Others	33.0	Others	60.3	Others	19.0	Others	35.0
World	100	World	100	World	100	World	100

Source: 2015 Key World Energy Statistics; IEA, * 2014 data, ***BP Statistics, 2015

CHAPTER III

3 THEORETICAL BACKGROUND OF THE FACTORS AFFECTING THE ENERGY MARKETS

The relationship between energy markets and financial variables is one of the issues that have attracted many researchers. Initially, most of the studies focused on developed countries. However, with the shocks in oil prices starting to affect the entire world, the numbers of countries that have been examined have also increased. In this section first the assumptions of classical, neo-classical and ecological growth models and the empirical literature between energy and economic growth will be examined. Secondly, the relationship between energy markets and financial variables will be introduced followed by a discussion of the theory behind empirical studies on the basis of relevant variables. In the last section, the theoretical relationship between financial development and economic growth will be explained, and then a review of the relevant studies in literature will be presented.

3.1 THEORETICAL APPROACHES TO THE RELATIONSHIP BETWEEN ENERGY AND ECONOMIC GROWTH

Economic growth is defined as the quantity of goods and services produced in a particular period within a particular economy. The relationship between energy and economic growth has an important place in the economic literature. The common belief presented in the literature is that energy affects economic growth through domestic production growth, total factor productivity, resource allocation and employment opportunities through the impact of factors such as the substitution-complementarity relationship between energy and capital, developments in technology and the changes in energy input-output combination (Yapraklı, 2013).

3.1.1 Classical Growth Model

The classical, neo-classical and ecological growth models are the three basic approaches that explain the relationship between energy and economic growth. From 1776 to 1843 the work of Adam Smith, Thomas R. Malthus and David Ricardo focused on the theory of economic growth. Dominant in this historical period, energy is not addressed as a factor of production; rather the main source of economic activities is the land (nature) and as nature is a limited resource the economic activities are also limited. In other words, energy is not directly considered as a factor of production, instead it is taken into consideration as an intermediate good. In this context, the classical economists divide economy into two main sectors; agriculture and industry. According to these classicists, while land is cultivated with labor in the agriculture sector, it does not have any importance in the industrial sector. In addition, the classical economists argue that the amount of land is fixed, but can vary in quality, and this fixed amount of land leads to diminishing returns of labor and capital in the agriculture sector. This declining productivity indicates the limitations that land put on the economy. Classical economists believe that it is possible to obtain natural resources through different forms of energy like light, heat, electricity, plant life, wind, elasticity, gravitation (Alam, 2006).

3.1.2 Neo-Classical Growth Model

Neo-classical approach that appeared in the late nineteenth century associates economic growth with human capital, labor and foreign technology. The energy and economic growth relationship is ignored while treating energy indirectly; as a raw material or intermediate good. This is mainly because in the neo-classical approach land is not considered as a factor of production due to the limited land supply. In other words, neo-classical economists ignore the relationship between land and economy (Alam, 2006).

This approach treats the economy as a closed system where goods are produced with inputs of capital and labor and then the products are delivered to the customers and companies. To create economic growth the inputs of human capital or labor should be increased. In addition, improvements in terms of technological developments and the quality of inputs of human capital or labor provide support for economic growth. In the neo-classical approach, the impact of natural resources on economic growth divided into the two distinct groups of renewable and non-renewable is also taken into consideration and these resources are allocated (Ockwell, 2008).

The neo-classical growth model has been categorized under three mainstream models. The first is the Solow (1956) in which, growth is the transition stage that moves a country towards stability. An underdeveloped country with low capital per worker can generate capital accumulation while at the same time exhibiting rapid growth. In contrast, if saving rate remains constant, the economy will reach the point of equilibrium over time when the growth rate is zero. It is not possible in either example to obtain infinite growth by only generating capital accumulation. If saving rates increase, even though growth will occur for some time until a new equilibrium is reached, higher saving rates will lead to lower living standards. According to the neo-classical growth theory, sustainable economic growth can be achieved only through technological developments (Stern & Cleveland, 2004). Neo-classicists believe that all the economies will grow until a certain point of equilibrium at which it is impossible to make additional investments. For any growth beyond the equilibrium point, to achieve ongoing economic growth, it is essential to have technological development. It is only possible to increase existing capital returns with the advances in technology (Ockwell, 2008; Solow, 1956).

The second model focuses on the role of natural capital consumption in ensuring sustainable economic growth. In other words, natural resources are treated as a source of growth. According to this model, although there is an abundance amount of resources such as sunlight or hydrogen, the amounts of all natural resources are limited furthermore, some environmental resources are non-renewable. This situation leads to the problem of sustainable economic growth and development. This means there will be a positive impact on sustainable economic growth in the situation where there are multiple inputs such as capital and natural resources, the dependence on a single input will lead to the opposite of this situation. In the neo-classical literature, the main focus of economic growth is to determine in which circumstances there will be sustainable economic growth. Sustainable economic growth; in other words, non-declining consumption is determined according to technical and institutional conditions. While technical conditions contain a mix of renewable and non-renewable resources, the initial donations of capital and natural resources and the convenience of substitution among inputs, institutional conditions contain the market structure, property rights system and systems for the welfare of future generations. When natural resources are depleted, in terms of production they will be replaced with their substitutes or equivalents of fake capital. While the neo-classics are interested with institutional arrangements that provide sustainable economic growth, they neglect the technical arrangements. The reason for this is that they assume that sustainable growth is technically possible (Stern & Cleveland, 2004).

In the final growth model, natural resources as well as technological changes are addressed in terms of ensuring economic growth. According to this model, in addition to the substitution of capital for resources, technological development can also provide economic growth or at least a level of constant consumption in the case of limited resources. In this model, while the increase of the total factor productivity technically makes economic sustainability easier, sustainability can be possible even with an elasticity of substitution that is less than one. However, this does not mean that there will be sustainability because of technical feasibility (Smulders, 2004; Stern & Cleveland, 2004).

For the three traditional economic growth models described above, the contribution of energy to economic activities is only taken into account in relation to the cost of production. From the economic perspective, these models consider energy as an "intermediate good" in production instead of an "essential input". In this context, separating economic growth arising from energy use is an acceptable probability (Ockwell, 2008).

3.1.3 Ecological Growth Model

One of the first scientists to criticize that energy was ignored in economic theory was N. Georgescu-Roegen (1976). In his fund-flow model he showed that there are two aspects of the production process; the flow of materials, energy and information (material cause) is transformed by human labor and manufactured capital (the efficient cause) in his fund-flow model (Stern & Cleveland; 2004). Georgescu-Rogen believes that the damage to the environment caused by the increase in output is ignored, and this situation destroys energy resources as they are non-reproducible.

Ecological economists criticize the neo-classical view as failing to ground economic activities by not considering the physical reality. They believe that considering economy as an open subsystem of the global ecosystem is a more realistic view. Figure 6 shows the process of the ecological and neo-classical approaches in which the neo-classical system is considered as a subsystem within the ecological system. Ecological economists criticize the neo-classical model for failing to include natural resources and waste products. Within the context of the ecological model, energy and raw materials are used and thrown out as waste heat and degraded materials in the neo-classical model. Degraded materials are reused in the system after recycling, but this is not valid for energy for which reuse is not possible. The ecological model, alternatively named the biophysical model treats energy as a factor of production which cannot be reproduced.

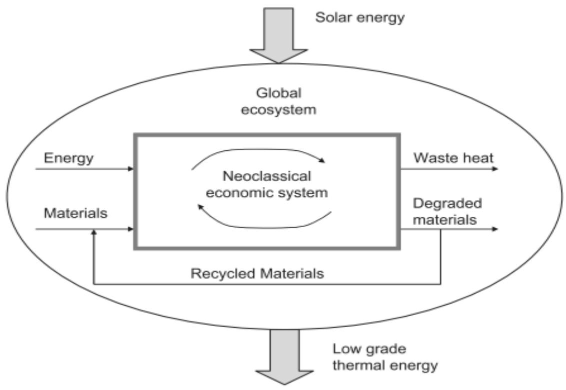

Figure 6 The Process of the Ecological and Neo-Classical Approaches

Source: Ockwell, 2008

Reproducibility is one of the key concepts in the economics of production. In the production process some inputs are non-reproducible, and others are reproducible in return for certain costs. Capital, labor and in the long-term natural resources are considered as reproducible factors of production, while energy is not (Stern, 1999). In this context, the role and existence of energy in economics of production are subject to discussion by many scientists and ecological economists.

In the context of the law of thermodynamics, the first law, energy and mass conservation, states that in any conversion process the energy input and output should be equal (Ayres; 1998). To obtain a particular level of output, greater or equal amounts of matter should be used as the input, and the remainder should be considered as waste matter. For this reason, in a particular production process that produces tangible output, there should be a minimal input requirement. The second law of thermodynamics, concerning efficiency, states that a minimum quantity of matter is needed for its transformation. Each production process contains the transformation or movement of matter. Although the substitution of certain elements and chemicals is possible, some form of matter should be moved or transformed and therefore, energy is needed. All economic processes need energy; as a result energy is a crucial part of the factor of production (Stern 1997; Stern & Cleveland, 2004). According to the second law of thermodynamics, also called as entropy law, additional energy is needed to transform one type of matter into other matter. This implies limits to the substitution of energy by other inputs in the production process (Ockwell, 2008).

It is considered by some that like energy, information is also considered as a non-producible factor of production (Chen, 1994; Spreng, 1993; Ruth, 1995; Stern, 1994). According to these authors, energy is necessary in order to obtain knowledge. Even non-intelligent living organisms need information to use energy. Despite measuring capital and labor is easier compared to information, when compared with energy information and knowledge cannot be easily measured (Stern, 1999).

According to the biophysical model of economy, energy is the only primary factor of production, while capital and labor are embodied energy. The prices of commodities should be determined depending on the cost of the use of the embodied energy associated with the commodities (Hannon, 1973). If there is an increase in the cost of embodied energy, the prices of commodities will increase. According to this approach, the distribution of the surplus of production depends on capital, labor and the bargaining power of different social classes such as property owners (Kaufmann, 1987).

3.2 EMPIRICAL LITERATURE ON THE CAUSAL RELATIONSHIP BETWEEN ENERGY CONSUMPTION AND ECONOMIC GROWTH

Kraft and Kraft (1978) presented the first study of the causal relationship between energy consumption and economic growth for the period from 1947 to 1974 in the USA. They used Sims technique and showed that there is a unidirectional causality running from GDP to energy consumption. This causal relationship between energy consumption and economic growth is categorized under four hypotheses (Apergis & Payne, 2010b; Apergis & Payne, 2010c; Payne, 2010; Squalli, 2007). The first one is the growth hypothesis argues that energy consumption has a significant impact on economic growth. In such a situation, policies applied to reduce energy consumption are likely to have a negative effect on economic growth. The second hypothesis concerns conservation stating that there is a uni-directional causal relationship from economic growth to energy consumption. Under this hypothesis, conservation policies applied to decrease energy consumption are not expected to have a negative effect on economic growth. The feedback hypothesis emphasizes the bi-directional causal relationship between energy consumption and economic growth; that there is an interdependent relationship. In such a situation, conservation policies implemented to reduce energy consumption may affect economic growth. On the other hand, the fourth hypothesis focuses on neutrality which implies that there is a non-causal relationship between energy consumption and economic growth meaning that energy consumption is a small part of economic growth, and therefore cannot significantly affect it. Thus conservation policies aiming to reduce energy consumption will not impact on economic growth.

The literature concerning the relation between energy consumption and economic growth is extensive with various studies been undertaken in different countries, within a range of time periods, utilizing proxy variables using diverse econometric methodologies (Table 3).

Table 3 Summary of Empirical Studies on the Causal relationship between Energy Consumption and Economic Growth

Authors	Period	Country	Methodology	Causality Relationship	Supported Hypothesis
Al-Iriani (2006)	1971-2002	6 GCC countries	Panel cointegration, Granger causality	GDP→EC	Conservation
Apergis and Payne (2009)	1980-2004	Central America	Panel cointegration, Granger causality based on VECM	EC→GDP	Growth
Apergis and Payne (2010a)	1985-2005	20 OECD countries	Panel cointegration, Granger causality based on VECM	REC↔GDP	Feedback
Apergis and Payne (2010b)	1992-2007	13 Eurasia countries	Panel cointegration, Granger causality based on VECM	REC↔GDP	Feedback
Apergis and Payne (2010c)	1992-2005	67 countries	Panel cointegration, Granger causality	NGC↔GDP	Feedback
Behmiri and Manso (2014)	1985-2011	23 Sub-Saharan Africa countries	Granger causality	OC↔GDP (oil importing region) OC→GDP (oil exporting region)	Feedback (oil importing region) Growth (oil exporting region)
Dergiades et al. (2013)	1960-2008	Greece	Standard and non-linear Granger causality	EC→GDP	Growth
Eggoh et al. (2011)	1970-2006	21 African countries	Panel causality	EC↔GDP	Feedback
Erdal et al. (2008)	1970-2006	Turkey	Cointegration, Pair-wise Granger causality	EC↔GDP	Feedback
Fatai et al. (2004)	1960-1999	Australia, India, Indonesia, New Zealand, Philippines, Thailand	Granger causality, TY, ARDL	GDP→EC (New Zealand, Australia) EC→Income (India, Indonesia) EC↔GDP (Thailand, Philippines)	Conservation, Growth, Feedback
Heidari et al. (2013)	1972-2007	Iran	ARDL	NGC→GDP	Growth

Kraft and Kraft (1978)	1947-1974	USA	Sims technique	GDP→EC	Conservation
Kula (2014)	1980-2008	19 OECD countries	Panel cointegration, Granger causality	GDP→RELC	Conservation
Lee (2005)	1975-2001	18 Developing countries	Panel cointegration, Granger causality	EC→ GDP	Growth
Lee and Chang (2007)	1965-2002	22 developed, 18 developing countries	Panel VAR, GMM	GDP→EC (developing countries) EC↔GDP (developed countries)	Conservation (developing countries) Feedback (developed countries)
Lee et al. (2008)	1960-2001	22 OECD countries	Panel cointegration, Granger causality based on VECM	EC↔GDP	Feedback
Llind and Wesseh (2014)	1971-2010	South Africa	Cointegration, bootstrap causality	EC →GDP	Growth
Masih and Masih (1996)	1955-1991	6 Asian economies	Cointegration, Sims technique and Granger causality based on VECM	EC →GDP (India) GDP →EC (Indonesia) EC↔GDP (Pakistan) EC≠GDP (Malaysia, Philippines, Singapore)	Growth (India) Conservation (Indonesia) Feedback (Pakistan) Neutrality (Malaysia, Philippines, Singapore)
Mehrara (2007)	1971-2002	11 oil exporting countries	Panel cointegration, causality	GDP→EC	Conservation
Mulali (2011)	1980-2009	Middle East, North African countries	Cointegration, Granger causality based on VECM	OC↔GDP	Feedback
Ozturk and Al-Mulali (2015)	1980-2012	GCC countries	Panel Granger causality	NGC↔GDP	Feedback
Payne (2009)	1949-2006	USA	TY, Granger causality	EC≠GDP	Neutrality

Pirlogea and Cicea (2012)	1990-2010	Spain, Romania, EU-27	Cointegration, Granger causality	EC→GDP (Spain; petroleum products and natural gas) NGC→GDP (Romania) EC≠GDP (EU-27)	Growth (Spain, Romania) Neutrality (EU-27)
Soytas et al. (2001)	1960-1995	Turkey	Panel cointegration, Granger causality	EC→GDP	Growth
Squalli (2007)	1980-2003	11 OPEC countries	TY	GDP→ELC (Algeria, Iraq and Libya) ELC↔GDP (Iran, Qatar, Venezuela)	Conservation (Algeria, Iraq and Libya) Feedback (Iran, Qatar, Venezuela)
Yang (2000)	1954-1997	Taiwan	Cointegration, Granger causality	EC↔GDP GDP→OC NGC→GDP	Feedback, Conservation, Growth
Yildirim et al. (2012)	1949-2010	USA	TY, Bootstrap corrected causality	REC≠GDP	Neutrality
Yıldırım et al. (2014)	1971-2010	Bangladesh, Egypt, Indonesia, Iran, Korea, Mexico, Pakistan, Philippines, Turkey	Bootstrapped autoregressive metric causality approach	EC→GDP (Turkey) EC≠GDP (Bangladesh, Egypt, Indonesia, Iran, Korea, Mexico, Pakistan, Philippines)	Growth (Turkey) Neutrality (Bangladesh, Egypt, Indonesia, Iran, Korea, Mexico, Pakistan, Philippines)
Wandji (2013)	1971-2009	Cameroon	Cointegration and Granger causality	EC→GDP	Growth

Notes: EC→GDP refers to the uni-directional causality running from energy consumption to economic growth. GDP→EC refers to the uni-directional causality running from economic growth to energy consumption. EC↔GDP refers to the bidirectional causality between energy consumption and economic growth. EC≠GDP refers no causality between energy consumption and economic growth. EC=total energy consumption, ELC= electricity consumption, GDP=economic growth, OC=oil consumption, NGC=natural gas consumption, VAR=vector autoregressive model, ECM=error correction model, ARDL=autoregressive distributed lag, GMM= generalized method of moments, REC=renewable energy consumption, RELC=renewable electricity consumption, TY=Toda-Yamamoto and VECM= vector error correction model

Examples of the studies that support the growth hypothesis in which the causality runs from energy consumption to economic growth by using Johansen cointegration and Granger causality tests are as follows; Soytas, Sari, and Ozdemir (2001) under took research in Turkey covering the 1960-1995 period; Lee (2005) analyzed 18 developing countries from 1975 to 2001; Apergis and Payne (2009) investigated Central American countries over the period from 1980 to 2004; Dergiades, Martinopoulos, and Tsoulfidis (2013) examined the situation in Greece from 1960 to 2008; Wandji (2013) investigated the growth hypothesis in relation to Cameroon from 1971 to 2009; Lin and Wesseh (2014) analyzed South Africa countries from 1971 to 2010. Moreover; Heidari, Katircioglu, and Saeidpour (2013) examined the relationship between natural gas consumption and GDP in Iran using ARDL method covering the period from 1972 to 2007.

In terms of the studies supporting the conservation hypothesis in which the direction of causality runs from economic development to energy consumption the following examples of research were found in the literature. Kraft and Kraft (1978) used Sims technique and the USA data set covering the period from 1947 to 1974; Al-Iriani (2006) analyzed six GCC countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE) using panel cointegration and Granger causality methods from 1971 to 2002; Mehrara (2007) examined 11 oil exporting countries (Iran, Kuwait, UAE, Saudi Arabia, Bahrain, Oman, Algeria, Nigeria, Mexico, Ecuador and Venezuela) using panel cointegration and causality methods for the period from 1971 to 2002 and Kula (2014) explored the relationship between renewable electricity consumption and GDP for OECD countries with the 1980-2008 period by using panel cointegration and Granger causality methods.

Feedback hypothesis in which there is a bi-directional causality between energy consumption and economic development is supported by many studies. Erdal, Erdal and Esengün (2008) analyzed Turkey from 1970 to 2006 using cointegration and Pair-wise Granger causality techniques; Lee, Chang, and Chen (2008) investigated 22 OECD countries for the 1960-2001 period using panel cointegration and Granger causality based on VECM; Apergis and Payne (2010a; 2010b) examined the causal relationships between renewable energy consumption and economic growth for 20 countries covering the 1985-2005 period, and for 13 Eurasia countries over the 1992-2007 period; and Apergis and Payne (2010c) analyzed the causal relationship between natural gas consumption and GDP in 67 countries within the period of 1992-2005 using panel cointegration and Granger causality techniques; Eggoh, Bangaké, and Rault (2011) investigated 21 African counties from 1970 to 2006 dividing their sample into the net exporting and net importing countries. Moreover; Mulali (2011) examined the effect of oil consumption on economic growth for the Middle East and North African counties during the 1980-2009 period applying cointegration and Granger causality based on VECM; whereas Ozturk and Al-Mulali (2015) studied the relationship between natural gas consumption and the GDP of GCC countries for the period 1980-2012 using panel Granger methods.

There are also studies that support the neutrality hypothesis in which there is no causality between energy consumption and economic growth. Masih and Masih (1996) analyzed 6 Asian countries using Johansen cointegration, Sims technique and Granger causality based on VECM. The research covered the 1995-1991 periods in India, Pakistan, Malaysia and the Philippines and for Indonesia and Singapore, they used the time period of 1960-1990. According to the results of their study, neutrality hypothesis is supported by Malaysia, Singapore and the Philippines. For the USA, Payne (2009) investigated the periods from 1949 to 2006 using the Toda-Yamamoto Granger causality technique; whereas Yildirim, Saraç, and Aslan (2012) also examining the USA selected the 1949-2010 period and the bootstrap-corrected causality technique to their study. Using cointegration and Granger causality techniques; Pirlogea and Cicea (2012) investigated Spain, Romania and EU-27 countries over the period from 1990 to 2010. Their results showed that there is no causal relationship between energy consumption and economic development in EU-27 countries; whereas Yıldırım et al. (2014) investigate Next 11 countries using the time periods of 1971-2010 for Bangladesh, Egypt, Indonesia, Pakistan and Philippines, 1971-2007 for Iran, 1971-2011 for Korea and Mexico and 1960-2011 for Turkey. According to their results, the neutrality hypothesis is supported except in the case of Turkey.

The literature also contains studies that support different hypotheses for various countries. Yang (2000) investigated the causal relationship between economic growth and total energy consumption as well as coal, oil, natural gas and electricity by considering 1954-1997 period for Taiwan. Cointegration and Granger causality tests were applied in the study and identified a bi-directional causality between energy consumption and GDP, a uni-directional causality from GDP to oil consumption and from natural gas consumption to GDP. Fatai, Oxley and Scrimgeour (2004) examined the possible impacts of energy conservation policies on the economies of Australia, India, Indonesia, New Zealand, the

Philippines and Thailand. Covering the 1960-1999 period, Granger causality, TY and ARDL methods are applied to analyze the causal relationship between energy consumption and GDP. Findings from New Zealand show that there is a uni-directional causality from the real GDP to the industrial, commercial and total energy consumption. Similar findings have also been confirmed for Australia. In addition, there is a uni-directional causality from energy consumption to income for India and Indonesia while there is a bi-directional causality for Thailand and the Philippines. According to the authors, energy conservation policies may not significantly affect real GDP in industrialized countries such as New Zealand and Australia compared to developing Asian countries. Lee and Chang (2007) analyzed the causal relationship between energy consumption and GDP using panel VARs and GMM techniques. The researchers divide their sample into two groups of 22 developed and 18 developing countries using the time span 1965-2002 for the former countries and 1971-2002 for latter group. The results imply that there is a uni--directional causality from GDP to energy consumption for developing countries, while a bi-directional causality exists between the relevant variables for developed countries. Squalli (2007) examined the relationship between electricity consumption and economic growth for OPEC countries using the TY method. For the 1980-2003 period, there were different results for the countries; a uni-directional causality from GDP to electricity consumption for Algeria, Iraq and Libya; while there was a bi-directional causality for Iran, Qatar and Venezuela. The causal relationship between crude oil consumption and GDP for 23 Sub-Saharan Africa countries for the 1985-2011 period was analyzed by Behmiri and Manso (2014). Their findings in relation to the Granger causality tests showed that in the short-term, there is a bi-directional causality between crude oil consumption and GDP for the oil importing region, while there is a uni-directional causality from crude oil consumption to GDP for the oil exporting region. In the long-term there is a bi-directional causality between the relevant variables for both regions.

3.3 THEORETICAL APPROACHES TOWARDS ENERGY MARKETS AND THE FINANCIAL/ ECONOMIC VARIABLES

The sharp increases in oil prices have significant impact on both economic activities and macroeconomic policies. The rises in cost that occur in world oil markets create concerns about a possible slowdown that might happen in many developed countries. In this regard, the channels through which oil price shocks affect economic variables have been the subject of numerous studies.

Many economists have offered theoretical explanations for the inverse relationship between the changes in oil prices and the degree of economic activities. First, is the supply-side effect that states that rising oil prices reduce the input for production hence the potential output. Accordingly, while there is an increase in production costs, there is a slowdown in the growth of both productivity and output. The slowdown in productivity has a negative effect on real wages and employment. As high energy costs reduce the profitability of companies, the desire to purchase new capital goods will also decrease; however, if the energy price increases seem to be permanent, in order to balance the decline in capital spending firms might decide to invest more into the energy-efficient capital. As a result, in long term high energy costs may encourage firms to decrease their new capital investments or cause the existing capital stocks to become obsolescent economically and technically. For that reason, there might be a decline in the production capacity of industrialized countries. Additionally, if consumers expect a temporary rise in energy prices, their preferences will be to save less or borrow more which may result a decline in real balances and an increase in future price levels (Cologni & Manera, 2008; Kumar, 2005).

The second channel through which oil price shocks affect economic activities, also known as the demand-side effect, is the wealth transfer from oil importing countries to oil exporting countries since the decline in purchasing power of firms and households in oil importing countries is higher than the increase of oil exporting countries. Rising oil prices can be considered as a tax gain for the oil exporting countries from the oil importing countries. An increase in oil prices weakens the trade conditions of oil importing countries. In the long-term although some part of the decline in domestic demand is offset by the export demand of income transfer from foreign buyers, there would be a negative impact on consumer demand of oil exporting countries. On the other hand, consumers might be unwilling to cut non-energy spending below their accustomed level so they may try to reduce savings instead of spending (Cologni & Manera, 2008; Kumar, 2005).

The third channel concerns the real balance effect. Higher crude oil prices are followed by an increase in the oil products used by consumers; such as gasoline and heating oil. Moreover, in the process of substituting oil with other energy products, the prices of related products might also increase. As well as this direct effect on inflation, there might be an indirect effect caused by the behavioral responses of firms and employees (the second round effects). The increase in oil prices not only causes a slowdown in the economy, but also raises the level of inflation which is followed by increases in the price-wage loop. The increased production costs might result in higher consumer prices for non-energy goods or services which can also lead to an increase in living costs and higher wage demands. In such a case, the decline in the real monetary balance might be expected to have negative impacts on household wealth and hence on the level of consumption and output. Moreover, as long as the customers tend to rebalance their portfolios towards liquidity, a liquidity preference effect will occur. However, if monetary policies fail to meet the growing demand by increasing the money supply and there will be a decrease in real balances thus, interest rates will raise (Cologni & Manera, 2008).

Finally, the monetary policy channel, states that higher oil prices will have negative effects on consumption, investment and stock prices. Consumption will be influenced due to the increase in firm costs and its positive relationship with disposable income and investments. Lasting increases in oil prices might create a change in production structure and affect the level of unemployment. Moreover, increases in oil prices may reduce the profitability of energy-intensive industries, and therefore may encourage firms to adopt new production methods which require lower levels of oil inputs. Given capital and labor inflexibility, the change in oil prices brings about changes in the cost of relevant goods and services thus, demand will change and unemployment will increase in the sectors that are mostly affected by this situation. Additionally, besides the increased price of oil, the volatility of these prices will lead to uncertainty in the market reducing wealth and investments (Kumar, 2005).

The theoretical relationship between liquidity and commodity prices indicates that there are various channels through which commodity prices are affected through the liquidity variable. Frankel 1984; Ratti and Vespignani, 2014 stated that an increase in the money stock will affect commodity prices in the short term. This may be attributed to the inflexibility of many other commodity prices in the short-term and the condition that interest rates will be affected. Frankel (1986) stated in his latter study; after a decline in the money supply level when the prices of other goods are sticky, real agricultural commodity prices will decrease and the real interest rate will increase. Theoretically, an increase in M2 level, the liquidity indicator, tends to be associated with an increase in asset prices as well as an increase in aggregate demand that increases the prices of many assets. Monetary policies affect commodity prices through higher growth expectations and inflation. Moreover, lower interest rates may encourage investors to invest in assets such as oil (Alquist & Kilian, 2010; Barsky & Kilian 2004; Ratti & Vespignani, 2014).

3.4 EMPIRICAL LITERATURE CONCERNING THE RELATIONSHIP BETWEEN ENERGY MARKETS AND FINANCIAL/ ECONOMIC VARIABLES

There is extensive literature concerning the relation between energy markets, the financial and economic variables, and liquidity. Different studies have been undertaken in various countries, over a range of time periods, and using selected proxy variables using a variety of econometric methodologies (Table 4 and Table 5). For example, Barsky and Kilian (2004) showed that many recessions after 1972 have been associated with high oil prices. According to Kilian (2008) after an increase of energy prices there was an economic disaster which reflects the unidirectional causality from higher energy prices to economic recessions, increased unemployment and potential inflation. Since high energy prices have an effect on macroeconomic activities, Hamilton (2008) questions the causes of this increase and introduces the following three main reasons for the high energy prices; low price elasticity of demand, increasing demand from industrialized economies such as China and the Middle East together with d the inability to increase global production level.

Table 4 Summary of Empirical Studies on the relationship between Energy Markets and Financial/Economic Variables

Authors	Period	Country	Methodology	Result
Acaravci et al. (2012)	1990-2008	15 European countries	Granger causality	There are long-term relationships between natural gas prices, industrial production and stock prices for Austria, Denmark, Finland, Germany and Luxembourg; while there is no relationship in the other ten of the EU-15 countries.
Ahmed et al. (2012)	1980-2010	USA	CGARCH, VAR	A one standard deviation shock to oil prices causes an increase in consumer prices index and commodity prices, while there is no evidence of any significant effect on industrial production.
Arshad and Bashir (2015)	2009-2013	Pakistan	Multi-factor model	Oil and natural gas prices, exchange rates and interest rates have negative impact on stock returns.
Basher and Sadorsky (2006)	1992-2005	21 emerging countries	Multi-factor model	Oil price shocks significantly affect stock market returns.
Burbidge and Harrison (1984)	1961-1982	Canada, Germany, Japan, UK and USA	VAR	There is a uni-directional causality from oil price shocks to macroeconomic variables (CPI, industrial production, interest rates, current account and hourly earnings in manufacturing sector).
Cuñado and Gracia (2003)	1960-1999	European countries	Cointegration, Granger	There is a uni-directional causality running from oil price changes to industrial production growth rates. Moreover, the increases in oil prices affect industrial production growth rates negatively; while the opposite result is not valid for the decreased oil prices.
Ewing and Thompson (2007)	1982-2005	USA	Band pass filter	While oil prices have a strong contemporaneously correlation with consumer price index, they have a negative correlation with unemployment cycles.
Guesmi and Fattoum (2014)	1990-2012	10 OECD	DCC	The author indicates that aggregate demand side oil price shocks such as global financial crisis or Chinese economic growth have greater impact on stock markets compared to supply-side shocks such as OPEC’s oil embargo.
Ferderer (1997)	1970-1990	USA	VAR	The deterioration in oil markets leads to sectorial shocks and uncertainty in the USA economy.

Iscan (2010)	2001-2009	Turkey	VAR	There is no causality between oil prices and stock market returns.
Katircioglu et al. (2015)	1980-2011	26 OECD countries.	Durbin-H panel cointegration	The changes in oil prices have negative impact on GDP, CPI and unemployment for most of the OECD countries.
Kumar (2005)	1975-2004	India	VAR	Oil prices shocks affect industrial production negatively.
Masih et al. (2011)	1985-2005	South Korea	VECM	Oil price movements significantly affect stock markets.
Miller and Ratti (2009)	1971-2008	6 OECD countries	VECM	There is a negative correlation between oil prices and stock market returns in the long-term.
Ng (2012)	1983-2009	Singapore	VECM	While a 1% increase in oil prices causes GDP to decrease by 0.45% in the long-term, in the short term it affects investments, aggregate output and inflation negatively
Papapetrou (2001)	1989-1999	Greece	VAR	Shocks in oil prices have an important impact on economic activity and employment furthermore; oil prices are the significant factors in the explanation of stock price movements.
Park and Ratti (2008)	1986-2005	USA, 13 European countries	VAR	Oil price movements significantly affect stock markets.
Sadorsky (1999)	1947-1996	USA	Multi-factor model	Volatility of oil prices significantly affects stock market returns.
Tang et al. (2010)	1998-2008	China	SVAR	While the rise in oil prices affects output and investments negatively, it has a positive effect on inflation and interest rate.
Wang et al. (2013)	1999-2011	Oil-improting and oil-exporting countries	SVAR	The uncertainty in oil supply negatively affects the stock market returns of both oil-importing and oil-exporting countries however, the effect of demand uncertainty is much greater on oil-exporting countries when compared to the oil-importing countries.
Yıldız and Karacaer-Ulusoy (2015)	2003-2013	Turkey	VAR	There is a significant relationship between oil prices and both the gross fixed capital formation and the interest rate.

Yilmaz (2013)	1995-2009	Turkey	ARDL, causality	There is a uni-directional causality running from stock prices to real GDP, from stock prices to natural gas prices and from GDP to real exchange rates.

Notes: ARDL= autoregressive distributed lag, CGARCH= component generalized autoregressive conditional heteroscedasticity, DCC= dynamic conditional correlations, SVAR= structural vector autoregressive model, VAR= vector autoregressive model, VECM= vector error correction model.

Table 5 Summary of Empirical Studies on the relationship between Energy Markets and Liquidity

Authors	Period	Country	Methodology	Result
Belke et al. (2010)	1984-2006	USA, the euro area, Japan, UK, Canada, South Korea, Australia, Switzerland, Sweden, Norway and Denmark	VAR	Global excess liquidity is an important determinant of asset and goods prices.
Kang et al. (2016)	1996-2014	China, USA	SVAR	The increase of China's liquidity increases the global oil and commodity prices and the USA inflation.
Ratti and Vespignani (2013a)	1997-2011	BRIC, G3	SVAR	The increase in oil prices raises the liquidity of Brazil and Russia while reducing the liquidity of China and India due to the different positions between countries such as commodity importers or exporters.
Ratti and Vespignani (2013b)	1996-2011	China, G3	SVAR	The cumulative impact of China's M2 variable on crude oil prices is statistically significant and higher when compared to G3 countries.
Ratti and Vespignani (2014)	1999-2012	BRIC, G3	SFAVEC	Positive shocks to BRIC M2 lead to increases in global industrial production.
Wu and Ni (2011)	1995-2005	USA	VAR	There is a bi-directional causality between oil price changes and consumer price changes, between M2 changes and interest rate changes and a uni-directional causality running from inflation to interest rate changes.

Notes: SFAVEC=structural factor-augmented error correction, SVAR=structural vector autoregressive model.

Burbidge and Harrison (1984) investigated the effect of oil prices on the economies of the USA, Japan, German, UK and Canada economies during the 1961-1982 period. The authors applied the VAR model and found that there is a uni-directional causality from oil price shocks to macroeconomic variables; including the consumer price index, total industrial production, short-term interest rates, current account and hourly earnings in the manufacturing sector. Ferderer (1997) examined the relationship between oil price volatility and the USA macroeconomic variables for the 1970-1990 period using cointegration and VAR model. The results imply that the deterioration in oil markets leads to sectorial shocks and uncertainty in the USA economy. Although tightening monetary policy after a rise in oil prices, can explain part of the correlation between output and oil prices, it cannot explain the asymmetry puzzle. Sadorksy (1999) analyzed the relationship between oil price shocks and the stock market returns of the USA during the 1947-1996 period using VAR model and stated that positive oil price shocks have a negative impact on stock returns, while stock return shocks have positive impact on interest rates and industrial production.

Papapetrou (2001) investigated the relationship among oil price shocks, the stock market, industrial production and employment in Greece over the period from 1989 to 1999. The author used the VAR model and found that shocks in oil prices have an important impact on economic activity and employment, furthermore, that oil prices are the significant factors that explain stock price movements. Cuñado and Gracia (2003) aimed to determine whether oil price shocks affect inflation and industrial production of European countries from 1960 to 1999. Using cointegration and Granger causality tests the authors indicated that there is a uni-directional causality running from oil price changes to industrial production growth rates. Moreover, the increases in oil prices affected industrial production growth rates negatively; while the opposite result is not valid for the decreased oil prices.

Kumar (2005) analyzed the effect of oil price shocks on Indian macroeconomic variables over the period from 1975 to 2004. This was the first study that investigated the impact of oil price shocks on the real economic activities of emerging markets. Using the VAR model, the author found that oil price shocks have a negative effect on industrial production. According to the results, a one hundred-percent increase in oil prices decreases industrial production by one percent. Basher and Sadorsky (2006) scrutinized 21 emerging countries over the period 1992-2005 using multi-factor model and stated that oil price shocks significantly affected stock market returns. Ewing and Thompson (2007) analyze the relationship between oil prices and industrial production, consumer prices, unemployment, and stock prices in the USA from 1982 to 2005 using a band pass filter method. The research showed that oil prices are sensitive to industrial production. When industrial companies increase (or decrease) production, oil prices increase (or decrease) this occurs following a lag of 1-2 months. Moreover, it was observed that while oil prices have a strong contemporaneous correlation with the consumer price index, they have a negative correlation with unemployment cycles.

Park and Ratti (2008) investigated the relationship between oil price shocks and the stock market returns of USA and 13 European countries using the VAR model for years from 1968 to 2005. The results show that oil price movements significantly affect stock market returns. Moreover, apart from the USA changes in oil prices decrease the stock market returns of many European countries contemporaneously. In Miller and Ratti's (2009) analysis of 6 OECD countries within the period from 1971 to 2008 using the VEC model and stated that there is a negative correlation between oil prices and the stock market return in the long-term.

Using the VAR method Iscan (2010) examined the relationship between oil prices and stock returns in Turkey over the period from 2001 to 2009. The author commented that there was no causality between oil prices and stock market returns for the country. Tang, Wu, and Zhang (2010) investigated the impact of oil price shocks on Chinese macroeconomic activities from 1998 to 2008 using the SVAR method. The results imply that while the rise in oil prices affects output and investments negatively, it has a positive effect on inflation and the interest rate. In South Korea Masih, Peters, and De Mello (2011) used the VEC model to investigate the relationship between oil price volatility and stock market price fluctuations for the 1985-2005 period. According to their results there is a long-term relationship between oil price volatility and stock returns, industrial production and interest rates. One of the main findings of this Korean study is that oil price movements significantly affect stock markets. Another finding is that oil price shocks have two negative effects on the firm profitability. First, the direct negative effect as oil price shocks increase the production costs of the firms. Second the indirect negative effect related to investors predicting the decrease of firm profitability from which they make decisions that affect stock market indexes. Acaravci, Ozturk, and Kandir (2012) were the first to undertake an analysis of the relationship between natural gas prices and stock prices using cointegration and Granger causality tests. They applied their research to 15 European countries for the period from 1990 to 2008. According to their results, there are long-term relationships between natural gas prices, industrial production and stock prices in Austria, Denmark, Finland, Germany and Luxembourg; however, no relationship was found for other ten EU-15 countries. It has been observed that at the beginning of the time period, natural gas prices affected the industrial production growth of relevant countries then afterwards industrial production growth seemed to affect stock returns. Ahmed, Bashar, and Wadud (2012) used the CGARCH and VAR models to investigate the impact of oil price uncertainty on USA industrial production. The authors selected the 1980-2010 period and determined that a one standard deviation shock to oil prices causes an increase in consumer price index and commodity prices however, they found no evidence of any significant effect on industrial production. In Singapore Ng (2012) analyzed the relationship between oil price volatility and macroeconomic activities of the country for the period from 1983 to 2009. According to the results from the VEC model, while a 1% increase in oil prices causes GDP to decrease by 0.45% in the long-term, in the short-term, it has a negative effect on investments, aggregate output and inflation.

Another study was conducted in Turkey by Yilmaz (2013) concerning the causal relationship between natural gas prices and stock index returns within the 1995-2009 period. In the study the ARDL and causality methods were applied and a uni-directional causality was revealed running from stock prices to real GDP, from stock prices to natural gas prices and from GDP to real exchange rates. Wang, Wu, and Yang (2013) adopted the SVAR model to investigate the link between oil price shocks and stock market activities from 1999 to 2011. The authors divided their data set into two groups; oil-importing and oil-exporting countries. According to the results, the effect of oil price shocks on stock market returns differed based on whether the country is oil-importing or oil-exporting and whether there is a demand shock or a supply shock. The uncertainty in oil supply affects both oil-importing and oil-exporting countries' stock market returns negatively, on the other hand the effect of demand uncertainty is much greater on oil-exporting countries when compared to oil-importing countries. It is possible that this could be due to the effect of the decreased business activities of oil-importing countries leading to a reduction in the demand of oil and thus, the oil prices, which in turn decreases revenues in the oil-exporting countries. In contrast, the increases in aggregate demand positively affect the stock returns of oil-exporting countries, while oil price changes have no significant effect on stock returns of oil-importing countries.

Guesmi and Fattoum (2014) investigated the relationship between the Brent oil index and stock markets for ten OECD countries during the period from 1990 to 2012 using the GARCH-DCC method. The authors found that the aggregate demand side oil price shocks such as a global financial crisis or Chinese economic growth had a greater impact on stock markets compared to supply-side shocks such as OPEC’s oil embargo. Arshad and Bashir (2015) analyzed the impact of both oil and natural gas prices on the stock returns of energy-intensive industries in Pakistan for the 2009-2013 period. They employed a multi-factor model and observed that oil and natural gas prices, exchange rates and interest rates have negative impacts on stock returns. Katircioglu, Sertoglu, Candemir, and Mercan (2015) examined the relationship between oil price changes and macroeconomic activities such as GDP, consumer price index and unemployment for 26 OECD countries. The study covered a period from 1980to 2011 in which the Durbin-H panel cointegration method was applied and revealed that changes in oil prices have negative impact on GDP, CPI and unemployment for most of the OECD countries. Yıldız and Karacaer-Ulusoy (2015) analyzed the relationship between oil price volatility and macroeconomic factors in Turkey through the period from 2003 to 2013 and utilizing the VAR model. The authors stated that there is a significant relationship between oil prices, and both gross fixed capital formation and the interest rate in the country.

3.5 EMPIRICAL LITERATURE ON THE RELATIONSHIP BETWEEN ENERGY MARKETS AND LIQUIDITY

Belke, Orth, and Setzer (2010) analyzed the relationship between liquidity and global assets and goods prices from 1984 to 2006 for the USA, the euro area, Japan, the UK, Canada, South Korea, Australia, Switzerland, Sweden, Norway and Denmark. The authors use M2 as a measure of liquidity for the USA using the VAR model and observed that global excess liquidity is an important determinant of asset and goods prices. Wu and Ni

(2011) examined the impact of oil prices on inflation, interest rates and money for the period between 1995 and 2005 for USA data. The results indicate that there is a bi-directional causality between oil price changes and consumer price changes, between M2 changes and interest rate changes and a uni-directional causality running from inflation to interest rate changes. Ratti and Vespignani (2013a) studied the impact of increases in the liquidity level of BRIC and G3 counties on crude oil prices. The authors choose real M2 as a measure of liquidity and analyzed the 1997-2011 period using cointegration and SVEC methods. The results show that due to the different positions between countries such as commodity importers or exporters, the increase in oil prices raised the liquidity of Brazil and Russia while reducing the liquidity of China and India. Ratti and Vespignani (2013b), investigated the relationship between liquidity and crude oil prices on the basis of the idea that the increase in global money supply is derived by the increase in China's money supply over the 1996-2011 period. In the study, the SVAR model is applied while M2 is used for the liquidity measure. According to the findings of the study, the cumulative impact of China's M2 variable on crude oil prices is statistically significant and higher when compared to the G3 countries. In this context, China's increasing liquidity led to an increase in oil prices for the relevant period. In another study by Ratti and Vespignani (2014) the relationship between commodity prices and liquidity of BRIC and G3 countries was examined by using the SFAVEC model. The study covers the 1999-2012 period and revealed that positive shocks applied to BRIC liquidity have larger effects than positive shocks in G3 countries on energy, mineral, metal and raw material prices. Moreover, positive shocks to BRIC measured by M2 showed increases in global industrial production. Kang, Ratti, and Vespignani (2016) studied the impact of liquidity shocks in China on economic activities in the USA covering the 1996-2014 period. M2 was used as a measure of liquidity both for China and the USA By applying the SVAR model it has been observed that the increase in China's liquidity increases global oil and commodity prices and the USA CPI inflation.

3.6 THEORETICAL APPROACHES TO THE RELATIONSHIP BETWEEN FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH

Schumpeter (1911) was the first researcher to state that financial intermediaries have a positive effect on economic growth. He emphasized that services provided by financial intermediaries such as mobilization of savings, evaluation of projects, risk management and facilitation of transactions are the most important factors for technological development and economic growth (King & Levine; 1993). On the other hand, Robinson (1952) stated that financial development follows economic growth and as a result it is important to obtain resources to strengthen economic growth. Gurley and Shaw (1955) demonstrated that economic development is generally discussed in terms of wealth, labor force, output and income; and the economic performance variations among countries resulting from the variation between their financial systems. In other words, one of the differences that separates developed countries from developing countries is the more powerful financial markets of the developed countries compared to the developing countries. However, Lucas (1988) commented that the relationship between finance and economic development has been exaggerated.

Greenwood and Jovanovic (1989) investigated the relationship between financial development, economic growth and distribution of income. According to the authors, as the income level rises, financial structure will become more comprehensive, economic growth will gain speed and the income inequality between rich and poor will be reduced. In their study, they applied two different production technology models; low-risk with low-income, and high-risk with high-income. The riskier technology reveals two distinct problems in the form of total and project-specific shocks. Financial intermediaries are able to identify project-specific and total shocks by managing their portfolios and observing problems that occur simultaneously with multiple projects. As a result, financial intermediaries distribute their resources to the projects that provide the highest return and in the absence of financial intermediaries; individuals cannot choose the correct technology to notice possible shocks. Moreover, as investors feel more secure with the existence of financial intermediaries they tend to share a large part of their savings with them (Kapusuzoglu, 2013).

Romer (1986), Lucas (1988) and Rebelo (1991) discussed two ways that financial functions can affect economic growth. First is capital accumulation which applies to growth models that use capital externalities or investment goods. The functions of financial systems affect stable growth through their effects on capital information. The second way is concerns the technological developments that affect capital accumulation by providing for the reallocation of savings between various technologies which generate capital or by changing the saving rates of financial systems. On the other hand, Diamond and Dybvig (1983) examined how economic growth is affected by financial markets and modelled the need for financial markets protect themselves from the risk of liquidity. According to their liquidity model, some investors are surprised by the results after investing in low-liquid but high-return projects or high-liquid but low-return projects. These investors would like to know when to obtain their savings before those low-liquid projects are completed (Kapusuzoglu, 2013).

Jacklin (as cited in Kapusuzoglu, 2013, p.316) argued that according to the information cost model, it is too costly to establish whether another investor is also surprised, and the assumptions of this model encourage the development of financial markets. Under these conditions, banks offer their investors liquid deposits and in order to meet the demand for the deposits they offer portfolios consisting of liquid but low-return investments, and illiquid and high-return investments. In this regard, by offering deposit accounts, the appropriate liquid and illiquid investments can be made to investors, the banks provide a guarantee against the risk of liquidity, and at the same time they provide long-term investments in high-return projects that encourage growth.

There are several studies on the relationship between financial development and economic growth however, there is no consensus on the scope of those relationships or direction of the causality. In this regard, four different hypotheses are introduced. The first hypothesis states that financial development is supply-leading, in which financial development supports economic growth by performing as a productive input. Schumpeter (1934), who offered important contributions to this perspective, stated that services provided by financial intermediaries encourage technical advances and economic growth. On the other hand, McKinnon (1973) and Shaw (1973) are the first researchers that underlined the needs of a bank system independent from the restrictions such as interest rate ceilings, high reserve requirements and directed credit programs. Although such policies are familiar all around the world, it is emphasized that they are especially common in developing countries. According to both authors, financial pressures affect both savings and investments negatively. On the other hand, liberalization of the financial system allows for financial development, while raising the competition in the financial sector that supports economic growth. Thus, according to the second hypothesis concerning demand-following, Robinson (1952) stated that financial development follows economic growth, which indicates that as an economy develops, the demand for financial services will increase and consequently there will be more financial founders, financial instruments and services in the market. Kuznets (1955) revealed a similar view in which with the expansion of the real side of the economy and reaching an intermediate stage of growth, the demand for financial services will start to increase, as a result this financial development will be dependent on economic development. The third hypothesis concerning feedback highlights the bi-directional causality between financial development and economic growth. Patrick (1966) was the first author to state that development of the financial sector is the result of economic growth, and this will result in as a factor of growth. Finally, the neutrality hypothesis indicates that there is no causal relationship between financial development and economic growth meaning that financial development does not cause economic growth nor does economic growth cause financial development. Lucas (1988) was the first to highlight that view support by Stern (1989) in the belief that economists concentrate too much on the role of financial factors in economic growth (Samargandi et al., 2014).

3.7 EMPIRICAL LITERATURE ON THE RELATIONSHIP BETWEEN FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH

The literature contains various studies that have used different methods to examine the relationship between financial development and economic growth for different countries (Examples of these studies are presented in Table 6).

Table 6 Summary of Empirical Studies on the relationship between Financial Development and Economic Growth

Authors	Period	Country	Methodology	Result	Supported Hypothesis
Abu-Bader and Abu-Qarn (2006)	1960-2004	5 MENA countries	Granger	FD≠GDP	Neutrality
Al-Malkawi et al. (2012)	1974-2008	UAE	ARDL method	FD↔GDP	Feedback
Al-Yousif (2002)	1970-1999	30 developing countries	Granger	FD↔GDP	Feedback
Ang and McKibbin (2007)	1960-2001	Malesia	Granger	GDP→FD	Demand-following
Bangake and Eggoh (2011)	1960-2004	71 developed and developing countries	Granger	FD↔GDP in long-term FD≠GDP for low and middle income countries in short-term GDP→FD for high income countries in short-term	Feedback in long-term Neutrality and Feedback in short-term
Calderón and Liu (2003)	1960-1994	109 developing and industrialized countries	Granger	FD↔GDP	Feedback
Caporale et al. (2005)	1979-1998	Chile, Malaysia, Korea and the Philippines	VAR, TY	FD→GDP	Supply-leading
Choe and Moosa (1999)	1970-1992	Korea	Granger	FD→GDP	Supply-leading
Christopoulos and Tsionas (2004)	1970-2000	10developing countries	Panel Granger	FD→GDP	Supply-leading
Demetriades and Hussein (1996)	1960-1990	16 countries	Granger	GDP→FD	Demand-following
Hayo (1999)	1960-1990	14 European countries, Canada, USA and Japan	Granger	FD≠GDP	Neutrality
Hsueh et al. (2013)	1980-2007	10 Asian countries	Panel Granger	FD→GDP	Supply-leading

Jung (1986)	1950-1981	37 developing and 19 developed countries	Granger	GDP→FD in developed countries FD→GDP in developing countries	Demand-following Supply-leading
King and Levine (1993)	1960-1989	80 countries	Least squares technique	FD↔GDP, PCA, ECD	Feedback
Luintel and Khan (1999)	36-41 years	10 developing countries	Granger	FD↔GDP	Feedback
Menyah et al. (2014)	1965-2008	21 African countries	Granger	FD≠GDP	Neutrality
Pradhan et al. (2015)	1988-2012	34 ECD countries	Granger	FD→GDP in long-term FD↔GDP in short-term	Supply-leading in long-term Feedback in short-term
Sinha and Macri (2001)	1950-1997	8 Asian countries	Granger	GDP→FD in Pakistan and the Philippines FD→GDP in Japan, Thailand and Korea FD↔GDP in India, Malesia	Demand-following Supply-leading Feedback
Thangavelu and Jiunn (2004)	1960-1999	Australia	VAR, Granger	FD→GDP	Supply-leading
Uddin et al. (2003)	1971-2011	Kenya	ARDL	FD→GDP	Supply-leading
Xu (2000)	1960-1993	41 countries	VAR	FD→GDP	Supply-leading
Zhang et al. (2012)	2001-2006	China	GMM	FD↔GDP	Feedback

Notes: FD→GDP refers to the uni-directional causality running from financial development to economic growth. GDP→FD refers to the uni-directional causality running from economic growth to financial development. FD↔GDP refers to the bidirectional causality between financial development and economic growth. FD≠GDP refers no causality between financial development and economic growth. FD=financial development, GDP=economic growth, ARDL=autoregressive distributed lag, GMM=generalized method of moments, TY=Toda-Yamamoto and VAR=Vector autoregressive model.

In the literature many studies support the supply-leading hypothesis, which indicates that the development of stock markets within a country that is, financial development encourages economic development. Jung (1986) investigates 56 countries covering the period from 1950 to 1981 using Granger causality test and found that in developing countries there is a uni-directional causality from financial development to economic growth; King and Levine (1993), based their work on the likely positive relationship between high levels of financial development economic growth for the 1960-1989 period in the context of 80 countries using the least squares method. The results of their analysis showed that there is a strong correlation between financial development and economic growth, physical capital accumulation and development in the efficiency of capital distribution. Choe and Moosa (1999) studied the relationship between financial system and economic growth of Korea from 1970 to 1992 using the Granger causality test; Xu (2000) analyzed 41 countries using the VAR test for the 1960-1993 period; Uddin, Sjö, and Shahbaz (2003) studied the causal relationship between financial development and economic growth of Kenya for the period 1971-2011 using ARDL method; Christopoulos and Tsionas (2004) used panel cointegration and causality methods covering the 1970-2000 period for 10 developing countries; Thangavelu and Jiunn (2004) analyzed Australia covering the 1960-1999 period using VAR and Granger techniques, Caporale, Howells, and Soliman (2005) investigated Chile, Malaysia, Korea and the Philippines for the period from 1979 to 1998 using VAR and Toda-Yamamoto methods; Hsueh, Hu, and Tu (2013) analyzed the causal relationship between financial development and economic growth of 10 Asian countries for the period 1980-2007 using panel Granger causality technique; while Sinha and Macri (2001) analyzed 8 Asian countries covering the 1950-1997 period and stated that there is a uni-directional causality from financial development to economic growth in Japan, Thailand and Korea. Pradhan, Arvin, and Normal (2015) investigated the relationship between insurance market development, financial development and economic growth of 34 OECD countries using Granger causality test for the period from 1988 to 2012. The authors stated that there is a uni-directional causality running from financial development to economic growth in the long-term.

The studies that supported the demand-following hypothesis, indicating that economic growth granger causes financial development are as follows; using Granger causality test Jung (1986) investigated 56 countries from 1950 to 1981 and found that in developed countries there is a uni-directional causality from economic growth to financial development; Demetriades and Hussein (1996) investigated whether financial development causes economic growth in 16 countries with a population exceeding 1 million over the period from 1960 to 1990; Hayo (1999) analyzes 14 European countries and Canada, USA and Japan covering the period of 1960-1990. Sinha and Macri (2001) investigated the 1950-1997 period for 8 Asian countries and found that economic growth Granger causes financial development in Pakistan and the Philippines. Abu-Bader and Abu-Qarn (2006) analyzed 5 MENA countries covering 1960-2004 period using Granger causality test and applying the support the neutrality hypothesis. Ang and McKibbin (2007) investigated the impact of financial development on economic growth considering the variables of real interest rate and financial pressure. The authors used cointegration and causality methods for Malaysia covering the period from 1960 to 2001. The results indicated that although the reforms implemented in financial sector improve the financial system, they do not have a long-term effect on economic growth. The study emphasized that the financial development of Malaysia is an outcome of economic growth and this supports the demand-following hypothesis in that economic growth provides financial development while the opposite situation is not valid.

There are also many studies that support the feedback hypothesis. For instance; using Granger causality analysis Luintel and Khan (1999) investigated 10 developing countries; Sinha and Macri (2001) investigated the 1950-1997 period for 8 Asian countries and found that there is a bi-directional causality between economic growth and financial development in Pakistan and the Philippines. Al-Yousif (2002) analyzed the relationship between financial development and economic growth covering 1970-1999 period for 30 developing countries; Calderón and Liu (2003) investigated the causal relationship between financial development and economic growth for 109 developing and industrialized countries covering the 1960-1994 period. Bangake and Eggoh (2011) analyzed the relevant causal relationship for 71 developed and developing countries covering the 1960-2004 period using Granger causality test. Their results show that in the long-term there is a bi-directional causality between financial development and economic growth, on the other hand in the short-term there is a uni-directional causality from economic growth to financial development for high income countries. Al-Malkawi, Marashdeh, and Abdullah (2012) investigated the relationship between financial development and economic growth for UAE using the ARDL method covering the 1974-2008 period; while Zhang, Wang, and Wang (2012) analyzed the 268 cities in China for the period between 2001 and 2006 using the GMM method. Pradhan et al. (2015) investigated the relationship between insurance market development, financial development and economic growth of 34 OECD countries using the Granger causality test for the period from 1988 to 2012 and stated that in the short-term there is a bi-directional causal relationship between the relevant variables. The authors offered proof that financial development leads to economic growth and economic growth leads to financial development.

The studies that support the neutrality hypothesis, which indicates that there is no causal relationship between economic growth and financial development are as follows; Bangake and Eggoh (2011) investigated 71 developed and developing countries covering the 1960-2004 period using Granger causality test and showed that in the short-term there is no causal relationship in low and middle income countries; Menyah, Nazlioglu, and Wolde-Rufael (2014) examined the relationship between financial development, trade openness and economic growth for 21 African countries using Granger causality test covering the 1965-2008 period and concluded that financial development and trade openness do not significantly granger cause economic growth.

CHAPTER IV

4 DATA SET AND METHODOLOGY

In this chapter, the data set and econometric methods will be briefly explained.

4.1 DATA SET

This section introduces the countries and the variables used in the analysis of the relationship among energy consumption, energy prices, the stock market index and the economic performance of 48 countries in the OECD, GCC and OPEC (see Table 7). The first hypothesis tested with the target data period is whether causality exists between the total of the global oil and natural gas, and the total energy consumption and the economic growth in the relevant countries. The second hypothesis tested concerned whether there was evidence of causality between the world energy prices (Brent, WTI, Dubai, HH, Japan and Russia) and the stock market, liquidity level and industrial production of these countries. Finally, the existence of causality between financial development and the economic growth of the related countries was tested.

Table 7 Countries that are used in the Study

OECD		
Australia	Hungary	Poland
Austria	Iceland	Portugal
Belgium	Ireland	Slovakia
Canada	Israel	Slovenia
Chile	Italy	Spain
Czech	Japan	Sweden
Denmark	Korea	Switzerland
Estonia	Luxembourg	Turkey
Finland	Mexico	UK
France	Netherlands	USA
Germany	New Zealand	
Greece	Norway	
GCC		
Bahrain	Oman	Saudi Arabia
Kuwait	Qatar	UAE
OPEC		
Algeria	Iraq	Qatar
Angola	Kuwait	Saudi Arabia
Ecuador	Libya	UAE
Iran	Nigeria	Venezuela

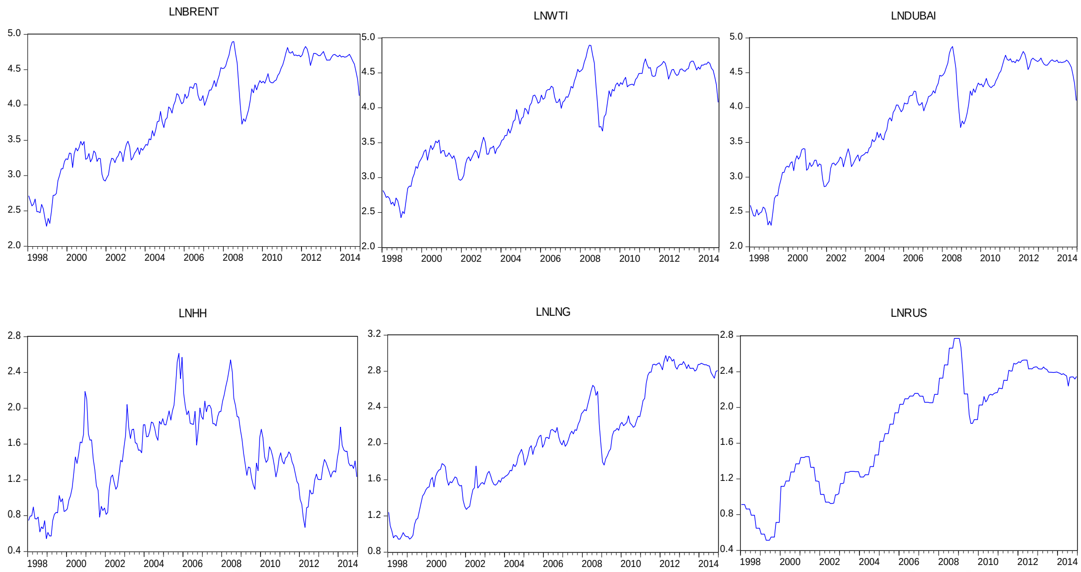

Figure 7 Graphs of Oil and Natural Gas Prices (Log Level) (1980.01-2015.12)

	BRENT	DUBAI	HH	JAP	RUS	WTI
BRENT	1.000000	0.998828	0.418903	0.933750	0.900686	0.990729
DUBAI	0.998828	1.000000	0.399157	0.936779	0.903908	0.988762
HH	0.418903	0.399157	1.000000	0.239003	0.423520	0.492066
JAP	0.933750	0.936779	0.239003	1.000000	0.874543	0.898450
RUS	0.900686	0.903908	0.423520	0.874543	1.000000	0.894758
WTI	0.990729	0.988762	0.492066	0.898450	0.894758	1.000000

Figure 8 The Correlation Matrix of Energy Prices (1980.01-2015.12)

Figure 7 presents oil and natural gas prices in log form and Figure 8 shows the correlation matrix of energy prices. According to the figures, while the prices of Europe Brent oil, West Texas Intermediate oil, Dubai oil, average import prices of LNG Japan and Russia exhibit strong co-movement (greater than 0.90), the correlation between Henry Hub and the relevant energy prices is lower (less than 0.50). As a result the tested hypothesis on energy prices is formed on the assumption that the Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while Henry Hub will act independently.

The annual Energy Consumption (EC) (measured as kg of oil equivalent per capita) and Gross Domestic Product (GDP) (per capita; measured at constant 2005 US$) data were obtained from the World Bank Development Indicators database (http://data.worldbank.org) 2015 (WDI, 2015) for 34 OECD countries (Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, UK and USA), 6 GCC countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE) and 13 OPEC countries (Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, UAE and Venezuela). For all countries the common period used is 1975-2011, except for: the Czech Republic (1990-2012), Estonia (1995-2012), Hungary (1991-2012), New Zealand (1977-2012), Poland (1990-2012), Slovakia (1992-2012), Slovenia (1995-2012), Switzerland (1980-2012), Bahrain (1980-2011), Kuwait (1995-2011), Qatar (1994-2011), Angola (1985-2011) and Libya (1999-2011). Ireland was not selected due to the lack of available data. Indonesia was excluded from the analysis as it has suspended its membership of OPEC in 2008.

The annual natural gas consumption (billion cubic feet per day) and oil consumption (million tonnes) data are also obtained from WDI (2015) for 34 OECD countries, 6 GCC countries and 13 OPEC countries. For all countries, the common period used for natural gas consumption was 1970-2013, except for: Czech Republic (1990-2013), Denmark (1998-2013), Finland (1974-2013), Greece (1984-2013), Hungary (1991-2013), Ireland (1979-2013), Korea (1986-2013), Norway (1977-2013), Poland (1990-2013), Portugal (1997-2013), Slovakia (1992-2013), Sweden (1985-2013), Switzerland (1980-2013), Turkey (1982-2013), Kuwait (1995-2012) and Qatar (1994-2013). Estonia, Iceland, Luxembourg, Slovenia, Bahrain, Oman, Angola, Iraq, Libya and Nigeria were not selected due to the lack of available data. Furthermore, for all countries the common period used for oil consumption was also 1970-2013, except for: Czech Republic (1990-2013), Hungary (1991-2013), Poland (1990-2013), Slovakia (1992-2013), Switzerland (1980-2013), Kuwait (1995-2012) and Qatar (1994-2013). Estonia, Iceland, Luxembourg, Slovenia, Bahrain, Oman, Angola, Iraq, Libya and Nigeria were not selected due to the lack of available data.

The monthly data for oil prices (Brent Oil, WTI and Dubai) (US$ per barrel) and natural gas prices (Henry Hub, Japan and Russia) (US$ per million metric British thermal unit) were obtained from the International Monetary Fund (IMF) (http://imf.org). The monthly M2 data; used as a measure of liquidity, and daily stock market prices were obtained from Trading Economics database (http://tradingeconomics.com) for 34 OECD countries, 6 GCC countries and 13 OPEC countries. Daily stock market prices were converted into monthly data by taking the average price. For all countries, the common period used for M2 was 2000-2014, except for: Slovakia (2006-2014), Slovenia (2005-2014), Turkey (2006-2014), Qatar, (2007-2014), UAE (2002-2013), Angola (2010-2014), Ecuador (2007-2014) and Iraq (2004-2014). Australia, Algeria, Iran, and Libya were not selected due to the lack of available data. For all countries the common period used for stock index was also 2000-2014, except for: New Zealand (2001-2014), Slovenia (2004-2014), Bahrain (2003-2014), Kuwait (2011-2014), Qatar (2011-2014), UAE (2002-2013), Ecuador (2005-2014) and Nigeria (2010-2014). Sweden, Algeria, Angola, Iran, Iraq and Libya were not selected due to the lack of available data.

The monthly Industrial Production (IP) data (measured at constant 2005 USA$, seasonally adjusted) are sourced from WDI (2015) for 34 OECD countries, 6 GCC countries and 13 OPEC countries. For all countries, the period used was 1998-2014, except for: Iceland (1998-2012), Turkey (2005-2014) and Venezuela (1998-2012). Bahrain, Angola and Nigeria were not selected due to the lack of available data. EViews version 7.0 econometric software was employed for the data analysis. Table 8 contains information about the data periods used for the groups of countries.

Table 8 Data Period of the Country Set

EC and GDP (1975-2011)		
OECD	**GCC**	**OPEC**
Australia, Austria, Belgium, Canada, Chile, Denmark, Finland, France, Germany, Greece, Iceland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, Norway, Portugal, Spain, Sweden, Turkey, UK, USA	Oman, Saudi Arabia, UAE	Algeria, Ecuador, Iran, Iraq, Nigeria, Saudi Arabia, UAE, Venezuela
1977-2012: New Zealand	1980-2011: Bahrain	1985-2011: Angola
1980-2012: Switzerland	1994-2011: Qatar	1994-2011: Qatar
1990-2012: Czech, Poland	1995-2011: Kuwait	1995-2011: Kuwait
1991-2012: Hungary		1999-2011: Libya
1992-2012: Slovakia		
1995-2012: Estonia, Slovenia		
NA: Ireland		
NG and GDP (1970-2013)		

OECD	GCC	OPEC
Australia, Austria, Belgium, Canada, Chile, France, Germany, Israel, Italy, Japan, Mexico, Netherlands, New Zealand, Spain, UK, USA	Saudi Arabia, UAE	Algeria, Ecuador, Iran, Saudi Arabia, UAE, Venezuela
1974-2013: Finland	1994-2013: Qatar	1994-2013: Qatar
1977-2013: Norway	1995-2012: Kuwait	1995-2012: Kuwait
1979-2013: Ireland		
1980-2013: Switzerland		
1982-2013: Turkey		
1983-2013: Denmark		
1984-2013: Greece		
1985-2013: Sweden		
1986-2013: Korea		
1990-2013: Czech, Poland		
1991-2013: Hungary		
1992-2013: Slovakia		
1997-2013: Portugal		
NA: Estonia, Iceland, Luxembourg, Slovenia	NA: Bahrain, Oman,	NA: Angola, Iraq, Libya, Nigeria
OIL and GDP (1970-2013)		
OECD	**GCC**	**OPEC**
Australia, Austria, Belgium, Canada, Chile, Denmark, Finland France, Germany, Greece, Ireland Israel, Italy, Japan, Korea, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Turkey, UK, USA	Saudi Arabia, UAE	Algeria, Ecuador, Iran, Saudi Arabia, UAE, Venezuela,
1980-2013: Switzerland		
1990-2013: Czech, Poland	1994-2013: Qatar	
1991-2013: Hungary	1995-2012: Kuwait	
1992-2013: Slovakia		
NA: Estonia, Iceland, Luxembourg,	NA: Bahrain, Oman	NA: Angola, , Iraq, Libya,

Slovenia		Nigeria
ENERGY PRICES and M2 (2000-2014)		
OECD	**GCC**	**OPEC**
Austria, Belgium, Canada, Chile, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Switzerland, UK, USA	Bahrain, Kuwait, Saudi Arabia, Oman	Nigeria, Venezuela,
2005-2014: Slovenia	2002-2013: UAE	2004-2014: Iraq
2006-2014: Slovakia, Turkey	2007-2014: Qatar	2007-2014: Ecuador
		2010-2014: Angola
NA: Australia		NA: Algeria, Iran, Libya,
ENERGY PRICES and SI (2000-2014)		
OECD	**GCC**	**OPEC**
Australia, Austria, Belgium, Canada, Chile, Czech, Denmark, Estonia Finland, France, Germany, Greece, Hungary, Iceland, , Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Switzerland, Turkey UK, USA	Oman, Saudi Arabia	Saudi Arabia, Venezuela
2001-2014: New Zealand	2002-2013: UAE	2002-2013: UAE
2004-2014: Slovenia	2003-2004: Bahrain	2005-2014: Ecuador
	2011-2014: Kuwait, Qatar	2010-2014: Nigeria
		2011-2014: Kuwait, Qatar
NA: Sweden		NA: Algeria, Angola, Iran, Iraq, Libya
ENERGY PRICES and IP (1998-2014)		
OECD	**GCC**	**OPEC**
Australia, Austria, Belgium, Canada, Chile, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, UK, USA	Kuwait, Oman, Qatar, Saudi Arabia, UAE	Algeria, Ecuador, Iran, Iraq, Kuwait, Libya, Qatar, Saudi Arabia, UAE

1998-2012: Iceland		1998-2012: Venezuela
2005-2014: Turkey		
	NA: Bahrain	NA: Angola, Nigeria
SI and IP (2000-2014)		
OECD	**GCC**	**OPEC**
Australia, Austria, Belgium, Canada, Chile, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland, UK, USA	Oman, Qatar, Saudi Arabia	Qatar, Saudi Arabia
1998-2012: Iceland	2002-2013: UAE	1998-2012: Venezuela
2001-2014: New Zealand	2011-2014: Kuwait	2002-2013: UAE
2004-2014: Slovenia		2005-2014: Ecuador
2005-2014: Turkey		2011-2014: Kuwait
	NA: Bahrain,	NA: Algeria, Angola, Iran, Iraq, Libya, Nigeria

4.2 METHODOLOGY

In this section, both the econometric methods and the models that are used in the analyses are given. In the first step, all the data set were transformed into natural logarithms. Next, unit root tests were carried out to examine stationary. After determining whether the variables were suitable for the analysis, Johansen cointegration tests were performed to examine the long-term relationship between energy consumption and economic growth, between world oil and natural gas prices and stock markets, liquidity and industrial production respectively and between financial development and economic growth. In the presence of a long-term relationship (cointegration vector) between the relevant variables the Vector error Correction Model (VECM) was conducted; while in the case of absence of a long-term relationship, in order to investigate the short-term Granger causality the Vector Autoregressive Model (VAR) was applied.

In the current work as in many studies the industrial production index is used as a GDP proxy. This is especially applied when is a lack of monthly GDP data (Acaravci et al., 2012; Bańbura & Rünstler, 2011; Cuche & Hess, 2000; Olomola, 2006; Tabata, 2006; Tanner, 1999; Sari et al., 2008). The main reason for this is that the value added by industrial production denotes a significant share of GDP (Fulop & Gyomai, 2012).

4.2.1 Unit Root Tests

Before starting the analysis, it is important to consider the properties of the data as suitable methods depend on whether the data is stationary. It is important that stationary data is used to avoid the possibility of spurious regression; as the results from non-stationary time series are not valid (Gujarati, 1999). Causality tests are known to be sensitive to the presence of non-stationarity and trends. If the series are not considered correctly, the results may show a trend which does not exist, or the results of the t-test may show a relationship between the variables even there is no relationship (Gebre-Mariam, 2011). Although there are different unit root tests to investigate the stability of the series, in the current study the following three unit root tests were applied; Augmented Dickey Fuller (ADF, 1979), Phillips-Perron (PP, 1988) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS, 1992).

4.2.1.1 Augmented Dickey Fuller Test

The ADF test indicates that the first difference of the variable is regressed onto its own delayed value and onto the delayed values of its first differences in order to test whether the coefficient of ADF is zero (Dickey & Fuller, 1979). The regression model of the ADF test is as follows:

$$\Delta Y_{t=} \alpha_0 + \alpha_1 t + \delta Y_{t-1} + \delta_i \sum_{j=1}^{m} \Delta Y_{t-j} + \varepsilon_t \qquad \tau \text{ statistics} \qquad \textbf{(1)}$$

Δ denotes the first difference operator, t denotes time trend, m denotes the lag length, $\mathcal{E}$ denotes the error term, α and δ denote coefficient parameters. $\delta = 0$ indicates that there is unit root, in other words the series is non-stationary. The alternative hypothesis is that $\delta < 0$, which means the series is stationary (Sevüktekin & Nargeleçekenler, 2007).

$H_0 = \delta = 0$ (There is a unit root, non-stationary)

$H_1 = \delta < 0$ (There is no unit root, stationary)

According to the Dickey-Fuller test, the error terms are not correlated; on the other hand ADF includes several lags of the difference of the series in the regression; in order to account for the serial correlation (Escudero, 2000).

4.2.1.2 Phillips-Perron Test

The ADF test assumes that error terms have a normal distribution and constant variance; whereas PP (1988) introduces more relaxed assumptions. The PP model introduces many weakly dependent and heterogeneously distributed time series and ignores any serial correlation. One of the important advantages of using the PP unit root test is that it is more robust to heteroscedasticity in the error term and non-parametric compared to ADF; on the other hand, both ADF and PP tests are sensitive to structural breaks (Phillips & Perron, 1988). The regression model of the ADF test is as follows:

$$\Delta Y_{t=} \alpha_0 + \beta Y_{t-i} + \mathcal{E}_t \qquad \textbf{(2)}$$

Δ denotes the first difference operator, t denotes a time trend, $\mathcal{E}$ denotes term error, α and β denote coefficient parameters. The null and alternative hypotheses for the PP unit root test are:

$H_0 = \beta = 0$ (There is a unit root, non-stationary)

$H_1 = \beta < 0$ (There is no unit root, stationary)

The ADF and PP unit root tests results of this study were compared with MacKinnon critical values at 10% levels of significance. If the ADF and PP statistics are less than the critical value, then the null hypothesis is rejected and the series are found to be stationary.

4.2.1.3 Kwiatkowski-Phillips-Schmidt-Shin Test

The excess sensitivity of the results obtained from the ADF and PP tests to determined lag length has been criticized from time to time. In this context, it is observed that KPSS (1992) stationarity test, which is not sensitive to lag length, has been preferred in recent studies. The KPSS test differs from the other unit root tests since it assumes that series is stationary under the null hypothesis (Başar & Temurlenk, 2007).

H_0= There is no unit root, stationary

H_1= There is a unit root, non-stationary

In this study, the ADF, PP and KPSS unit root tests were performed to determine stationarity properties of the time series. In the first step, the stationarity of the series are tested at level (0) and all the tests were performed at level and at first difference for the constant, and for the constant and trend. The mostly used unit root test in the literature is ADF however, due to its weak assumptions the PP unit root test and the KPSS test which has inverse hypothesis are applied. When evaluating the stationarity, the results of three of the tests are discussed as a whole at 10% levels of significance. The Schwarz Information Criterion (SIC) which minimizes the autocorrelation problem was used when performing the ADF test, while the Newey-West bandwidth automatic selection was used when performing PP and KPSS tests

4.2.2 Cointegration Analysis

The cointegration and error correction terms were first introduced by Granger (1981), later Engle and Granger (1987) developed one of the most used methods, which requires all variables to be integrated as I (1). If the linear combination of a series is stationary, then the set of variables is defined as cointegrated. According to this two-step estimation method, first, a cointegration test is performed in which a regression of one non-stationary series on another is run and the residuals are examined for stationarity. In the case that two I(1) variables are linearly combined, their combination will also be I(1) (Sari et al., 2008). A cointegrating relationship can be seen as a long-term phenomenon; as there is a possibility that cointegrating variables may derivate from their relationship in the short-term; whereas their association might return in the long-term (Brooks, 2008).

4.2.2.1 Johansen Cointegration Test

In the literature there are many methods to test cointegration, the main three were devised by Engle and Granger, Engle and Yoo, and Johansen. In the case of more than one cointegration vectors, the results of the Engle and Granger test will be invalid. To solve this problem, Johansen (1988; 1991) suggested a test that defines the required cointegrating vector number. In this test, Johansen reformulated the Vector Autoregressive (VAR) Model, which analyzes the selected series' relationship with each other.

$$\Delta Y_{t=} \prod Y_{t-1} + \sum_{i=1}^{a-1} \Gamma_i \, \Delta Y_{t-1} + \beta X_t + \mathcal{E}_{\,t} \quad \textbf{(3)}$$

$$\Pi = \sum_{i=1}^{k} \alpha_i i - 1 \quad \textbf{(4)}$$

$$\Gamma = -\sum_{j=i+1}^{k} \alpha_j \quad \textbf{(5)}$$

This study used Johansen Cointegration analysis. In the literature, there are several lag length criteria considering the cointegration test for the current study the Akaike Information Criterion (AIC) was chosen as the appropriate lag order. There are two test statistics used in the Johansen test: the trace statistics and the maximum eigenvalue statistics. If the trace and maximum eigenvalue statistics are higher than the critical value, then the null hypothesis which indicates that there is no cointegrating relationship between the related variables is rejected.

H_0= There is no cointegrating relationship between the variables

H_1= There is a cointegrating relationship between the variables

4.2.3 Granger Causality Test Based on VECM

After performing the cointegration analysis, Granger causality test is applied in order to establish the causal relationship between the variables. The cointegration test questions whether there exists a long-term relationship between the variables; while it does not give any information about the causality. To question the causality between the variables, the Granger (1969) causality test should be performed. The regression models for Granger causality test are as follows:

$$X_t = \alpha_0 + \sum_{i=1}^{k} \alpha_i X_{t-i} + \sum_{i=1}^{k} \beta_i Y_{t-i} + \varepsilon_i \qquad \textbf{(6)}$$

$$Y_t = \beta_0 + \sum_{i=1}^{k} \alpha_i Y_{t-i} + \sum_{i=1}^{k} \beta_i X_{t-i} + \varepsilon_i \qquad \textbf{(7)}$$

For the first equation there is a uni-directional causality running from Y to X, and in the second equation, there is a uni-directional causality running from X to Y.

In the case of the detection of a relation of co-integration that indicates the existence of a long-term relation between the variables, relations of Granger (1969) causality must be analyzed using the Vector Error Correction Model (VECM) and adopting the VAR approach if there is no relation to co-integration (Chimobi and Igwe, 2010).

The regression models for Granger causality based on VECM are as follows:

$$\Delta X_t = \alpha_0 + \sum_{i=1}^{k} \alpha_i \Delta X_{t-i} + \sum_{i=1}^{k} \beta_i \Delta Y_{t-i} + \theta_x ECT_{t-i} + \varepsilon_i \qquad \textbf{(8)}$$

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{k} \alpha_i \Delta Y_{t-i} + \sum_{i=1}^{k} \beta_i \Delta X_{t-i} + \theta_x ECT_{t-i} + \varepsilon_i \qquad \textbf{(9)}$$

Δ denotes the first difference operator, ECT denotes the error correction term and i denotes the lag length in the equation.

If the dependent variable is Y and independent variable is X, then the tested hypotheses are:

H_0= X does not Granger cause Y

H_1= X does Granger cause Y

4.3 EMPIRICAL FINDINGS

The section introduces the empirical findings of the study. In the first part the unit root tests results are given, in the second part the Johansen cointegration test results are introduced and in the third part the Granger causality test results are provided.

4.3.1 Results of the Unit Root Tests

In the first stage of this study, firstly the natural logarithms of the variables are taken and unit root tests (Augmented Dickey Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS)) are performed to investigate the stationarity for each variable. The combination of the results of unit root tests for OECD, GCC and OPEC countries are given in Table 9, Table 10 and Table 11 respectively.

Table 9 : Combining the Results of the Unit Root Tests for the OECD Countries

OECD	EC vs GDP	NGC vs GDP	OILC vs GDP	Brent vs M2	WTI vs M2	Dubai vs M2	HH vs M2	LNG vs M2	RUS vs M2	Brent vs SI	Wti vs SI	Dubai vs SI	HH vs SI	LNG vs SI	RUS vs SI	Brent vs IP	Wti vs IP	Dubai vs IP	HH vs IP	LNG vs IP	RUS vs IP	SI vs IP
Australia	S	NS	S	-	-	-	-	-	-	S	S	S	S	S	S	S	S	S	S	S	S	S
Austria	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Belgium	S	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Canada	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Chile	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Czech	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Denmark	S	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Estonia	S	-	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Finland	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
France	S	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Germany	S	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Greece	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Hungary	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Iceland	S	-	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Ireland	-	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Israel	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Italy	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Japan	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S

Korea	S	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Luxembourg	S	-	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Mexico	NS	S	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Netherlands	S	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	NS
NewZealand	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Norway	NS	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Poland	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Portugal	S	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Slovakia	S	S	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Slovenia	S	-	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Spain	S	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Sweden	S	NS	S	S	S	S	S	S	S	-	-	-	-	-	-	S	S	S	S	S	S	-
Switzerland	S	S	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Turkey	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
UK	S	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
USA	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S

Notes: S denotes stationary, NS denotes non-stationary and '-' denotes no existing data

Within the framework of the OECD countries, the unit root tests results between energy consumption and economic growth showed that while the relevant variables of Czech, Mexico and Norway were found to be non-stationary (NS), they are stationary (S) in the rest of the OECD countries except Ireland for which there was no available data. The unit root tests results between natural gas consumption and economic growth showed that the relevant variables of Australia, Belgium, Denmark, France, Germany, Ireland, Korea, Netherlands, Norway, Portugal, Spain, Sweden and UK were found to be non-stationary (NS); on the other hand, the unit root tests results between oil consumption and economic growth indicate that variables were non-stationary (NS) in Mexico, Slovakia and Switzerland while the relevant variables were stationary (S) at the rest of the OECD countries. Estonia, Iceland, Luxembourg and Slovenia were excluded from the analysis since there was no available data. The results of the unit root tests between oil prices (Brent, WTI and Dubai) and M2 and between natural gas prices (HH, LNG and Russia) and M2 showed that the relevant variables were stationary (S) in the remainder of the OECD countries except Australia which had no available data. The results of the unit root tests between oil prices (Brent, WTI and Dubai), and stock indices and natural gas prices (HH, LNG and Russia) and stock indices showed that the relevant variables were stationary (S) at the same level. Sweden is excluded from the analysis as had no available data. The results of the unit root tests between oil prices (Brent, WTI and Dubai) and industrial production and natural gas prices (HH, LNG and Russia) and industrial production showed that the relevant variables were stationary (S) at the same level for all the OECD countries. Finally, the results of the unit root tests between stock indices and industrial production of OECD countries excluding Sweden, which had no available data, indicate that the relevant variables were non-stationary (NS) and at the same level only in the Netherlands.

Table 10 Combining the Results of the Unit Root Tests for the GCC Countries

GCC	EC vs GDP	NGC vs GDP	OILC vs GDP	Brent vs M2	WTI vs M2	Dubai vs M2	HH vs M2	LNG vs M2	RUS vs M2	Brent vs SI	Wti vs SI	Dubai vs SI	HH vs SI	LNG vs SI	RUS vs SI	Brent vs IP	Wti vs IP	Dubai vs IP	HH vs IP	LNG vs IP	RUS vs IP	SI vs IP
Bahrain	NS	-	-	S	S	S	S	S	S	S	S	S	S	S	S	-	-	-	-	-	-	-
Kuwait	NS	NS	NS	S	S	S	S	S	S	S	S	NS	S	NS	S	S	S	S	S	S	S	S
Oman	S	-	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Qatar	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Saudi A	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
UAE	S	NS	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S

Notes: S denotes stationary, NS denotes non-stationary and '-' denotes no existing data

Within the framework of the GCC countries, the unit root tests results between energy consumption and economic growth showed that while the relevant variables of Bahrain and Kuwait are found to be non-stationary (NS), they were stationary (S) in the remainder of the GCC countries. The results of the unit root tests between natural gas consumption and economic growth and oil consumption. The economic growth results showed that the relevant variables of Kuwait and UAE are found to be non-stationary; while in the remainder of the GCC countries were stationary. Bahrain and Oman are excluded from the analysis since they had no available data. There was no unit root result between oil prices (Brent, WTI and Dubai) and M2 and between natural gas prices (HH, LNG and Russia) and M2 of GCC countries. The unit root tests results between oil prices (Brent, WTI and Dubai) and stock indices and natural gas prices (HH, LNG and Russia) and stock indices of GCC countries showed that the relevant variables of Kuwait were non-stationary (NS). There was no unit root (S) result between oil prices (Brent, WTI and Dubai) and industrial production and natural gas prices (HH, LNG and Russia) and industrial production in the remainder of the GCC countries while Bahrain was excluded from the analysis due to not having available data. Finally, the unit root tests results concerning stock indices and industrial production indicated that the relevant variables are stationary (S) at the same level in the all the GCC countries while Bahrain could not be tested because data was unavailable.

Table 11 Combining the Results of the Unit Root Tests for the OPEC Countries

OPEC	EC vs GDP	NGC vs GDP	OILC vs GDP	Brent vs M2	WTI vs M2	Dubai vs M2	HH vs M2	LNG vs M2	RUS vs M2	Brent vs SI	Wti vs SI	Dubai vs SI	HH vs SI	LNG vs SI	RUS vs SI	Brent vs IP	Wti vs IP	Dubai vs IP	HH vs IP	LNG vs IP	RUS vs IP	SI vs IP
Algeria	NS	S	S	-	-	-	-	-	-	-	-	-	-	-	-	NS	NS	NS	NS	NS	NS	-
Angola	S	-	-	S	S	S	S	S	S	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecuador	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Iran	S	S	S	-	-	-	-	-	-	-	-	-	-	-	-	S	S	S	S	S	S	-
Iraq	S	-	-	S	S	S	S	S	S	-	-	-	-	-	-	NS	NS	NS	NS	NS	NS	-
Kuwait	NS	NS	NS	S	S	S	S	S	S	S	S	NS	S	NS	S	S	S	S	S	S	S	S
Libya	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NS	NS	NS	NS	NS	NS	-
Nigeria	S	-	-	S	S	S	S	S	S	S	S	S	S	S	S	-	-	-	-	-	-	-
Qatar	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Saudi A.	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
UAE	S	NS	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Venezuela	NS	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S

Notes: S denotes stationary, NS denotes non-stationary and '-' denotes no existing data

Within the framework of the OPEC countries, the unit root tests results between energy consumption and economic growth showed that while the relevant variables of Algeria, Kuwait, Libya and Venezuela were found to be non-stationary (NS), they were stationary in the rest of the OPEC countries. The unit root tests results between natural gas consumption and economic growth and oil consumption and economic growth showed that the relevant variables of Kuwait and UAE were non-stationary (NS), but stationary (S) in the rest of the OPEC countries. Angola, Iraq, Libya and Nigeria were excluded from the analysis since they had no available data. There was no unit root (S) between oil prices (Brent, WTI and Dubai) and M2 and between natural gas prices (HH, LNG and Russia) and M2 in all of the OPEC countries while Algeria, Iran and Libya were excluded from the analysis as there was no available data. The unit root tests results between oil prices (Brent, WTI and Dubai) and stock indices and natural gas prices (HH, LNG and Russia) and stock indices of OPEC countries showed that the relevant variables of Kuwait were found to be non-stationary (NS) however, Algeria, Angola, Iran and Iraq could not be tested because data was unavailable. A unit root (NS) exists between oil prices (Brent, WTI and Dubai), industrial production and natural gas prices (HH, LNG and Russia) and industrial production in Algeria, Iraq and Libya. Angola and Nigeria were excluded from the analysis because they had no available data. The relevant variables were stationary (S) at the same level in the remaining OPEC countries. Finally, the unit root tests results between stock indices and industrial production indicated that except for Algeria, Angola, Iran, Iraq and Nigeria which had no available data, the relevant variables were stationary (S) at the same level in rest of the OPEC countries.

According to the results of the unit root tests, because the variables are stationary at the same level it is possible to test the long-term relationships among the variables for OECD, GCC and OPEC in the following testing steps.

4.3.2 Results of the Johansen Cointegration Tests

This part reports on the Johansen cointegration tests performed to investigate the existence of a long-term relationship between the variables. For this purpose, firstly the lag lengths are identified using VAR models and the lag structures are selected through Akaike Information Criterion (AIC). Furthermore, in order to check for the autocorrelation of the variables the Lagrange Multiplier (LM) test is performed. The findings of cointegration tests are presented in Table 12, Table 13 and Table 14.

Table 12 Combining the Results of the Johansen Cointegration Tests for the OECD Countries

OECD	EC vs GDP	NGC vs GDP	OILC vs GDP	Brent vs M2	WTI vs M2	Dubai vs M2	HH vs M2	LNG vs M2	RUS vs M2	Brent vs SI	Wti vs SI	Dubai vs SI	HH vs SI	LNG vs SI	RUS vs SI	Brent vs IP	Wti vs IP	Dubai vs IP	HH vs IP	LNG vs IP	RUS vs IP	SI vs IP
Australia	NA	-	NA	-	-	-	-	-	-	NA	NA	NA	NA	NA	A	NA	NA	NA	NA	NA	NA	NA
Austria	NA	A	NA	A	A	A	A	NA	A	NA	NA	NA	NA	NA	NA	A	A	A	NA	NA	A	A
Belgium	NA	-	NA	NA	A	NA	NA	NA	A	NA	NA	NA	NA	NA	NA	A	A	A	NA	NA	A	NA
Canada	NA	NA	NA	A	A	A	A	A	A	NA	A	NA	NA	NA	A	NA	NA	A	A	NA	NA	NA
Chile	NA	NA	NA	A	A	A	A	A	A	A	A	A	NA	A	A	A	A	A	NA	NA	A	NA
Czech	-	A	NA	A	A	A	A	A	A	NA	NA	NA	NA	NA	NA	NA	A	NA	NA	NA	A	NA
Denmark	A	-	NA	A	A	A	A	A	A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Estonia	A	-	-	A	A	A	A	A	A	NA	NA	NA	NA	NA	A	NA	NA	NA	NA	NA	NA	NA
Finland	NA	NA	NA	A	A	A	A	NA	A	NA	NA	NA	A	NA	A	NA	NA	NA	NA	NA	NA	A
France	NA	-	A	A	A	A	A	A	A	NA	NA	NA	A	NA	NA	NA	NA	NA	NA	NA	NA	NA
Germany	NA	-	NA	A	A	A	A	A	A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Greece	NA	NA	A	NA	NA	NA	A	NA	NA	NA	NA	NA	A	NA	NA	NA	NA	NA	A	NA	A	NA
Hungary	NA	NA	A	A	A	A	A	A	A	A	A	NA	NA	NA	A	A	NA	NA	NA	NA	A	A
Iceland	NA	-	-	A	A	A	A	NA	A	NA	NA	NA	A	NA	NA	NA	NA	A	NA	NA	A	NA
Ireland	-	-	NA	A	A	A	A	NA	A	NA	NA	NA	A	NA	NA	A	A	A	NA	NA	A	NA
Israel	NA	NA	NA	NA	NA	NA	NA	A	A	NA	NA	NA	NA	NA	A	A	A	A	NA	A	A	A
Italy	A	A	A	NA	NA	NA	NA	A	A	NA	NA	NA	A	NA	NA	A	A	A	NA	A	NA	NA
Japan	NA	A	A	NA	NA	NA	A	NA	NA	NA	NA	NA	A	NA	NA	NA	NA	A	A	A	NA	A

Korea	NA	-	A	NA	NA	NA	NA	NA	A	A	A	A	NA	NA	A	A	A	A	NA	A	A	A
Luxembourg	A	-	-	NA	A	NA	NA	NA	A	NA	NA	NA	A	NA	NA	NA	NA	NA	A	NA	NA	NA
Mexico	-	A	-	A	A	A	NA	A	A	A	A	A	NA	NA	A	NA	NA	NA	NA	NA	A	NA
Netherlands	NA	-	NA	A	A	A	A	A	A	NA	NA	NA	A	NA	NA	A	A	A	A	NA	A	-
NewZealand	NA	NA	NA	NA	NA	NA	NA	A	NA	NA	NA	NA	A	NA	NA	NA	NA	NA	A	NA	NA	A
Norway	-	-	A	NA	A	NA	NA	NA	NA	NA	NA	NA	NA	NA	A	NA	NA	NA	NA	A	NA	NA
Poland	NA	A	A	A	A	A	A	A	A	NA	A	NA	NA	NA	A	NA	A	A	NA	A	A	NA
Portugal	NA	-	A	A	A	A	A	NA	A	NA	NA	NA	A	NA	NA	NA	NA	NA	NA	A	NA	NA
Slovakia	A	A	-	A	A	A	NA	A	A	NA	NA	NA	A	NA	NA	NA	A	NA	NA	NA	A	NA
Slovenia	A	-	-	A	A	A	A	A	A	NA	A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Spain	NA	-	NA	A	A	A	A	NA	A	NA	NA	NA	A	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sweden	NA	-	NA	A	A	A	NA	A	A	-	-	-	-	-	-	NA	NA	NA	A	NA	NA	-
Switzerland	NA	A	-	NA	NA	NA	NA	A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	A	NA
Turkey	NA	A	NA	NA	A	NA	NA	NA	A	A	A	A	NA	A	A	A	A	A	NA	NA	A	A
UK	NA	-	NA	A	A	A	A	A	A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	A	NA
U.S.	NA	NA	NA	NA	NA	NA	A	A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: A denotes available long-term relationship, NA denotes no available long-term relationship and '-' denotes no existing data

According to the results of the Johansen cointegration test on the OECD countries, while long-term relationships exist between energy consumption and economic growth for Denmark, Estonia, Italy, Luxembourg, Slovakia and Slovenia, there was no long-term relationship between the relevant variables for the rest of the OECD countries except Czech, Ireland and Mexico which had no available data. For Canada, Chile, Finland, Greece, Hungary, Israel, New Zealand and USA, there were no long-term relationships between natural gas consumption and economic growth. Also for Australia, Austria, Belgium, Canada, Chile, Czech, Denmark, Finland, Germany, Ireland, Israel, Netherlands, New Zealand, Spain, Sweden, Turkey, UK and USA, there were no long-term relationships between oil consumption and economic growth. It was observed that only for Italy did a long-term relationship exist in three of the relevant relationships. Generally, for OECD countries, there were no long-term relationships between total energy consumption and economic growth besides oil consumption and economic growth; while there was long-term relationship between natural gas consumption and economic growth. These findings demonstrate that since OECD countries do not have their own sources of energy thus, they are not able to direct these energy sources to consumption in order to contribute to GDP.

According to the results concerning energy prices and M2 of the OECD countries, Australia is excluded from the analysis as it had no available data. From the remaining countries Belgium, Greece, Israel, Italy, Japan, Korea, Luxembourg, New Zealand, Norway, Switzerland, Turkey and USA do not have any long-term relationships between Brent oil prices and M2 apart from Dubai prices and M2. For Greece, Israel, Italy, Japan, Korea, New Zealand, Switzerland and USA there were no long-term relationships between WTI prices and M2. It was observed that from the OECD countries only Greece, Israel, Italy, Japan, Korea, New Zealand, Switzerland and USA did not have any long-term relationships between three of the oil prices (Brent, WTI, Dubai) and M2. For Belgium, Israel, Italy, Korea, Luxembourg, Mexico, New Zealand, Norway, Slovakia, Sweden, Switzerland and Turkey there was no long-term relationships between HH prices and M2. Additionally, for Austria, Belgium, Finland, Greece, Iceland, Ireland, Japan, Korea, Luxembourg, Norway, Portugal, Spain and Turkey there were no long-term relationships between LNG prices and M2. There were no long-term relationships between Russian prices and M2 for Greece, Japan, New Zealand, Norway, Switzerland and USA It was observed that only Norway had no long-term relationships between three of the natural gas prices (HH, LNG and Russia) and M2. Interestingly; the analysis of the cointegrated relationship between energy prices and M2 revealed that the Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while the Henry Hub price will be independent from these countries only holds for Canada, Chile, Czech, Denmark, Estonia, France, Germany, Mexico, Netherlands, Poland, Slovakia, Slovenia, Sweden and UK.

The findings of the relationship between energy prices and stock index of OECD countries showed that long-term relationships exist between Brent oil prices and stock index for Chile, Hungary, Korea, Mexico and Turkey however, no long-term relationships existed for the remaining OECD countries with Sweden being excluded as it had no available data. Additionally, while there was a long-term relationship between WTI prices and stock index for Canada, Chile, Hungary, Korea, Mexico, Poland, Slovenia and Turkey, there were no long-term relationships for the remaining OECD countries. Although there was evidence of a long-term relationship between Dubai prices and the stock index for Chile, Korea, Mexico and Turkey, this was not found for the remaining OECD countries. It was observed that for Australia, Austria, Belgium, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Slovakia, Spain, Switzerland, UK and USA there were no long-term relationships between three of the oil prices (Brent, WTI and Dubai) and the stock index. A long-term relationship between HH prices and stock index was revealed for Finland, France, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Portugal, Slovakia and Spain, but not for any of the remaining OECD countries. Additionally, in the OECD countries only for Chile and Turkey were there long-term relationships between LNG prices and the stock index. Long-term relationships are evident between Russia prices and the stock index for Australia, Canada, Chile, Estonia, Finland, Hungary, Israel, Korea, Mexico, Norway, Poland and Turkey, but there were no long-term relationships for the remaining OECD countries. It was observed that for Austria, Belgium, Czech, Denmark, Germany, Slovenia, Switzerland, UK and USA no long-term relationships existed between three of the natural gas prices (HH, LNG and Russia) and the stock index. Austria, Belgium, Czech, Denmark, Germany, Switzerland, U.K. and USA did not have any long-term relationships between the six energy prices (Brent, WTI, Dubai, HH, LNG and Russia) and stock index. Interestingly; the analysis of the cointegrated relationship between energy prices and stock index, revealed that Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while Henry Hub price be independent from these countries only holds for Austria, Belgium, Chile, Czech, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Portugal, Slovakia, Spain, Switzerland, UK and USA.

According to the results between energy prices and industrial production of OECD countries, while long-term relationships were determined between Brent oil prices and industrial production for Austria, Belgium, Chile, Hungary, Ireland, Israel, Italy, Korea, Netherlands and Turkey, this was not found for the remaining OECD countries. Additionally, there were long-term relationships between WTI prices and industrial production for Austria, Belgium, Chile, Czech, Ireland, Israel, Italy, Korea, Netherlands, Poland, Slovakia and Turkey, the remaining OECD countries showed no long-term relationships. Additionally, there were long-term relationships between Dubai prices and industrial production for Austria, Belgium, Canada, Chile, Iceland, Ireland, Israel, Italy, Japan, Korea, Netherlands, Poland and Turkey, there were no long-term relationships for the remaining OECD countries. It was observed that for Australia, Denmark, Estonia, Finland, France, Germany, Greece, Luxembourg, Mexico, New Zealand, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, U.K. and USA there was no long-term relationships between the three oil prices (Brent, WTI and Dubai) and industrial production. While there were long-term relationships between HH prices and industrial production for Canada, Greece, Japan, Luxembourg, Netherlands, New Zealand and Sweden, this was not evident in the remaining OECD countries. Additionally, from the OECD countries only Israel, Italy, Japan, Korea, Norway, Poland and Portugal had long-term relationships between LNG prices and industrial production. For Australia, Canada, Denmark, Estonia, Finland, France, Germany, Italy, Japan, Luxembourg, New Zealand, Norway, Portugal, Slovenia, Spain, Sweden and USA there were no long-term relationships between Russia prices and industrial production. It was observed that Australia, Denmark, Estonia, Finland, France, Germany, Slovenia, Spain and USA did not have any long-term relationships between the six energy prices (Brent, WTI, Dubai, HH, LNG and Russia) and industrial production. Interestingly; the analysis of the cointegrated relationship between energy prices and industrial production revealed that Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while Henry Hub price be independent from these countries only holds for Australia, Denmark, Estonia, Finland, France, Germany, Luxembourg, New Zealand, Slovenia, Spain, Sweden and USA.

Finally, for the relationship between stock index and industrial production of OECD countries, Netherlands and Sweden were excluded from the analysis since they had no available data. From the remaining OECD countries, a long-term relationship is apparent between the stock index and industrial production for Austria, Finland, Hungary, Israel, Japan, Korea, New Zealand and Turkey however; this was not the case between the relevant variables for the remaining OECD countries.

Table 13 Combining the Results of the Johansen Cointegration Tests for the GCC Countries

GCC	EC vs GDP	NGC vs GDP	OILC vs GDP	Brent vs M2	WTI vs M2	Dubai vs M2	HH vs M2	LNG vs M2	RUS vs M2	Brent vs SI	Wti vs SI	Dubai vs SI	HH vs SI	LNG vs SI	RUS vs SI	Brent vs IP	Wti vs IP	Dubai vs IP	HH vs IP	LNG vs IP	RUS vs IP	SI vs IP
Bahrain	-	-	-	A	A	A	A	NA	A	A	A	A	A	NA	NA	-	-	-	-	-	-	-
Kuwait	-	-	-	A	A	A	A	NA	A	NA	NA	-	NA	-	A	A	A	A	NA	A	NA	A
Oman	NA	-	-	A	A	A	A	A	A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	A
Qatar	A	A	A	NA	NA	NA	A	NA	A	A	A	A	NA	A	A	NA	NA	NA	A	NA	NA	NA
Saudi A	A	A	NA	A	A	NA	A	A	A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAE	A	-	-	A	A	A	A	NA	A	NA	NA	NA	NA	NA	NA	A	A	A	NA	NA	NA	NA

Notes: A denotes available long-term relationship, NA denotes no available long-term relationship and '-' denotes no existing data

According to the findings concerning the GCC countries, a long-term relationship was found between energy consumption and economic growth for Qatar, Saudi Arabia and UAE however, there were no long-term relationships between the relevant variables for Bahrain and Oman. Kuwait was excluded from the analysis as there was no available data. There was no long-term relationship between oil consumption and economic growth for Saudi Arabia. Across the GCC countries, a long-term relationship between total energy consumption and economic growth was apparent, besides between natural gas consumption and economic growth. These findings demonstrate that GCC countries have their own energy sources and they direct them to consumption in order to contribute to GDP thus, energy consumption is the main source of their economic growth.

According to the results between energy prices and M2 of GCC countries, from the remaining GCC countries only Qatar does not have any long-term relationship between the three oil prices (Brent, WTI and Dubai) and M2. On the other hand, for all the GCC countries there were long-term relationships between HH prices and M2, and also between Russia prices and M2. There were no long-term relationships between LNG prices and M2 for Bahrain, Kuwait, Qatar and UAE Interestingly; the analysis of the cointegrated relationship between energy prices and M2, revealed that Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while Henry Hub price be independent from these countries only holds for Oman.

For GCC countries the results showed that, there were no long-term relationships between Brent oil prices and the stock index beside WTI prices and the stock index for Kuwait, Oman, Saudi Arabia and UAE. Additionally, there were no long-term relationships between Dubai prices and the stock index for Oman, Saudi Arabia and UAE. Kuwait does not have available data for the relevant relationship. On the other hand, there was only a long-term relationship between HH prices and the stock index for Bahrain but not for any other GCC countries. For Bahrain, Oman, Saudi Arabia and UAE there were no long-term relationships between LNG prices and the stock index, beside Russia prices and stock index. There was no data available for Kuwait concerning LNG prices and the stock index relationship. It was observed that there were no long-term relationships between six of the energy prices (Brent, WTI, Dubai, HH, LNG and Russia) and the stock index for Oman, Saudi Arabia and UAE. Interestingly; the analysis of the cointegrated relationship between energy prices and stock index revealed that Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while Henry Hub price be independent from these countries only holds for Oman, Qatar, Saudi Arabia and UAE.

According to the results concerning energy prices and industrial production of GCC countries, there were no long-term relationships between three of the oil prices (Brent, WTI and Dubai) and industrial production for Qatar and Saudi Arabia. Additionally, there were no long-term relationships between three of the natural gas prices (HH, LNG and Russia) and industrial production for Saudi Arabia and UAE. Moreover, it was observed that there were no long-term relationships between six of the energy prices (Brent, WTI, Dubai, HH, LNG and Russia) and industrial production for Oman. Bahrain was excluded from the analysis as there was no available data. Interestingly; the analysis of the cointegrated relationship between energy prices and industrial production revealed that Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while Henry Hub price be independent from these countries only holds for Oman, Qatar and Saudi Arabia.

Finally, for the relationship between the stock index and industrial production of the GCC countries, Bahrain, was excluded from the analysis because it had no available data. From the remaining GCC countries, there were no long-term relationships between the stock index and industrial production for Qatar, Saudi Arabia and UAE.

Table 14 Combining the Results of the Johansen Cointegration Tests for the OPEC Countries

OPEC	EC vs GDP	NGC vs GDP	OILC vs GDP	Brent vs M2	WTI vs M2	Dubai vs M2	HH vs M2	LNG vs M2	RUS vs M2	Brent vs SI	Wti vs SI	Dubai vs SI	HH vs SI	LNG vs SI	RUS vs SI	Brent vs IP	Wti vs IP	Dubai vs IP	HH vs IP	LNG vs IP	RUS vs IP	SI vs IP
Algeria	-	NA	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Angola	NA	-	-	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecuador	NA	NA	A	A	A	NA	A	A	NA	NA	A	NA	NA	NA	A	NA	NA	NA	NA	NA	A	A
Iran	A	NA	A	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA	NA	NA	NA	NA	-
Iraq	NA	-	-	A	A	A	A	A	A	-	-	-	-	-	-	-	-	-	-	-	-	-
Kuwait	-	-	-	A	A	A	A	NA	A	NA	NA	-	NA	-	A	A	A	A	NA	A	NA	A
Libya	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nigeria	A	-	-	A	A	A	A	A	A	NA	NA	NA	NA	NA	A	-	-	-	-	-	-	-
Qatar	A	A	A	NA	NA	NA	A	NA	A	A	A	A	NA	A	A	NA	NA	NA	A	NA	NA	NA
Saudi A	A	A	NA	A	A	NA	A	A	A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
UAE	A	-	-	A	A	A	A	NA	A	NA	NA	NA	NA	NA	NA	A	A	A	NA	NA	NA	NA
Venezuela	-	A	NA	NA	NA	NA	NA	NA	A	NA	NA	NA	NA	NA	NA	NA	A	NA	A	NA	NA	NA

Notes: A denotes available long-term relationship, NA denotes non available long-term relationship and '-' denotes no existing data

According to the Johansen cointegration test results applied to the OPEC countries, there were no long-term relationships between energy consumption and economic growth for Angola, Ecuador and Iraq. Since there was no available data Algeria, Kuwait and Venezuela were excluded from the analysis. Additionally, while there were no long-term relationships between oil consumption and economic growth for Algeria, Ecuador and Iran, there were no long-term relationships between natural gas consumption and economic growth for Saudi Arabia and Venezuela. Angola, Iraq, Kuwait, Nigeria and UAE were excluded from the analysis as they had no available data. Libya was also excluded from the framework of the study for the same reason. Generally, for OPEC countries, while there was long-term relationship between total energy consumption and economic growth, there was no long-term relationship between oil consumption and economic growth. Since the OPEC countries have their own energy sources and they are able to direct these energy sources to consumption in order to contribute to GDP, thus, energy consumption is the main source of their economic growth.

According to the test results concerning energy prices and M2 of OPEC countries, Algeria and Iran were excluded from the analysis since they had no available data. There were no long-term relationships between Dubai prices and M2 for Ecuador and Saudi Arabia. From the remaining OPEC countries, Angola, Qatar and Venezuela do not have any long-term relationships between three of the oil prices (Brent, WTI and Dubai) and M2. The other remaining OPEC countries have long-term relationships between each of the three oil prices (Brent, WTI and Dubai) and M2. On the other hand, except Venezuela, for all the OPEC countries there were long-term relationships between HH prices and M2. There were no long-term relationships between LNG prices and M2 for Angola, Kuwait, Qatar, UAE and Venezuela furthermore there was no long-term relationship between Russia prices and M2 for Angola. It was observed that only Angola did not have long-term relationship between six of the energy prices (Brent, WTI, Dubai, HH, LNG and Russia) and M2. Interestingly; the analysis of the cointegrated relationship between energy prices and M2 revealed that Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while Henry Hub price be independent from these countries only holds for Angola, Iraq and Nigeria.

Concerning the findings of the relationship between energy prices and the stock index of OPEC countries, excluding Algeria, Angola, Iran and Iraq as they had no available data a long-term relationship between Brent oil prices and stock index only existed for Qatar and there were no long-term relationships for the remaining OPEC countries. Additionally, only long-term relationships existed between WTI prices and stock index for Ecuador and Qatar. There was a long-term relationship between Dubai oil prices and the stock index only for Qatar. Except for Kuwait, there were no long-term relationships between Dubai oil prices and stock index for the remaining OPEC countries. It was observed that there were no long-term relationships between six of the energy prices (Brent, WTI, Dubai, HH, LNG and Russia) and the stock index for Saudi Arabia, UAE and Venezuela. Interestingly; the analysis of the cointegrated relationship between energy prices and stock index revealed that Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while Henry Hub price be independent from these countries only holds for Qatar, Saudi Arabia, UAE and Venezuela.

According to the results of the tests concerning the energy prices and industrial production of OPEC countries, Algeria, Angola, Iraq and Nigeria were excluded since there was no available data. There was no long-term relationship between Brent oil prices and industrial production apart from the Dubai oil prices and industrial production of Venezuela. It was observed that there were no long-term relationships between three of the oil prices (Brent, WTI and Dubai) and industrial production for Ecuador, Iran, Qatar and Saudi Arabia. On the other hand, only long-term relationships exist between HH prices and industrial production for Qatar and Venezuela. Additionally, there was only a long-term relationship between LNG prices and industrial production for Kuwait, and no evidence for this relationship for the remaining OPEC countries. However, there was a long-term relationship between Russia prices and industrial production only for Ecuador. It was observed that for UAE there was no long-term relationship between three of the natural gas prices (HH, LNG and Russia) and industrial production. Moreover, it was observed that there were no long-term relationships between six of the energy prices (Brent, WTI, Dubai, HH, LNG and Russia) and industrial production for Iran and Saudi Arabia. Interestingly; the analysis of the cointegrated relationship between energy prices and industrial production revealed that Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while Henry Hub price be independent from these countries only holds for Iran, Qatar and Saudi Arabia.

Finally, concerning the relationships between the stock index and industrial production of OPEC countries, Algeria, Angola, Iran, Iraq and Nigeria were excluded from the analysis due to data not being available. From the remaining OPEC countries, long-term relationships between stock index and industrial production only existed for Ecuador and Kuwait.

4.3.3 Results of the Granger Causality Tests

This part reports the results of VAR and VECM Granger Causality/Block Exogeneity Wald tests results. Both tests were applied to test for a causal relationship among the relevant variables. The causality test results of OECD, GCC and OPEC countries are presented in Table 15, Table 16 and Table 17 respectively.

Table 15 Combining the Results of Granger Causality/Block Exogeneity Wald Tests for the OECD Countries

OECD	EC vs Y	NGC vs Y	OC vs Y	BRvs M2	WTI vs M2	DUB vs M2	HH vs M2	LNG vs M2	RUS vs M2	BR vs SI	WTI vs SI	DUB vs SI	HH vs SI	LNG vs SI	RUS vs SI	BR vs IP	WTI vs IP	DUB vs IP	HH vs IP	LNG vs IP	RUS vs IP	SI vs IP
Australia	EC≠Y	-	Y→OC	-	-	-	-	-	-	SI→BR	SI→WTI	SI→DUB	HH≠SI	SI→LNG	RUS→SI	BR≠IP	WTI≠IP	DUB≠IP	HH→IP	LNG→IP	RUS≠IP	SI≠IP
Austria	Y→EC	NGC≠Y	OC≠Y	BR→M2	WTI→M2	DUB→M2	HH≠M2	M2→LNG	RUS≠M2	SI→BR	SI→WTI	SI→DUB	HH≠SI	SI→LNG	SI→RUS	BR↔IP	WTI↔IP	DUB→IP	HH→IP	IP→LNG	RUS≠IP	SI→IP
Belgium	EC→Y	-	OC≠Y	M2→BR	WTI≠M2	M2→DUB	HH≠M2	M2→LNG	RUS≠M2	SI→BR	SI→WTI	SI→DUB	SI→HH	SI↔LNG	SI→RUS	BR≠IP	WTI≠IP	DUB≠IP	HH→IP	LNG→IP	RUS≠IP	SI→IP
Canada	EC→Y	Y→NGC	OC≠Y	BR→M2	WTI→M2	DUB→M2	HH≠M2	M2→LNG	RUS≠M2	SI→BR	SI→WTI	SI→DUB	HH≠SI	SI→LNG	SI→RUS	BR→IP	WTI→IP	DUB→IP	HH→IP	LNG≠IP	IP→RUS	SI→IP
Chile	EC≠Y	Y→NGC	Y→OC	BR≠M2	WTI≠M2	DUB≠M2	HH≠M2	LNG≠M2	RUS↔M2	BR≠SI	WTI≠SI	DUB≠SI	HH≠SI	LNG≠SI	RUS↔SI	IP→BR	IP→WTI	IP→DUB	HH≠IP	LNG↔IP	RUS≠IP	SI→IP
Czech	-	NGC≠Y	OC≠Y	BR→M2	WTI→M2	DUB→M2	HH→M2	LNG→M2	RUS≠M2	SI→BR	SI→WTI	DUB→SI	HH≠SI	SI→LNG	RUS↔SI	BR≠IP	WTI≠IP	DUB≠IP	HH≠IP	IP→LNG	IP→RUS	SI→IP
Denmark	Y→EC	-	OC→Y	BR→M2	WTI≠M2	DUB→M2	HH→M2	LNG→M2	RUS≠M2	BR→SI	SI→WTI	DUB↔SI	HH≠SI	LNG→SI	RUS→SI	BR→IP	WTI→IP	DUB→IP	HH≠IP	LNG≠IP	RUS→IP	SI→IP
Estonia	EC≠Y	-	-	M2→BR	M2→WTI	DUB≠M2	HH≠M2	LNG≠M2	RUS≠M2	SI→BR	SI→WTI	SI→DUB	HH≠SI	SI→LNG	RUS↔SI	BR→IP	WTI→IP	DUB→IP	HH→IP	LNG↔IP	IP→RUS	SI→IP
Finland	EC→Y	NGC≠Y	Y→OC	BR→M2	WTI→M2	DUB→M2	HH≠M2	M2→LNG	RUS≠M2	BR↔SI	WTI↔SI	DUB↔SI	HH≠SI	LNG≠SI	SI→RUS	BR→IP	WTI→IP	DUB→IP	HH≠IP	LNG≠IP	RUS→IP	SI→IP
France	EC≠Y	-	OC→Y	M2→BR	M2→WTI	M2→DUB	HH≠M2	LNG≠M2	M2→RUS	SI→BR	SI→WTI	SI→DUB	HH≠SI	SI→LNG	RUS≠SI	BR→IP	WTI→IP	DUB→IP	HH→IP	LNG→IP	RUS↔IP	SI→IP
Germany	Y→EC	-	Y→OC	BR≠M2	WTI≠M2	DUB≠M2	HH≠M2	LNG≠M2	RUS→M2	SI→BR	WTI↔SI	SI→DUB	HH≠SI	SI→LNG	RUS≠SI	BR→IP	WTI→IP	DUB→IP	IP→HH	LNG↔IP	IP→RUS	SI→IP
Greece	EC↔Y	Y→NGC	Y→OC	BR≠M2	WTI≠M2	DUB≠M2	HH↔M2	LNG≠M2	RUS≠M2	SI→BR	SI→WTI	SI→DUB	HH≠SI	SI→LNG	RUS→SI	BR→IP	WTI→IP	DUB→IP	HH≠IP	LNG≠IP	RUS≠IP	IP→SI

Hungary	EC≠Y	NGC≠Y	OC→Y	BR→M2	WTI≠M2	DUB≠M2	HH→M2	LNG≠M2	RUS≠M2	BR≠SI	WTI→SI	SI→DUB	HH≠SI	LNG↔SI	RUS→SI	BR→IP	WTI↔IP	DUB→IP	HH≠IP	LNG→IP	IP→RUS	SI≠IP
Iceland	Y→EC	-	-	BR→M2	WTI→M2	DUB→M2	HH≠M2	M2→LNG	RUS≠M2	BR↔SI	WTI↔SI	DUB↔SI	HH→SI	LNG↔SI	SI→RUS	BR→IP	WTI→IP	DUB≠IP	HH≠IP	LNG→IP	RUS≠IP	SI→IP
Ireland	-	-	Y→OC	BR≠M2	WTI≠M2	DUB≠M2	M2→HH	LNG≠M2	RUS≠M2	SI→BR	WTI↔SI	DUB↔SI	HH≠SI	LNG↔SI	SI→RUS	BR≠IP	WTI≠IP	DUB≠IP	HH→IP	LNG≠IP	RUS≠IP	SI≠IP
Israel	Y→EC	Y→NGC	OC≠Y	BR→M2	WTI→M2	DUB→M2	HH≠M2	LNG≠M2	RUS→M2	SI→BR	WTI↔SI	DUB↔SI	HH≠SI	SI→LNG	SI→RUS	BR≠IP	WTI≠IP	DUB≠IP	HH≠IP	LNG→IP	RUS≠IP	SI≠IP
Italy	EC≠Y	NGC→Y	OC↔Y	BR≠M2	WTI≠M2	M2→DUB	HH≠M2	LNG≠M2	RUS≠M2	SI→BR	SI→WTI	SI→DUB	HH≠SI	SI→LNG	SI→RUS	BR→IP	WTI→IP	DUB↔IP	IP→HH	LNG↔IP	RUS↔IP	SI→IP
Japan	EC↔Y	NGC≠Y	OC≠Y	BR≠M2	WTI≠M2	DUB≠M2	HH≠M2	LNG↔M2	M2→RUS	SI→BR	WTI≠SI	SI→DUB	HH≠SI	SI→LNG	RUS≠SI	BR→IP	WTI→IP	DUB→IP	HH≠IP	LNG→IP	IP→RUS	SI≠IP
Korea	Y→EC	-	OC≠Y	BR→M2	WTI≠M2	DUB→M2	HH≠M2	M2→LNG	M2→RUS	BR≠SI	WTI≠SI	DUB↔SI	HH≠SI	LNG↔SI	RUS↔SI	BR→IP	WTI→IP	DUB→IP	HH≠IP	LNG↔IP	IP→RUS	SI→IP
Luxembourg	EC≠Y	-	-	BR→M2	WTI≠M2	DUB→M2	M2→HH	LNG→M2	RUS≠M2	SI→BR	SI→WTI	SI→DUB	HH≠SI	SI→LNG	SI→RUS	BR→IP	WTI→IP	DUB→IP	HH≠IP	LNG≠IP	IP→RUS	SI→IP
Mexico	-	NGC→Y	-	BR→M2	WTI→M2	DUB→M2	HH≠M2	LNG→M2	M2→RUS	BR≠SI	WTI≠SI	DUB≠SI	HH≠SI	SI→LNG	RUS↔SI	BR→IP	WTI→IP	DUB→IP	HH≠IP	LNG→IP	RUS→IP	SI→IP
Netherlands	Y→EC	-	OC→Y	BR≠M2	WTI≠M2	DUB≠M2	HH→M2	LNG≠M2	RUS≠M2	SI→BR	SI→WTI	SI→DUB	HH≠SI	SI→LNG	SI→RUS	BR≠IP	WTI≠IP	DUB≠IP	HH≠IP	LNG≠IP	RUS≠IP	-
NewZealand	EC≠Y	NGC≠Y	OC→Y	BR↔M2	WTI↔M2	DUB↔M2	M2→HH	LNG↔M2	RUS≠M2	BR≠SI	WTI≠SI	DUB≠SI	HH≠SI	SI→LNG	SI→RUS	BR≠IP	WTI↔IP	DUB→IP	IP→HH	IP→LNG	IP→RUS	SI≠IP
Norway	-	-	OC→Y	M2→BR	WTI≠M2	M2→DUB	HH≠M2	LNG≠M2	M2→RUS	SI→BR	WTI↔SI	DUB↔SI	HH≠SI	SI→LNG	SI→RUS	BR≠IP	WTI≠IP	DUB≠IP	HH≠IP	IP→LNG	RUS≠IP	SI≠IP
Poland	Y→EC	NGC↔Y	OC→Y	BR→M2	WTI→M2	DUB→M2	HH→M2	LNG≠M2	RUS≠M2	SI→BR	WTI≠SI	SI→DUB	HH≠SI	SI→LNG	RUS→SI	IP→BR	WTI≠IP	DUB→IP	HH≠IP	LNG≠IP	IP→RUS	SI↔IP

Portugal	Y→EC	-	OC↔Y	BR≠M2	WTI≠M2	DUB→M2	HH≠M2	LNG≠M2	RUS≠M2	SI→BR	SI→WTI	SI→DUB	HH≠SI	SI→LNG	RUS≠SI	BR→IP	WTI→IP	DUB→IP	HH↔IP	LNG→IP	RUS↔IP	SI→IP
Slovakia	EC↔Y	NGC≠Y	-	BR→M2	WTI→M2	DUB→M2	HH≠M2	LNG→M2	RUS↔M2	BR≠SI	WTI→SI	DUB≠SI	SI→HH	LNG≠SI	RUS↔SI	BR↔IP	WTI↔IP	DUB↔IP	HH≠IP	LNG↔IP	IP→RUS	SI≠IP
Slovenia	EC→Y	-	-	BR≠M2	WTI≠M2	DUB≠M2	HH≠M2	LNG≠M2	RUS≠M2	BR→SI	WTI≠SI	DUB→SI	SI→HH	LNG↔SI	RUS↔SI	BR→IP	WTI→IP	DUB→IP	IP→HH	LNG→IP	IP→RUS	SI↔IP
Spain	EC→Y	-	OC≠Y	BR≠M2	WTI→M2	DUB≠M2	M2→HH	M2→LNG	RUS≠M2	SI→BR	SI→WTI	SI→DUB	HH≠SI	SI→LNG	RUS↔SI	BR→IP	WTI→IP	DUB→IP	HH↔IP	LNG↔IP	RUS↔IP	SI→IP
Sweden	EC≠Y	-	OC≠Y	BR↔M2	WTI↔M2	DUB↔M2	HH≠M2	LNG↔M2	RUS≠M2	-	-	-	-	-	-	BR→IP	WTI→IP	DUB→IP	HH≠IP	LNG→IP	IP→RUS	-
Switzerland	EC≠Y	NGC≠Y	-	BR→M2	WTI↔M2	DUB→M2	HH≠M2	M2→LNG	M2→RUS	SI→BR	SI→WTI	SI→DUB	HH≠SI	SI→LNG	SI→RUS	BR→IP	WTI→IP	DUB→IP	HH≠IP	IP→LNG	RUS→IP	SI→IP
Turkey	EC≠Y	NGC≠Y	OC≠Y	BR≠M2	WTI≠M2	M2→DUB	HH≠M2	M2→LNG	RUS≠M2	BR≠SI	WTI≠SI	DUB≠SI	HH≠SI	LNG≠SI	RUS→SI	BR→IP	WTI→IP	DUB→IP	HH≠IP	LNG↔IP	RUS→IP	SI↔IP
UK	EC→Y	-	Y→OC	M2→BR	M2→WTI	M2→DUB	M2→HH	M2→LNG	M2→RUS	SI→BR	SI→WTI	SI→DUB	HH≠SI	SI→LNG	SI→RUS	BR→IP	WTI→IP	DUB→IP	HH≠IP	LNG↔IP	IP→RUS	IP→SI
U.S.	EC→Y	Y→NGC	OC↔Y	BR→M2	WTI→M2	DUB→M2	M2→HH	LNG→M2	M2→RUS	SI→BR	SI→WTI	SI→DUB	HH≠SI	SI→LNG	SI→RUS	IP→BR	WTI≠IP	IP→DUB	HH≠IP	IP→LNG	RUS↔IP	SI↔IP

Notes: →, ↔, ≠ and '-' denotes unidirectional causality, bidirectional causality, no causality and no available data respectively; the abbreviations for measures of energy consumption are defined as follows: EC, total energy consumption; Y, GDP per capita; NGC, natural gas consumption; OC, oil consumption; BR, Brent oil price; WTI, West Texas Intermediate price; DUB, Dubai oil price; HH, Henry Hub price; LNG, Liquefied natural gas price; RUS, Russia natural gas price; M2, liquidity; SI, stock index and IP, industrial production

According to the Granger causality test results of OECD countries, there were no causal relationships; between total energy consumption and economic growth in Australia, Chile, Estonia, France, Hungary, Italy, Luxembourg, New Zealand, Sweden, Switzerland and Turkey; between natural gas consumption and economic growth in Austria, Czech, Finland, Hungary, Japan, New Zealand, Slovakia, Switzerland and Turkey; and between oil consumption and economic growth in Austria, Belgium, Canada, Czech, Israel, Japan, Korea, Spain, Sweden and Turkey. Turkey was the only country which did not have any causal relationship between economic growth and all of the three of the relevant variables.

The general findings of the Granger causality test results showed that; there were no causal relationships between economic growth and total energy consumption, natural gas consumption and oil consumption in OECD countries. The results indicate that energy conservation policies such as reducing energy usage or encouraging technological progress in order to reduce global warming can be applied without damaging economic growth in OECD countries.

According to the causality results concerning oil prices and M2 of the OECD countries, there was a uni-directional causality running from Brent oil prices to M2 (Austria, Canada, Czech, Denmark, Finland, Hungary, Iceland, Israel, Korea, Luxembourg, Mexico, Poland, Slovakia, Switzerland and Turkey) and Dubai oil prices to M2 (Austria, Canada, Czech, Denmark, Finland, Iceland, Israel, Korea, Luxembourg, Mexico, Poland, Slovakia, Switzerland and Turkey) in most of the OECD countries. Furthermore, in many of the OECD countries there was a uni-directional causality running from WTI prices to M2 (Austria, Canada, Czech, Finland, Iceland, Israel, Mexico, Poland, Slovakia, Spain and USA). On the other hand, for many of the OECD countries, it was observed that there were no causal relationships between Brent oil prices and M2 (Chile, Germany, Greece, Ireland, Italy, Japan, Netherlands, Portugal, Slovenia, Spain and Turkey) and between Dubai prices and M2 (Chile, Estonia, Germany, Greece, Hungary, Ireland, Japan, Netherlands, Slovenia and Spain). Additionally, there was no causal relationship between WTI prices and M2 in most of the OECD countries (Belgium, Chile, Denmark, Germany, Greece, Hungary, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, Norway, Portugal, Slovenia and Turkey). According to the causality results between natural gas prices and M2 of OECD countries, there were no causal relationships between HH prices and M2 (Austria, Belgium, Canada, Chile, Estonia, Finland, France, Germany, Iceland, Israel, Italy, Japan, Korea, Mexico, Norway, Portugal, Slovakia, Slovenia, Sweden, Switzerland and Turkey) between LNG prices and M2 (Chile, Estonia, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Netherlands, Norway, Poland, Portugal and Slovenia) and between Russia prices and M2 (Austria, Belgium, Canada, Czech, Denmark, Estonia, Finland, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, New Zealand, Poland, Portugal, Slovenia, Spain, Sweden and Turkey). Only for Estonia, Italy, Portugal and Turkey there were no casual relationships between three of the natural gas prices (HH, LNG and Russia) and M2. Interestingly; the analysis of the cointegrated relationship between energy prices and M2 revealed that the Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while the Henry Hub price will be independent from these countries only holds for Greece, Ireland, Netherlands, Slovenia and UK.

The general findings of the Granger causality test results showed that; in most of the OECD countries there was a uni-directional causality running from oil prices (Brent, WTI and Dubai) to liquidity; while there was no causal relationship between natural gas prices (HH, LNG and Russia) liquidity. The theory suggests that the increase in liquidity would increase aggregate demand, while lowering interest rates; which may in turn increase commodity and oil prices. On the other hand, the increase in oil prices may cause recessions by lowering consumption, investments, stock prices, economic growth and aggregate demand. With respect to all the information given above, the findings indicate that the rise in oil prices may damage liquidity level thus have a negative effect on economic growth in the long-term for OECD countries; while the increase in natural gas prices will not have this affect.

The findings of the causal relationship between oil prices and the stock index of OECD countries showed that in most of the member countries there was a uni-directional causality running from the stock index to Brent oil prices (Australia, Austria, Belgium, Canada, Czech, Estonia, France, Germany, Greece, Ireland, Israel, Italy, Japan, Luxembourg, Netherlands, Poland, Portugal, Spain, Switzerland, UK and USA), to WTI prices (Australia, Austria, Belgium, Canada, Czech, Denmark, Estonia, France, Greece, Italy, Luxembourg, Netherlands, Portugal, Spain, Switzerland, UK and USA) and from the stock index to Dubai prices (Australia, Austria, Belgium, Canada, Estonia, France, Germany, Greece, Hungary, Italy, Japan, Luxembourg, Netherlands, Poland, Portugal, Spain, Switzerland, UK and USA). It was observed that there was a uni-directional causality running from stock index to three of the relevant oil prices (Brent, WTI and Dubai) in almost half of the OECD countries (Australia, Austria, Belgium, Canada, Estonia, France, Greece, Italy, Luxembourg, Netherlands, Portugal, Spain, Switzerland, UK and USA).

The findings of the causal relationship between natural gas prices and stock index of OECD countries showed that in most of the OECD countries there were no causal relationships between HH prices and stock index in most of the OECD countries (Australia, Austria, Canada, Chile, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Switzerland, Turkey, UK and USA). On the other hand, it was observed in most of the OECD countries that there was a uni-directional causality running from stock index to LNG prices (Australia, Austria, Canada, Czech, Estonia, France, Germany, Greece, Israel, Italy, Japan Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Switzerland, UK and USA) and from stock index to Russia prices (Austria, Belgium, Canada, Finland, Iceland, Ireland, Israel, Italy, Luxembourg, Netherlands, New Zealand, Norway, Switzerland, UK and USA) respectively.

Interestingly; the analysis of the cointegrated relationship between energy prices and stock index revealed that the Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while the Henry Hub price will be independent from these countries only holds for Austria, Canada, Italy, Luxembourg, Netherlands, Switzerland, UK, and USA.

The general findings of the Granger causality test results showed that in most of the OECD countries there was a uni-directional causality running from stock index to oil and natural gas prices. These findings indicate that in order to have an effective diversified portfolio, investors can invest in OECD countries when there was a high volatility in energy prices as oil and natural gas price changes do not have a significant effect on the stock market returns of OECD countries.

According to the causality results between oil prices and the industrial production of OECD countries, there was a uni-directional causality running from Brent oil prices to industrial production (Canada, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Japan, Korea, Luxembourg, Mexico, Portugal, Slovenia, Spain, Sweden, Switzerland, Turkey and UK), from WTI prices to industrial production (Canada, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Italy, Japan, Korea, Luxembourg, Mexico, Portugal, Slovenia, Spain, Sweden, Switzerland, Turkey and UK) and from Dubai prices to industrial production (Austria, Canada, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Japan, Korea, Luxembourg, Mexico, New Zealand, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, Turkey and UK) in most of the OECD countries. It was observed that there was a uni-directional causality running from the three relevant oil prices (Brent, WTI and Dubai) to industrial production in more than half the OECD countries (Canada, Denmark, Estonia, Finland, France, Germany, Greece, Japan, Korea, Luxembourg, Mexico, Portugal, Slovenia, Spain, Sweden, Switzerland, Turkey and UK).

According to the causality results concerning the relationship between natural gas prices and the industrial production of OECD countries, it was observed that in most of these countries there were no causal relationships between HH prices and industrial production (Chile, Czech, Denmark, Finland, Greece, Hungary, Iceland, Israel, Japan, Korea, Luxembourg, Mexico, Netherlands, Norway, Poland, Slovakia, Sweden, Switzerland, Turkey, UK and USA). On the other hand, it was observed that in most of the OECD countries there was a uni-directional causality running from LNG prices to industrial production (Australia, Belgium, France, Hungary, Iceland, Israel, Japan, Mexico, Portugal, Slovenia and Sweden). Contrary, to the above results, in most OECD countries there was a uni-directional causality running from industrial production to Russia prices (Canada, Czech, Estonia, Germany, Hungary, Japan, Korea, Luxembourg, New Zealand, Poland, Slovakia, Slovenia, Sweden and UK).

Interestingly; the analysis of the cointegrated relationship between energy prices and industrial production revealed that the Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while the Henry Hub price will be independent from these countries only holds for Mexico.

The general findings of the Granger causality test results showed that in most of the OECD countries there was a uni-directional causality running from oil prices to industrial production; while there was no causality between natural gas prices and industrial production. This indicates that the governments of the OECD countries may choose policies that stabilize the uncertainties in oil prices, as oil price volatility is the reason for volatility in industrial production as well as economic growth. In an environment of volatile oil prices, OECD countries may delay their oil sensitive investments in the short term. However, a long-delay may cause the aggregate industrial output level to decrease and dampen economic activities. As a result, the governments of OECD countries may implement policies that reduce oil price volatility in order to attain a steady industrial production in the short-term. On the other hand; in OECD countries energy policies to stabilize the uncertainty in natural gas prices do not appear to have a significant effect on industrial production as well as economic growth.

Finally, concerning the causal relationships between the stock index and industrial production of OECD countries, it was observed that in most OECD countries there was a uni-directional causality running from the stock index to industrial production (Austria, Belgium, Canada, Chile, Czech, Denmark, Estonia, Finland, France, Germany, Iceland, Italy, Korea, Luxembourg, Mexico, Portugal, Spain and Switzerland). The findings in this study indicate that the services provided by financial intermediaries promote innovation and economic growth; while financial stress affects savings and investments negatively. As a result, in order to obtain sustainable economic growth in OECD countries, it is necessary to undertake financial reforms, such as the liberalization of the finance sector.

In conclusion, within OECD countries generally there were no causal relationships between economic growth and total energy consumption, natural gas consumption, oil consumption respectively; nor between natural gas prices and M2 and industrial production; but a uni-directional causality from oil prices to M2 and industrial production was observed together with a uni-directional causality from the stock index to oil prices, natural gas prices and industrial production (Table 18).

Table 16 Combining the Results of Granger Causality/Block Exogeneity Wald Tests for the GCC Countries

GCC	EC vs Y	NGC vs Y	OC vs Y	BRvs M2	WTI vs M2	DUB vs M2	HH vs M2	LNG vs M2	RUS vs M2	BR vs SI	WTI vs SI	DUB vs SI	HH vs SI	LNG vs SI	RUS vs SI	BR vs IP	WTI vs IP	DUB vs IP	HH vs IP	LNG vs IP	RUS vs IP	SI vs IP
Bahrain	-	-	-	BR↔M2	WTI ↔M2	DUB ↔M2	HH→M2	LNG ≠M2	M2→RUS	BR→SI	WTI →SI	DUB →SI	HH↔SI	LNG ≠SI	RUS≠SI	-	-	-	-	-	-	-
Kuwait	-	-	-	BR↔M2	WTI ↔M2	DUB ↔M2	HH≠M2	LNG ↔M2	RUS≠M2	BR≠SI	WTI≠SI	-	HH≠SI	-	RUS≠SI	BR→IP	WTI →IP	DUB ≠IP	HH≠IP	LNG →IP	IP→RUS	SI≠IP
Oman	EC→Y	-	-	BR→M2	WTI →M2	DUB →M2	M2→HH	M2→LNG	RUS≠M2	BR↔SI	WTI ↔SI	DUB ↔SI	SI→HH	SI→LNG	RUS ↔SI	IP→BR	IP→WTI	IP→DUB	IP→HH	LNG ≠IP	RUS≠IP	SI≠IP
Qatar	EC≠Y	NGC ≠Y	OC≠Y	BR→M2	WTI →M2	DUB →M2	HH→M2	LNG →M2	M2→RUS	SI→BR	SI→WTI	DUB ≠SI	HH≠SI	LNG →SI	RUS≠SI	BR↔IP	WTI ↔IP	DUB ↔IP	HH≠IP	LNG ↔IP	IP→RUS	SI↔IP
Saudi A.	Y→EC	NGC ↔Y	Y→OC	M2→BR	M2→WTI	M2→DUB	HH→M2	LNG ≠M2	RUS →M2	SI→BR	WTI →SI	SI→DUB	HH≠SI	SI→LNG	SI→RUS	BR→IP	WTI →IP	DUB →IP	HH≠IP	LNG ↔IP	IP→RUS	SI→IP
UAE	EC≠Y	-	-	M2→BR	M2→WTI	M2→DUB	HH≠M2	M2→LNG	RUS≠M2	BR→SI	SI→WTI	DUB →SI	HH≠SI	LNG ≠SI	SI→RUS	BR≠IP	WTI →IP	DUB ≠IP	HH≠IP	LNG →IP	IP→RUS	SI≠IP

Notes: →, ↔, ≠ and '-' denotes unidirectional causality, bidirectional causality, no causality and no available data respectively; the abbreviations for measures of energy consumption are defined as follows: EC, total energy consumption; Y, GDP per capita; NGC, natural gas consumption; OC, oil consumption; BR, Brent oil price; WTI, West Texas Intermediate price; DUB, Dubai oil price; HH, Henry Hub price; LNG, Liquefied natural gas price; RUS, Russia natural gas price; M2, liquidity; SI, stock index and IP, industrial production

According to the Granger causality test results from the GCC countries, there were not any causal relationships between total energy consumption and economic growth (Qatar and UAE) in most of these countries. On the other hand it is not possible to make a general conclusion for the relationship between both oil and natural gas consumption and economic growth of GCC countries. Only for Qatar, was there no evidence of causal relationship between economic growth and total energy, oil and natural gas consumption.

The general findings of the Granger causality test results showed that; there were no causal relationships between economic growth and total energy consumption, natural gas consumption and oil consumption in GCC countries. The results indicate that energy conservation policies such as reducing energy use or encouraging technological progress in order to reduce global warming can be applied without damaging economic growth in Qatar.

Concerning the results of the causal relationship between three of the oil prices (Brent, WTI and Dubai) and M2 of GCC countries, it was observed that causal relationship of three of the oil prices and M2 results are same for this group of countries and it is not possible to generalize the results as they are equally distributed across the countries.

The results of the causal relationship between three of the natural gas prices (HH, LNG and Russia) and M2 of GCC countries showed that, in most of the GCC countries there were no causal relationships between natural gas prices and M2, and in many of the GCC countries there was a uni-directional causality running from M2 to oil prices. When the causal relationship between the six of the energy prices and the M2 of GCC countries considered, it was observed that in most of the GCC countries there was a uni-directional causality from M2 to energy prices.

Interestingly; the analysis of the cointegrated relationship between energy prices and M2 revealed that the Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while the Henry Hub price will be independent from these countries does not hold for for members of GCC.

The liquidity theory suggests that an increase in liquidity would increase aggregate demand, while lowering interest rates; this in turn may raise commodity and oil prices. On the other hand, the increase in oil prices can cause recessions by lowering consumption, investments, stock prices, economic growth and aggregate demand. With respect to the information given above, the findings indicate that a rise in oil prices may damage the liquidity level in the long-term for Bahrain, Kuwait, Oman and Qatar countries; while the increase in natural gas prices will not generally have an effect in GCC countries.

According to the results of the causal relationship between three of the oil prices (Brent, WTI and Dubai) and stock index of GCC countries, it was observed that the results vary from country to country and across oil prices. The findings showed that, in most of the GCC countries there was a uni-directional causality from oil prices to the stock index and in many of the GCC countries there was a uni-directional causality from the stock index to oil prices. According to the results of the causal relationship between three of the natural gas prices (HH, LNG and Russia) and the stock index of GCC countries, it was observed that, in most of the GCC countries there were no causal relationships between natural gas prices and the stock index, and in many of the GCC countries there was a uni-directional causality from the stock index to oil prices. When the causal relationship between the six of the energy prices and the stock index of GCC countries is considered, it was observed that in most GCC countries there were no causal relationships between the relevant variables whereas, in many of the GCC countries there was a uni-directional causality from the stock index to energy prices.

Interestingly; the analysis of the cointegrated relationship between energy prices and stock index revealed that the Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while the Henry Hub price will be independent from these countries does not hold for members of GCC.

These findings in this study indicate that oil demand shortage or oil supply surplus can cause oil prices to decrease, leading to smaller revenues and reduced stock market returns in GCC countries. As a result, investors in GCC countries can buy futures contracts or use financial derivatives in order to hedge the demand uncertainty as their stock market is affected from the changes in oil prices. On the other hand policies to avoid natural gas price uncertainty may not have any impact on the stock markets of GCC countries.

According to the causality results concerning the relationship between oil prices (Brent, WTI and Dubai) and industrial production of GCC countries, it was observed that causal relation of three of the oil prices and industrial production were generally similar for the same group of countries. In most of the GCC countries, there was a uni-directional causality running from oil prices to industrial production.

The results of the causal relationship between three of the natural gas prices (HH, LNG and Russia) and industrial production of GCC countries showed that, in most of the GCC countries there was no causal relationships between natural gas prices and industrial production, and in many of the GCC countries there was a uni-directional causality running from industrial production to natural gas prices. When the causal relationship between the six of the energy prices and the stock index of GCC countries considered, it was observed that in most of the GCC countries there were no causal relationships between the relevant variables, and in many of the GCC countries there was a uni-directional causality from energy prices to industrial production.

Interestingly; the analysis of the cointegrated relationship between energy prices and industrial production revealed that the Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while the Henry Hub price will be independent from these countries does not hold for members of GCC.

These results indicate that the governments of the GCC countries may choose policies that stabilize the uncertainties in oil prices, since oil price volatility is the reason for the volatility in industrial production as well as in economic growth. For GCC countries, an increase in oil prices would increase the export earnings and in turn the industrial output level. The danger will occur when the oil prices rise too high and stay at that level for a long-time. In that case, energy demand would start to decrease, which may raise oil supply and lead to a reduction in oil prices which would damage the budget of oil-exporting countries. As a result, the governments of GCC countries may implement policies to reduce the oil price volatility in order to maintain steady industrial production in the short-term. The economies of GCC countries are heavily dependent on oil exports. An uncertainty in oil prices can easily affect their income levels. These countries should diversify their income sources to reduce the impact of oil price shocks on economic growth. On the other hand; energy policies to stabilize the uncertainty in natural gas prices do not have a significant effect on industrial production as well as economic growth in GCC countries.

Finally, for the causal relationships between the stock index and industrial production of GCC countries, it was observed that in most of these countries there were no causal relationships between the stock index and industrial production. The results indicate that policies to promote economic growth or finance sector liberalization would not have any significant effect in GCC countries.

In conclusion, across GCC countries generally, there were no causal relationships between economic growth and total energy consumption natural gas prices and M2, the stock index, industrial production respectively, and stock index and industrial production. On the other there was a unidirectional causality running from oil prices to the stock index and industrial production (Table 18).

Table 17 Combining the Results of Granger Causality/Block Exogeneity Wald Tests for the OPEC Countries

OPEC	EC vs Y	NGC vs Y	OC vs Y	BRvs M2	WTI vs M2	DUB vs M2	HH vs M2	LNG vs M2	RUS vs M2	BR vs SI	WTI vs SI	DUB vs SI	HH vs SI	LNG vs SI	RUS vs SI	BR vs IP	WTI vs IP	DUB vs IP	HH vs IP	LNG vs IP	RUS vs IP	SI vs IP
Algeria	-	NGC≠Y	OC≠Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Angola	Y→EC	-	-	BR→M2	WTI≠M2	DUB≠M2	M2→HH	LNG≠M2	RUS↔M2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecuador	Y→EC	NGC≠Y	OC≠Y	BR≠M2	WTI≠M2	DUB→M2	HH↔M2	LNG≠M2	RUS↔M2	BR≠SI	WTI≠SI	DUB≠SI	HH≠SI	LNG≠SI	RUS→SI	IP→BR	IP→WTI	IP→DUB	HH≠IP	LNG≠IP	RUS≠IP	SI≠IP
Iran	EC≠Y	Y→NGC	Y→OC	-	-	-	-	-	-	-	-	-	-	-	-	BR≠IP	WTI≠IP	DUB≠IP	HH≠IP	LNG→IP	RUS≠IP	-
Iraq	Y→EC	-	-	BR≠M2	WTI≠M2	DUB≠M2	M2→HH	LNG≠M2	RUS≠M2	-	-	-	-	-	-	-	-	-	-	-	-	-
Kuwait	-	-	-	BR↔M2	WTI↔M2	DUB↔M2	HH≠M2	LNG↔M2	RUS≠M2	BR≠SI	WTI≠SI	-	HH≠SI	-	RUS≠SI	BR→IP	WTI→IP	DUB≠IP	HH≠IP	LNG→IP	IP→RUS	SI≠IP
Nigeria	EC≠Y	-	-	BR≠M2	WTI≠M2	DUB≠M2	HH≠M2	LNG≠M2	RUS↔M2	BR≠SI	WTI→SI	DUB≠SI	SI→HH	LNG≠SI	RUS→SI	-	-	-	-	-	-	-
Qatar	EC≠Y	NGC≠Y	OC≠Y	BR→M2	WTI→M2	DUB→M2	HH→M2	LNG→M2	M2→RUS	SI→BR	SI→WTI	DUB≠SI	HH≠SI	LNG→SI	RUS≠SI	BR↔IP	WTI↔IP	DUB↔IP	HH≠IP	LNG↔IP	IP→RUS	SI↔IP
Saudi A.	Y→EC	NGC↔Y	Y→OC	M2→BR	M2→WTI	M2→DUB	HH→M2	LNG≠M2	RUS→M2	SI→BR	WTI→SI	SI→DUB	HH≠SI	SI→LNG	SI→RUS	BR→IP	WTI→IP	DUB→IP	HH≠IP	LNG↔IP	IP→RUS	SI→IP
UAE	EC≠Y	-	-	M2→BR	M2→WTI	M2→DUB	HH≠M2	M2→LNG	RUS≠M2	BR→SI	SI→WTI	DUB→SI	HH≠SI	LNG≠SI	SI→RUS	BR≠IP	WTI→IP	DUB≠IP	HH≠IP	LNG→IP	IP→RUS	SI≠IP
Venezuela	-	NGC≠Y	Y→OC	BR→M2	WTI→M2	DUB≠M2	M2→HH	LNG↔M2	RUS≠M2	BR≠SI	WTI≠SI	DUB≠SI	HH≠SI	LNG≠SI	RUS≠SI	BR→IP	WTI≠IP	DUB→IP	IP→HH	LNG→IP	RUS→IP	SI≠IP

Notes: →, ↔, ≠ and '-' denotes unidirectional causality, bidirectional causality, no causality and no available data respectively; the abbreviations for measures of energy consumption are defined as follows: EC, total energy consumption; Y, GDP per capita; NGC, natural gas consumption; OC, oil consumption; BR, Brent oil price; WTI, West Texas Intermediate price; DUB, Dubai oil price; HH, Henry Hub price; LNG, Liquefied natural gas price; RUS, Russia natural gas price; M2, liquidity; SI, stock index and IP, industrial production

According to the results of the Granger causality tests in OPEC countries; it was observed that there were no causal relationships between total energy consumption and economic growth (Iran, Nigeria, Qatar and UAE), additionally, there was a uni-directional causality running from economic growth to total energy consumption (Angola, Ecuador, Iraq and Saudi Arabia) in most of the OPEC countries. There were no causal relationships between natural gas consumption and economic growth (Algeria, Ecuador, Qatar and Venezuela), between oil consumption and economic growth (Algeria, Ecuador and Qatar), while on the other hand there was a uni-directional causality running from economic growth to oil consumption (Iran, Saudi Arabia and Venezuela) in OPEC countries.

The general findings from the Granger causality tests showed that; there were no causal relationships between economic growth and total energy consumption, natural gas consumption and oil consumption in OPEC countries. The results indicate that energy conservation policies such as reducing energy usage or encouraging technological progress in order to reduce global warming can be applied without damaging economic growth in OPEC countries.

According to the results of the causal relationship between energy prices (Brent, WTI, Dubai, HH, LNG and Russia) and M2 of OPEC countries, it was observed that the causal relationship of three of the oil prices and M2 results are generally similar for the same group of countries. The findings showed that, in most of the OPEC countries there were no causal relationships between three of the oil prices and M2 and between three of the natural gas prices and M2.

Interestingly; the analysis of the cointegrated relationship between energy prices and M2 revealed that the Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while the Henry Hub price will be independent from these countries only holds for Iraq.

The liquidity theory suggests that an increase in liquidity would increase aggregate demand, while lowering interest rates; which may in turn raise commodity and oil prices. On the other hand, the increase in oil prices may cause recessions by lowering consumption, investments, stock prices, economic growth and aggregate demand. With respect to the information given above, the findings indicate that a rise in oil and natural gas prices may not damage liquidity level nor, generally, the economic growth in the long-term for OPEC countries. Furthermore; a monetary expansion policy would promote economic growth without affecting natural gas prices in OPEC countries.

According to the results concerning the causal relationship between energy prices (Brent, WTI, Dubai, HH, LNG and Russia) and the stock index of OPEC countries, it was observed that the causal relationship of three of the oil prices and the stock index. Additionally, natural gas prices and stock index results are generally similar for the same group of countries. The findings show that, in most of the OPEC countries there were no causal relationships between three of the oil prices and the stock index, and no causal relationship between three of the natural gas prices and the stock index.

Interestingly; the analysis of the cointegrated relationship between energy prices and stock index revealed that the Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while the Henry Hub price will be independent from these countries only holds for Venezuela.

These findings indicate that investors can invest in OPEC countries when there was a high volatility in energy prices as oil since natural gas price changes do not have a significant effect on the stock market returns of OPEC countries. Furthermore, policies to avoid natural gas price uncertainty may not have any impact on the stock index of OPEC countries.

According to the results pertaining to the causal relationship between energy prices (Brent, WTI, Dubai, HH, LNG and Russia) and industrial production of OPEC countries, it was observed that the outcomes are generally similar for the same group of countries and in most of the OPEC countries there was a uni-directional causality from oil prices to industrial production, furthermore, in many OPEC countries there were no causal relationships between oil prices and industrial production. Additionally, there were no causal relationships between three of the natural gas prices and industrial production in most of the OPEC countries.

Interestingly; the analysis of the cointegrated relationship between energy prices and industrial production revealed that the Brent, WTI, Dubai, Japan and Russia prices will act in the same direction while the Henry Hub price will be independent from these countries does not hold for members of OPEC.

These results indicate that the governments of the OPEC countries can select policies that stabilize the uncertainties in oil prices, since it is oil price volatility that is the reason for the volatility in industrial production as well as economic growth. For OPEC countries, an increase in oil prices would increase the export earnings and thus, the industrial output level. The danger would occur when the oil prices rise too high and stay at this level for a long time. In that case, energy demand would start to decrease, which may increase oil supply and lead to a reduction in oil prices which would damage the budget of oil-exporting countries. As a result, the governments of OPEC countries may implement policies that reduce the oil price volatility in order to attain a steady industrial production in the short-term. The economies of OPEC countries are heavily dependent on oil exports therefore, uncertainty in oil prices can easily affect their income levels. These countries can diversify their income sources or reduce the impact of oil price shocks on economic growth. On the other hand; energy policies to stabilize uncertainty in natural gas prices do not have a significant effect on industrial production or the economic growth in OPEC countries.

Finally, for the causal relationships between the stock index and industrial production of OPEC countries, it was observed that in most of the OPEC countries there were no causal relationships between the stock index and industrial production. Thus, policies to promote economic growth or finance sector liberalization would not have any significant effect in OPEC countries.

In conclusion, across the OPEC countries, generally, there were no causal relationships between economic growth and total energy consumption, natural gas consumption, oil consumption;M2 and both oil and natural gas prices; the stock index and both oil and natural gas prices; industrial production and natural gas prices, and between stock index and industrial production. On the other hand, there was a uni-directional causality running from oil prices to industrial production (Table 18).

Table 18 Summary of Granger Causality Test Results

	EC vs Y	NGC vs Y	OC vs Y	OIL vs M2	NG vs M2	OIL vs SI	NG vs SI	OIL vs IP	NG vs IP	SI vs IP
OECD	EC≠Y	NGC≠Y	OC≠Y	OIL→M2	NG≠M2	SI→OIL	SI→NG	OIL→IP	NG≠IP	SI→IP
GCC	EC≠Y	NGC≠Y	OC≠Y	COUNTRY SPECIFIC	NG≠M2	OIL→SI	NG≠SI	OIL→IP	NG≠IP	SI≠IP
OPEC	EC≠Y	NGC≠Y	OC≠Y	OIL≠M2	NG≠M2	OIL≠SI	NG≠SI	OIL→IP	NG≠IP	SI≠IP

Notes: →, ↔, ≠ and '-' denotes unidirectional causality, bidirectional causality, no causality and no available data respectively; abbreviations for measures of energy consumption defined as follows: EC, total energy consumption; Y, GDP per capita; NGC, natural gas consumption; OC, oil consumption; OIL, oil prices; NG, natural gas prices; M2, liquidity; SI, stock index and IP, industrial production

CHAPTER V

5 CONCLUSIONS

The purpose of this study was to analyze the countries in the group of OECD, GCC and OPEC under the selected data periods to test whether there are long-term or short-term relationships between world's total, oil and natural gas consumption and the economic growth in the selected countries. Furthermore, various tools were used to test whether there are long-term or short-term relationships between the world energy prices (Brent oil, WTI, Dubai, HH, Japan and Russia) and the liquidity level, stock market and industrial production of the target countries and finally, to test whether there was long-term or short-term relationship between financial development and the economic growth of the these countries.

The first investigated relationship was that between economic growth and total energy consumption, natural gas consumption, oil consumption respectively. Generally for OECD countries, there were no long-term relationships between total energy consumption and economic growth and also between oil consumption and economic growth; however, long-term relationship was found between natural gas consumption and economic growth. Across the GCC countries, there was long-term relationship between economic growth and total energy, natural gas and oil consumption respectively. Generally, for OPEC countries, while there was a long-term relationship between total energy consumption and economic growth, there was no long-term relationship between oil consumption and economic growth. These findings demonstrate that the GCC and OECD countries having their own energy sources direct them to consumption in order to contribute to GDP, thus, energy consumption is the main source of their economic growth. The general findings from the application of the Granger causality tests show that; there were no causal relationships between economic growth and total energy consumption, natural gas consumption and oil consumption respectively in the OECD, GCC and OPEC countries. These findings are similar to those of many researchers who support the neutrality hypothesis (Masih & Masih, 1996; Payne, 2009; Pirlogea & Cicea, 2012; Yildirim et al., 2012, Yıldırım et al., 2014).These results indicate that energy conservation policies such as reducing energy use or encouraging technological progress in order to reduce global warming can be applied without damaging economic growth in OECD, GCC and OPEC countries.

The relationship between energy prices (Brent, WTI, Dubai, HH, LNG and Russia) and liquidity was the subject of the second investigation. For most OECD, GCC and OPEC countries; there were long-term relationships between the energy prices and liquidity. The general findings of the Granger causality test results showed that in most of the OECD countries there was a uni-directional causality running from oil prices (Brent, WTI and Dubai) to liquidity, which is in line with the results of Ratti and Vespignani (2013a). It is not possible to generalize the results from the analysis of the GCC countries since the results are country specific however, there were no causal relationships between oil prices and liquidity in most of the OPEC countries. Furthermore, when the relationship between natural gas prices (HH, LNG and Russia) and liquidity was investigated an absence of causality between natural gas prices and liquidity was detected in most of the OECD, GCC and OPEC countries. This finding was not in line with those of Belke et al. (2010), Ratti and Vespignani (2013b) and Kang et al. (2016). Concerning the liquidity theory, the increase in liquidity would increase aggregate demand, while lowering interest rates; which may in turn raise commodity and oil prices. On the other hand, the increase in oil prices may cause recessions by lowering consumption, investments, stock prices, economic growth and aggregate demand. The findings of the current study indicate that a rise in oil prices may damage liquidity level, and consequently, have a negative effect on economic growth in the long-term for OECD countries; while this will not have an effect in OPEC countries. Furthermore, while the increase in natural gas prices will not have any negative effect on the liquidity level of the OECD, GCC and OPEC countries, a monetary expansion policy would promote economic growth without affecting oil prices in the OECD and OPEC countries, or natural gas prices in OECD, GCC and OPEC countries.

The third relationship to be examined was between energy prices and stock index. For most OECD, GCC and OPEC countries; there were no long-term relationships between energy prices and the stock index. The general findings of the Granger causality test results showed that; in most of the OECD countries there was a uni-directional causality running from stock index to oil prices; on the other hand, in most of the GCC countries there was a uni-directional causality running from oil prices to stock index, which is in line with the findings of Basher and Sadorsky (2006), Masih et al. (2011), Park and Ratti (2008) and Sadorsky (1999), Furthermore, in most of the OPEC countries there were no causal relationships between oil prices and the stock index, in line with the results of Iscan's study (2010). An oil demand shortage or oil supply surplus can cause oil prices to decrease leading to smaller revenues and reduced stock market returns in GCC countries. As a result, investors in GCC countries can buy futures contracts or use financial derivatives in order to hedge the demand uncertainty. Furthermore, to achieve an effective diversified portfolio, investors can invest in OECD and OPEC countries when there was a high volatility in energy prices as oil and natural gas price changes do not have a significant effect on stock market returns of OECD and OPEC countries. For most of the OECD countries, there was a uni-directional causality running from stock index to natural gas prices which is in line with the results from research undertaken by Yilmaz (2013); however, there were no causal relationships between natural gas prices and the stock index of both GCC and OPEC countries, which is in agreement with the results obtained by Acaravci et al. (2012). Finally, policies to avoid natural gas price uncertainty may not have any impact on stock index of OECD, GCC and OPEC countries.

The relationship between energy prices and industrial production accounts for the fourth relationship. For most of the OECD, GCC and OPEC countries; there were no long-term relationships between the energy prices and industrial production. The general findings of the Granger causality tests showed thatin most of the OECD, GCC and OPEC countries there was a uni-directional causality running from oil prices to industrial production and the results are in line with the studies of Burbidge and Harrison (1984) and Cuñado and Gracia (2003). These results indicate that three of the country groups could choose energy policies that stabilize the uncertainties in oil prices, since oil price volatility is the reason for the volatility in industrial production as well as in economic growth. In an environment of volatile oil prices, OECD countries may delay their oil sensitive investments in the short-term. However, a long-delay may cause aggregate industrial output level to decrease and dampen economic activities. For GCC and OPEC countries, an increase in oil prices would increase the export earnings, and consequently, the industrial output level. The danger will occur when the oil prices are too high and remain at that level for a long-time. In that case, energy demand would start to decrease, which may cause oil surplus and lead to a reduction in oil prices which would damage the budget of oil-exporting countries. As a result, the governments of OECD, GCC and OPEC countries may implement policies that reduce the oil price volatility in order to have steady industrial production in the short-term. The economies of GCC and OPEC countries are heavily dependent on oil exports. An uncertainty in oil prices can easily affect their income levels. These countries may diversify their income sources or reduce the impact of oil price shocks on economic growth (Fitti, Guesmi, & Teulon, 2014).On the other hand; there were no causal relationships between natural gas prices and industrial production in most of the OECD, GCC and OPEC countries. This means that energy policies to stabilize the uncertainty in natural gas prices would not have a significant effect on industrial production as well as economic growth in OECD, GCC and OPEC countries.

The last relationship is between the stock index and industrial production. In this study, stock index is considered as a proxy for financial development and industrial production is considered as a proxy for economic growth. The findings show that there were no long-term relationships between financial development and economic growth for most of the OECD, GCC and OPEC countries. On the other hand, the findings of the Granger causality test showed that while there was uni-directional causality running from the stock index to industrial production in most of the OECD countries, the absence of causality between the stock index and industrial production was supported in most of the GCC and OPEC countries. The findings from OECD countries support the view of Schumpeter (1934), which advocates the supply-leading hypothesis, and the findings of GCC and OPEC countries support the view of Lucas (1988) and Stern (1989), endorsing the neutrality hypothesis. This means that for OECD countries, the services provided by financial intermediaries promote innovation and economic growth; while financial stress affects savings and investments negatively. As a result, in order to obtain sustainable economic growth in OECD countries, it is necessary to undertake financial reforms, such as the liberalization of the finance sector. These results are in line with the work of Caporale et al.

(2005), Choe and Moosa (1999), Christopoulos and Tsionas (2004), Hsueh et al. (2013), Thangavelu and Jiunn (2004), Uddin et al. (2003) and Xu (2000). On the other hand, policies to promote economic growth or finance sector liberalization would not have any significant effect in GCC and OPEC countries; this is in line with the findings of Abu-Bader and Abu-Qarn (2006), Hayo (1999), and Menyah et al. (2014).

The determination of the relationships between the relevant variables varies across countries in regard to their economic policies, proximity to raw material sources, energy production capacities, energy reserves or stock markets. This causes commodity prices, stock prices and even output level to be affected by energy price changes (Arouri, Lahiani, & Nguyen, 2011). As a result it is difficult to reach a common associative consequence between countries; however, it is possible to propose some generalizations and interpretations. The empirical findings of the current study indicate that there were multidirectional relationships between the above-mentioned variables. These relationships can be explained by the factors that each country group owns within the framework of their energy sources, financial markets, economic conditions and geographical positions. The data accrued and analyzed in this thesis is presented as a contribution to guide policymakers, global investors and researchers in constituting an extensive country specific energy, macroeconomic and financial policies.

This study does not cover the period after 2014. There have been very important issues in energy markets since that year and it is essential that there is further research to capture the latest events in the energy markets, understand those developments and consider their likely effects on the countries of the. This future work could be undertaken by applying the models and approaches in the current study to an enlarged data set covering an extended period of time.

REFERENCES

Abu-Bader, S., & Abu-Qarn, A. S. (2006). Financial development and economic growth nexus: Time series evidence from middle eastern and north African countries. *Monaster Center for Economic Research's Discussion Paper*, (06-09).

Acaravci, A., Ozturk, I., & Kandir, S. Y. (2012). Natural gas prices and stock prices: Evidence from EU-15 countries. *Economic Modelling*, *29*(5), 1646-1654.

Ahmed, H. J. A., Bashar, O. H., & Wadud, I. M. (2012). The transitory and permanent volatility of oil prices: What implications are there for the US industrial production? *Applied energy*, *92*, 447-455.

Alam, M.S. (2006). Economic Growth with Energy. Munich Personnel RePEc Archive. Retrieved from https://mpra.ub.uni-muenchen.de/id/eprint/1260

Al-Iriani, M. A. (2006). Energy–GDP relationship revisited: an example from GCC countries using panel causality. *Energy policy*, *34*(17), 3342-3350.

Al-Malkawi, H. A. N., Marashdeh, H. A., & Abdullah, N. (2012). Financial development and economic growth in the UAE: Empirical assessment using ARDL approach to co-integration. *International Journal of Economics and Finance*, *4*(5), p105.

Alquist, R., & Kilian, L. (2010). What do we learn from the price of crude oil futures?. *Journal of Applied Econometrics*, *25*(4), 539-573.

Al-Yousif, Y. K. (2002). Financial development and economic growth: another look at the evidence from developing countries. *Review of Financial Economics*, *11*(2), 131-150.

Ang, J. B., & McKibbin, W. J. (2007). Financial liberalization, financial sector development and growth: evidence from Malaysia. *Journal of development economics*, *84*(1), 215-233.

Apergis, N., & Payne, J. E. (2009). Energy consumption and economic growth in Central America: evidence from a panel cointegration and error correction model. *Energy Economics*, *31*(2), 211-216.

Apergis, N., & Payne, J. E. (2010a). Renewable energy consumption and economic growth: evidence from a panel of OECD countries. *Energy policy*,*38*(1), 656-660.

Apergis, N., & Payne, J. E. (2010b). Renewable energy consumption and growth in Eurasia. *Energy Economics*, *32*(6), 1392-1397.

Apergis, N., & Payne, J. E. (2010c). Natural gas consumption and economic growth: a panel investigation of 67 countries. *Applied Energy*, *87*(8), 2759-2763.

Arouri, M. E. H., Lahiani, A., & Nguyen, D. K. (2011). Return and volatility transmission between world oil prices and stock markets of the GCC countries. *Economic Modelling*, *28*(4), 1815-1825.

Arshad, R., & Bashir, A. (2015). Impact of Oil and Gas Prices on Stock Returns: Evidence from Pakistan's Energy Intensive Industries. *International Review of Social Sciences* 3(4), 156-168.

Bangake, C., & Eggoh, J. C. (2011). Further evidence on finance-growth causality: A panel data analysis. *Economic Systems*, *35*(2), 176-188.

Bańbura, M., & Rünstler, G. (2011). A look into the factor model black box: publication lags and the role of hard and soft data in forecasting GDP. *International Journal of Forecasting*, *27*(2), 333-346.

Barsky, R., & Kilian, L. (2004). *Oil and the Macroeconomy since the 1970s*(No. w10855). National Bureau of Economic Research.

Basher, S. A., & Sadorsky, P. (2006). Oil price risk and emerging stock markets. *Global Finance Journal*, *17*(2), 224-251.

Başar, S., & Temurlenk, M. S. (2007). Çevreye Uyarlanmış Kuznets Eğrisi: Türkiye Üzerine Bir Uygulama. *Atatürk* Üniversitesi *İktisadi ve İdari Bilimler Dergisi*, *21*(1).

Baumeister, C., & Kilian, L. (2015). Understanding the Decline in the Price of Oil since June 2014. CFS Working Paper No. 501, Available at SSRN: http://ssrn.com/abstract=2557316

Behmiri, N. B., & Manso, J. R. P. (2014). The linkage between crude oil consumption and economic growth in Latin America: The panel framework investigations for multiple regions. *Energy*, *72*, 233-241.

Belke, A., Orth, W., & Setzer, R. (2010). Liquidity and the dynamic pattern of asset price adjustment: A global view. *Journal of Banking & Finance*, *34*(8), 1933-1945.

Brooks, C. (2008). *Introductory econometrics for finance*. Cambridge university press

Brown, S. P., & Yücel, M. K. (2009). Market arbitrage: European and North American natural gas prices. *The Energy Journal*, 167-185.

Burbidge, J., & Harrison, A. (1984). Testing for the effects of oil-price rises using vector autoregressions. *International Economic Review*, 459-484.

Calderón, C., & Liu, L. (2003). The direction of causality between financial development and economic growth. *Journal of development economics*, *72*(1), 321-334.

Caporale, G. M., Howells, P., & Soliman, A. M. (2005). Endogenous growth models and stock market development: evidence from four countries. *Review of Development Economics*, *9*(2), 166-176.

Chimobi, O. P., & Igwe, O. L. (2010). Budget deficit, money supply and inflation in Nigeria. *European Journal of Economics, Finance and Administrative Sciences*, *19*(5), 52-60.

Choe, C., & Moosa, I. A. (1999). Financial system and economic growth: the Korean experience. *World Development*, *27*(6), 1069-1082.

Christopoulos, D. K., & Tsionas, E. G. (2004). Financial development and economic growth: evidence from panel unit root and cointegration tests. Journal of development Economics, 73(1), 55-74.

Cuche, N. A., & Hess, M. K. (2000). Estimating monthly GDP in a general Kalman filter framework: evidence from Switzerland. *Economic and Financial Modelling*, *7*(4), 153-194.

Cuñado, J., & de Gracia, F. P. (2003). Do oil price shocks matter? Evidence for some European countries. *Energy Economics*, *25*(2), 137-154.

Cologni, A., & Manera, M. (2008). Oil prices, inflation and interest rates in a structural cointegrated VAR model for the G-7 countries. *Energy economics*,*30*(3), 856-888.

Demetriades, P. O., & Hussein, K. A. (1996). Does financial development cause economic growth? Time-series evidence from 16 countries. *Journal of development Economics*, *51*(2), 387-411.

DePratto, B., De Resende, C., & Maier, P. (2009). *How changes in oil prices affect the macroeconomy* (No. 2009, 33). Bank of Canada Working Paper.

Dergiades, T., Martinopoulos, G., & Tsoulfidis, L. (2013). Energy consumption and economic growth: Parametric and non-parametric causality testing for the case of Greece. *Energy Economics*, *36*, 686-697.

Diamond, D. W., & Dybvig, P. H. (1983). Bank runs, deposit insurance, and liquidity. *The journal of political economy*, 401-419.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association*, *74*(366a), 427-431.

Eggoh, J. C., Bangaké, C., & Rault, C. (2011). Energy consumption and economic growth revisited in African countries. *Energy Policy*, *39*(11), 7408-7421.

EIA, U. (2016) *US Energy Information Administration (EIA)*, Available at: http:// http://www.eia.gov/todayinenergy/detail.cfm?id=18571

EIA, U. (2014) *US Energy Information Administration (EIA)*, Available at: http://www.eia.gov/forecasts/aeo/er/early_production.cfm

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, 251-276.

Erdal, G., Erdal, H., & Esengün, K. (2008). The causality between energy consumption and economic growth in Turkey. *Energy Policy*, *36*(10), 3838-3842.

Escudero, W. S. (2000). A Primer on Unit-roots and Cointegration. *Universidad Nacional de La Plata*.

Ewing, B. T., & Thompson, M. A. (2007). Dynamic cyclical comovements of oil prices with industrial production, consumer prices, unemployment, and stock prices. *Energy Policy*, *35*(11), 5535-5540.

Fatai, K., Oxley, L., & Scrimgeour, F. G. (2004). Modelling the causal relationship between energy consumption and GDP in New Zealand, Australia, India, Indonesia, The Philippines and Thailand. *Mathematics and Computers in Simulation*, *64*(3), 431-445.

Ferderer, J. P. (1997). Oil price volatility and the macroeconomy. *Journal of macroeconomics*, *18*(1), 1-26.

Ftiti, Z., Guesmi, K., & Teulon, F. (2014). *Oil shocks and Economic Growth in OPEC countries* (No. 2014-064).

Fulop, G., & Gyomai, G. (2012). Transition of the OECD CLI system to a GDP-based business cycle target, OECD, Available at: http://www.oecd.org/std/leading-indicators/49985449.pdf

Gebre-Mariam, Y. K. (2011). Testing for unit roots, causality, cointegration, and efficiency: The case of the northwest US natural gas market. *Energy*, *36*(5), 3489-3500.

Granger, C. W. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica: Journal of the Econometric Society*, 424-438.

Granger, C. W. (1981). Some properties of time series data and their use in econometric model specification. *Journal of econometrics*, *16*(1), 121-130.

Greenwood, J., & Jovanovic, B. (1989). *Financial development, growth, and the distribution of income* (No. w3189). National Bureau of Economic Research.

Guesmi, K., & Fattoum, S. (2014). *Measuring contagion effects between crude oil and OECD stock markets* (No. 2014-090).

Gujarati, D. N. (1999). Temel ekonometri (Çev. U. Senesen ve GG Senesen).*İstanbul, Turkey: Literatür Yayınları*.

Gurley, J. G., & Shaw, E. S. (1955). Financial aspects of economic development. *The American Economic Review*, 515-538.

Hamilton, J. D. (1983). Oil and the macroeconomy since World War II. *The Journal of Political Economy*, 228-248.

Hamilton, J. D. (2008). *Understanding crude oil prices* (No. w14492). National Bureau of Economic Research.

Hamilton, J. D. (2011). *Historical oil shocks* (No. w16790). National Bureau of Economic Research.

Hannon, B. (1973). The structure of ecosystems. *Journal of theoretical biology*,*41*(3), 535-546.

Hayo, B. (1999). Money-output Granger causality revisited: an empirical analysis of EU countries. *Applied Economics*, *31*(11), 1489-1501.

Heidari, H., Katircioglu, S. T., & Saeidpour, L. (2013). Natural gas consumption and economic growth: Are we ready to natural gas price liberalization in Iran?. *Energy Policy*, *63*, 638-645.

Hsueh, S. J., Hu, Y. H., & Tu, C. H. (2013). Economic growth and financial development in Asian countries: a bootstrap panel Granger causality analysis. *Economic Modelling*, *32*, 294-301.

International Energy Agency. (2015). *Key world energy statistics*. International Energy Agency.

İscan, E. (2010). Petrol fiyatının hisse senedi piyasası üzerindeki etkisi. *Maliye Dergisi*, *158*, 607-617.

Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of economic dynamics and control*, *12*(2), 231-254.

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica: Journal of the Econometric Society*, 1551-1580.

Jung, W. S. (1986). Financial development and economic growth: international evidence. *Economic Development and cultural change*, 333-346.

Kang, W., Ratti, R. A., & Vespignani, J. L. (2016). Chinese liquidity increases and the US economy. *Economic Modelling*, *52*, 764-771.

Kapusuzoglu, A. (2013). Financial development and economic growth in Turkey: an empirical analysis. *Актуальні проблеми економіки*, (1), 314-324.

Kapusuzoglu, A., Liang, X., Karacaer-Ulusoy, M. (2015). The Dynamic Interactions of World Natural Gas Markets. The 5th Multinational Energy and Value Conference, May 7-9, 2015, Istanbul - Turkey.

Katircioglu, S. T., Sertoglu, K., Candemir, M., & Mercan, M. (2015). Oil price movements and macroeconomic performance: Evidence from twenty-six OECD countries. *Renewable and Sustainable Energy Reviews*, *44*, 257-270.

Kilian, L. (2008). The Economic Effects of Energy Price Shocks. *Journal of Economic Literature* 46, 871-909.

King, R. G., & Levine, R. (1993). Finance and growth: Schumpeter might be right. *The quarterly journal of economics*, 717-737.

Kraft, J., & Kraft, A. (1978). Relationship between energy and GNP. *J. Energy Dev.;(United States)*, *3*(2).

Kula, F. (2014). The long-run relationship between renewable electricity consumption and GDP: evidence from panel data. *Energy Sources, Part B: Economics, Planning, and Policy*, *9*(2), 156-160.

Kumar, S. (2005). The macroeconomic effects of oil price shocks: Empirical evidence for India. *Available at SSRN 900285*.

Kuznets, S. (1955). Economic growth and income inequality. *The American economic review*, 1-28.

Kwiatkowski, D., Phillips, P. C., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root: How sure are we that economic time series have a unit root?. *Journal of econometrics*,*54*(1), 159-178.

Lee, C. C. (2005). Energy consumption and GDP in developing countries: a cointegrated panel analysis. *Energy economics*, *27*(3), 415-427.

Lee, C. C., & Chang, C. P. (2007). Energy consumption and GDP revisited: a panel analysis of developed and developing countries. *Energy Economics*,*29*(6), 1206-1223.

Lee, C. C., Chang, C. P., & Chen, P. F. (2008). Energy-income causality in OECD countries revisited: The key role of capital stock. *Energy Economics*,*30*(5), 2359-2373.

Levine, R. (2004). Finance and growth: theory and evidence: NBER Working Paper Series n. 10766.

Lin, B., & Wesseh Jr, P. K. (2014). Energy consumption and economic growth in South Africa reexamined: A nonparametric testing apporach. *Renewable and sustainable energy reviews*, *40*, 840-850.

Lucas, R. E. (1998). On the mechanics of economic development. *Econometric Society Monographs*, *29*, 61-70.

Luintel, K. B., & Khan, M. (1999). A quantitative reassessment of the finance–growth nexus: evidence from a multivariate VAR. *Journal of Development Economics*, *60*(2), 381-405.

Masih, A. M., & Masih, R. (1996). Energy consumption, real income and temporal causality: results from a multi-country study based on cointegration and error-correction modelling techniques. *Energy economics*, *18*(3), 165-183.

Masih, R., Peters, S., & De Mello, L. (2011). Oil price volatility and stock price fluctuations in an emerging market: evidence from South Korea. *Energy Economics*, *33*(5), 975-986.

McKinnon, R. I. (1973). Money and Capital in Economic Development (Washington, DC: Brookings Institution, 1973). *McKinnonMoney and Capital in Economic Development1973*.

Mehrara, M. (2007). Energy consumption and economic growth: the case of oil exporting countries. *Energy policy*, *35*(5), 2939-2945.

Menyah, K., Nazlioglu, S., & Wolde-Rufael, Y. (2014). Financial development, trade openness and economic growth in African countries: New insights from a panel causality approach. *Economic Modelling*, *37*, 386-394.

Miller, J. I., & Ratti, R. A. (2009). Crude oil and stock markets: Stability, instability, and bubbles. *Energy Economics*, *31*(4), 559-568.

MIT Energy Initiative. (2011). The future of natural gas: An interdisciplinary MIT Study. *Massachusetts Institute of Technology, Cambridge, MA*.

Mork, K. A., & Hall, R. E. (1979). Energy prices, inflation, and recession, 1974-1975.

Ng, W. (2012). Oil price volatility and the Singapore macroeconomy. *The Singapore Economic Review*, *57*(03), 1250022.

Olomola, P. A. (2006). Oil price shock and aggregate economic activity in nigeria. *African Economic and Business Review*, *4*(2), 40-45.

Ozturk, I., & Al-Mulali, U. (2015). Natural gas consumption and economic growth nexus: Panel data analysis for GCC countries. *Renewable and Sustainable Energy Reviews*, *51*, 998-1003.

Papapetrou, E. (2001). Oil price shocks, stock market, economic activity and employment in Greece. *Energy Economics*, *23*(5), 511-532.

Park, J., & Ratti, R. A. (2008). Oil price shocks and stock markets in the US and 13 European countries. *Energy Economics*, *30*(5), 2587-2608.

Patrick, H. T. (1966). Financial development and economic growth in underdeveloped countries. *Economic development and Cultural change*, 174-189.

Payne, J. E. (2009). On the dynamics of energy consumption and output in the US. *Applied Energy*, *86*(4), 575-577.

Payne, J. E. (2010). Survey of the international evidence on the causal relationship between energy consumption and growth. *Journal of Economic Studies*, *37*(1), 53-95.

Petroleum, B. (2015). BP statistical review of world energy. June, 2015

Petroleum, B. Energy Charting Tool, Available at: http://tools.bp.com/energy-charting-tool.aspx#/st/natural_gas/ep/oil_prices/unit2/$-bbl/view/area/

Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, *75*(2), 335-346.

Pirlogea, C., & Cicea, C. (2012). Econometric perspective of the energy consumption and economic growth relation in European Union. *Renewable and Sustainable Energy Reviews*, *16*(8), 5718-5726.

Pradhan, R. P., Arvin, M. B., & Norman, N. R. (2015). Insurance development and the finance-growth nexus: Evidence from 34 OECD countries. *Journal of Multinational Financial Management*, *31*, 1-22.

Ratti, R. A., & Vespignani, J. L. (2013a). Crude oil prices and liquidity, the BRIC and G3 countries. *Energy Economics*, *39*, 28-38.

Ratti, R. A., & Vespignani, J. L. (2013b). Liquidity and crude oil prices: China's influence over 1996–2011. *Economic Modelling*, *33*, 517-525.

Ratti, R. A., & Vespignani, J. L. (2015). Commodity prices and BRIC and G3 liquidity: A SFAVEC approach. *Journal of Banking & Finance*, *53*, 18-33.

Robinson, J. (1952). The generalisation of the general theory. *The rate of interest and other essays*, *2*, 1-76.

Sadorsky, P. (1999). Oil price shocks and stock market activity. *Energy Economics*, *21*(5), 449-469.

Sadorsky, P. (2010). The impact of financial development on energy consumption in emerging economies. *Energy Policy*, *38*(5), 2528-2535.

Samargandi, N., Fidrmuc, J., & Ghosh, S. (2014). Financial development and economic growth in an oil-rich economy: The case of Saudi Arabia. *Economic Modelling*, *43*, 267-278.

Sari, R., Ewing, B. T., & Soytas, U. (2008). The relationship between disaggregate energy consumption and industrial production in the United States: an ARDL approach. *Energy Economics*, *30*(5), 2302-2313.

Schumpeter, J. A. (1911). 1934. *The theory of economic development*. New York Press.

Schumpeter, J. A. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle* (Vol. 55). Transaction publishers

Sevüktekin, M., & Nargeleçekenler, M. (2007). *Ekonometrik zaman serileri analizi: Eviews uygulamalı*. Nobel Yayın Dağıtım.

Shaw, E. S. (1973). *Financial deepening in economic development* (Vol. 270). New York: Oxford University Press.

Siliverstovs, B., L'Hégaret, G., Neumann, A., & Von Hirschhausen, C. (2005). International market integration for natural gas? A cointegration analysis of prices in Europe, North America and Japan. *Energy Economics*, *27*(4), 603-615.

Sinha, D., & Macri, J. (2001). Financial development and economic growth: the case of eight Asian countries.

Soytas, U., Sari, R., & Ozdemir, O. (2001). Energy consumption and GDP relation in Turkey: a cointegration and vector error correction analysis. *Economies and Business in Transition: Facilitating Competitiveness and Change in the Global Environment Proceedings*, 838-844.

Squalli, J. (2007). Electricity consumption and economic growth: bounds and causality analyses of OPEC members. *Energy Economics*, *29*(6), 1192-1205.

Tabata, S. (2006). Observations on the influence of high oil prices on Russia's GDP growth. *Eurasian Geography and Economics*, *47*(1), 95-111.

Tang, W., Wu, L., & Zhang, Z. (2010). Oil price shocks and their short-and long-term effects on the Chinese economy. *Energy Economics*, *32*, S3-S14.

Tanner, M. E. (1999). *Exchange Market Pressure and Monetary Policy: Asia and Latin America in the 1990's* (No. 99-114). International monetary fund.

Thangavelu, S. M., & Jiunn, A. B. (2004). Financial development and economic growth in Australia: an empirical analysis. *Empirical Economics*, *29*(2), 247-260.

Uddin, G. S., Sjö, B., & Shahbaz, M. (2013) . The causal nexus between financial development and economic growth in Kenya. *Economic Modelling*, *35*, 701-707.

Villar, J. A., & Joutz, F. L. (2006). The relationship between crude oil and natural gas prices. *Energy Information Administration, Office of Oil and Gas*, 1-43.

Wandji, Y. D. F. (2013). Energy consumption and economic growth: Evidence from Cameroon. *Energy Policy*, *61*, 1295-1304.

Wang, Y., Wu, C., & Yang, L. (2013). Oil price shocks and stock market activities: Evidence from oil-importing and oil-exporting countries. *Journal of Comparative Economics*, *41*(4), 1220-1239.

Wu, M. H., & Ni, Y. S. (2011). The effects of oil prices on inflation, interest rates and money. *Energy*, *36*(7), 4158-4164.

Yang, H. Y. (2000). A note on the causal relationship between energy and GDP in Taiwan. *Energy economics*, *22*(3), 309-317.

Yapraklı, S. (2013) . Enerjiye Dayalı Büyüme Türk Sanayi Sektörü Üzerine. Beta Basım Yayım.

Yıldırım, E., Sukruoglu, D., & Aslan, A. (2014) . Energy consumption and economic growth in the next 11 countries: The bootstrapped autoregressive metric causality approach. *Energy Economics*, *44*, 14-21.

Yıldız, E., & Karacaer-Ulusoy, M. (2015). The Fragility of Turkish Economy from the Perspective of Oil Dependency. *Managing Global Transitions*, *13*(3), 253-266.

Yildirim, E., Saraç, Ş., & Aslan, A. (2012) . Energy consumption and economic growth in the USA: Evidence from renewable energy. *Renewable and Sustainable Energy Reviews*, *16*(9), 6770-6774.

Yilmaz, K. S. (2013). Causality between Natural Gas Prices and Stock Market Returns in Turkey. *Economia politica*, (2), 203-220.

Xu, Z. (2000). Financial development, investment, and economic growth.*Economic Inquiry*, *38*(2), 331-344.

Zhang, J., Wang, L., & Wang, S. (2012). Financial development and economic growth: Recent evidence from China. *Journal of Comparative Economics*,*40* (3), 393-412.

APPENDICES

A. ANALYSIS RESULTS OF OECD COUNTRIES

AUSTRALIA

UNIT ROOT TEST RESULTS

Table 19 EC and GDP (1975-2011)–Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.705 [0] (0.420)	-2.152 [0] (0.500)	-6.952 [0]*** (0.000)	-4.972 [1]*** (0.001)
LN(GDP)	-0.099 [1] (0.942)	-2.460 [1] (0.344)	-5.180 [0]*** (0.000)	-5.098 [0]*** (0.001)
	PP (Level)		PP (First Difference)	
LN(EC)	-1,745 [2] (0.400)	-2.264 [3] (0.441)	-6.972 [1]*** (0.000)	-7.124 [1]*** (0.000)
LN(GDP)	-0.081 [4] (0.944)	-2.263 [2] (0.442)	-5.131 [6]*** (0.000)	-5.032 [6]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.691 [5]**	0.104 [4]	0.180 [1]	0.073 [1]
LN(GDP)	0.720 [5]**	0. 141 [4]*	0.105 [5]	0.100 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 20 NG Consumption and GDP (1970-2013)–Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-8.690 [0]*** (0.000)	-4.627 [0]*** (0.003)	-4.152 [0]*** (0.002)	-5.181 [0]*** (0.000)
LN(GDP)	-0.271[0] (0.974)	-2.239 [0] (0.456)	-5.763 [0]*** (0.000)	-5.690 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(NG)	-8.690 [0]*** (0.000)	-4.627 [0]*** (0.003)	-4.217 [3]*** (0.001)	-5.641 [4]*** (0.000)
LN(GDP)	-0.276 [3] (0.974)	-2.316 [2] (0.416)	-5.725 [4]*** (0.000)	-5.690 [0]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.732 [5]**	0.208 [5]**	0.753[1]***	0.157 [3]**
LN(GDP)	0.832 [5]***	0.155 [5]**	0.144 [3]	0.105 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 21 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-0.597 [0] (0.860)	-1.765 [0] (0.704)	-6.123 [0]*** (0.000)	-6.056 [0]*** (0.000)
LN(GDP)	-0.271[0] (0.974)	-2.239 [0] (0.456)	-5.763 [0]*** (0.000)	-5.690 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(OIL)	-0.670 [3] (0.843)	-2.101 [3] (0.530)	-6.139 [2]*** (0.000)	-6.073 [2]*** (0.000)
LN(GDP)	-0.276 [3] (0.974)	-2.316 [2] (0.416)	-5.725 [4]*** (0.000)	-5.690 [0]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(OIL)	0.818 [5]***	0.123 [5]*	0.083 [3]	0.085 [3]

LN(GDP)	0.832 [5]***	0.155 [5]**	0.144 [3]	0.105 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 22 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.510 [1] (0.526)	-1.859 [1] (0.671)	-10.335 [0]*** (0.000)	-10.310 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.612 [7] (0.474)	-2.0066 [7] (0.593)	-10.526 [5]*** (0.000)	-10.502 [5]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.961 [10]***	0.193 [10]**	0.069 [7]	0.059 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 23 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2] (0.037)**	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2] (0.050)**	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.510 [1] (0.526)	-1.859 [1] (0.671)	-10.335 [0]*** (0.000)	-10.310 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.612 [7] (0.474)	-2.0066 [7] (0.593)	-10.526 [5]*** (0.000)	-10.502 [5]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[9]
LN(SI)	0.961 [10]***	0.193 [10]**	0.069 [7]	0.059 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 24 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-0.695 [2] (0.844)	-3.024 [2] (0.128)	-6.243 [1]*** (0.000)	-6.231 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-0.396 [7] (0.906)	-2.295 [7] (0.433)	-9.707 [6]*** (0.000)	-9.690 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.637 [11]***	0.175 [10]**	0.069 [7]	0.061 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 25 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]*** (0.006)
LN(IP)	-0.695 [2] (0.844)	-3.024 [2] (0.128)	-6.243 [1]*** (0.000)	-6.231 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-0.396 [7] (0.906)	-2.295 [7] (0.433)	-9.707 [6]*** (0.000)	-9.690 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.637 [11]***	0.175 [10]**	0.069 [7]	0.061 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 26 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-1.510 [1] (0.526)	-1.859 [1] (0.671)	-10.335 [0]*** (0.000)	-10.310 [0]*** (0.000)
LN(IP)	-0.423 [1]	-2.520 [2]	-8.293 [0]***	-8.280 [0]***

	(0.901)	(0.318)	(0.000)	(0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.612 [7] (0.474)	-2.0066 [7] (0.593)	-10.526 [5]*** (0.000)	-10.502 [5]*** (0.000)
LN(IP)	-0.549 [7] (0.877)	-2.248 [7] (0.459)	-8.484 [5]*** (0.000)	-8.461 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.961 [10]***	0.193 [10]**	0.069 [7]	0.059 [7]
LN(IP)	1.558 [10]***	0.232 [10]***	0.085 [7]	0.073 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 27 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC	H0: r=0	0.170533	6.780497	0.6033	6.544027	0.5444
GDP [1]	H1: r≤1	0.006734	0.236470	0.6268	0.236470	0.6268
OILC	H0: r=0	0.099646	4.410189	0.8678	4.408632	0.8139
GDP [1]	H1: r≤1	3.71E-05	0.001557	0.9665	0.001557	0.9665
BRENT PRICE	H0: r=0	0.017917	5.346451	0.7710	3.199979	0.9325
SI [2]	H1: r≤1	0.012054	2.146473	0.1429	2.146473	0.1429
WTI PRICE	H0: r=0	0.025501	6.627807	0.6213	4.572239	0.7946
SI [2]	H1: r≤1	0.011546	2.055568	0.1516	2.055568	0.1516
DUBAI PRICE	H0: r=0	0.018073	5.402140	0.7647	3.228260	0.9304
SI [2]	H1: r≤1	0.012207	2.173879	0.1404	2.173879	0.1404
HH PRICE	H0: r=0	0.041515	9.342585	0.3346	7.504986	0.4312
SI [2]	H1: r≤1	0.010328	1.837599	0.1752	1.837599	0.1752
LNG PRICE	H0: r=0	0.019335	5.009051	0.8079	3.455748	0.9118
SI [2]	H1: r≤1	0.008737	1.553303	0.2126	1.553303	0.2126
RUS PRICE	H0: r=0	0.077359	16.13724**	0.0400	14.09013*	0.0532
SI [4]	H1: r≤1	0.011630	2.047106	0.1525	2.047106	0.1525
BRENT PRICE	H0: r=0	0.024141	6.733123	0.6089	4.887382	0.7560
IP [3]	H1: r≤1	0.009186	1.845740	0.1743	1.845740	0.1743
WTI PRICE	H0: r=0	0.025703	6.565131	0.6287	5.207849	0.7154
IP [3]	H1: r≤1	0.006763	1.357283	0.2440	1.357283	0.2440
DUBAI PRICE	H0: r=0	0.023962	7.090652	0.5671	4.850697	0.7606
IP [3]	H1: r≤1	0.011137	2.239955	0.1345	2.239955	0.1345
HH PRICE	H0: r=0	0.036784	7.591355	0.5101	7.495607	0.4323
IP [3]	H1: r≤1	0.000479	0.095747	0.7570	0.095747	0.7570
LNG PRICE	H0: r=0	0.042087	9.166112	0.3503	8.599752	0.3210
IP [3]	H1: r≤1	0.002828	0.566360	0.4517	0.566360	0.4517
RUS PRICE	H0: r=0	0.031739	6.759533	0.6058	6.418544	0.5601
IP [4]	H1: r≤1	0.001712	0.340990	0.5593	0.340990	0.5593
SI	H0: r=0	0.024145	4.467921	0.8624	4.301619	0.8262
IP [3]	H1: r≤1	0.000944	0.166301	0.6834	0.166301	0.6834

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 28 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP	0.022	0.881	1	No causal relation
GDP does not granger cause EC	1.880	0.170		
OILC does not granger cause GDP	0.003	0.955	1	GDP→OIL
GDP does not granger cause OILC	3.250*	0.071		
BRENT does not granger cause SI	0.144	0.930	2	SI→BRENT
SI does not granger cause BRENT	5.897*	0.052		
WTI does not granger cause SI	0.673	0.714	2	SI→WTI
SI does not granger cause WTI	5.349*	0.068		
DUBAI does not granger cause SI	0.098	0.951	2	SI→DUBAI

SI does not granger cause DUBAI	6.069*	0.048		
HH does not granger cause SI SI does not granger cause HH	0.717 2.066	0.698 0.355	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	0.742 16.306***	0.690 0.000	2	SI→LNG
BRENT does not granger cause IP IP does not granger cause BRENT	4.358 0.866	0.225 0.833	3	No causal relation
WTI does not granger cause IP IP does not granger cause WTI	3.363 1.426	0.338 0.699	3	No causal relation
DUBAI does not granger cause IP IP does not granger cause DUBAI	3.976 0.991	0.264 0.803	3	No causal relation
HH does not granger cause IP IP does not granger cause HH	7.489* 3.062	0.057 0.382	3	HH→IP
LNG does not granger cause IP IP does not granger cause LNG	7.202* 2.807	0.065 0.422	3	LNG→IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	4.184 6.388	0.381 0.172	4	No causal relation
SI does not granger cause IP IP does not granger cause SI	3.950 1.592	0.266 0.661	3	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 29 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	10.822** 1.767	0.028 0.778	4	RUSSIA→SI

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

AUSTRIA

UNIT ROOT TEST RESULTS

Table 30 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.471 [0] (0.536)	-3.243 [0]* (0.092)	-6.948 [0]*** (0.000)	-6.850 [1]*** (0.000)
LN(GDP)	-1.886 [0] (0.334)	-2.475 [1] (0.337)	-5.534 [0]*** (0.000)	-5.288 [1]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(EC)	-1.464 [3] (0.539)	-3.243 [0]* (0.092)	-8.770 [13]*** (0.000)	-8.485 [13]*** (0.000)
LN(GDP)	-2.129 [4] (0.234)	-2.447 [0] (0.350)	-5.738 [5]*** (0.000)	-6.236 [7]*** (0.000)
	KPSS (Level)		KPSS (Level)	
LN(EC)	0.709 [5]**	0.078 [2]	0.141 [5]	0.098 [6]
LN(GDP)	0.727 [5]**	0.143 [3]*	0.269 [2]	0.067 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 31 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-3.049 [0]** (0.038)	-2.016 [0] (0.575)	-5.782 [0]*** (0.000)	-6.276 [0]*** (0.000)
LN(GDP)	-3.284 [0]** (0.021)	-2.101 [0] (0.530)	-4.846 [1]*** (0.000)	-5.849 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-3.013 [1]**	-2.016 [0]	-5.777 [3]***	-6.285 [4]***

	(0.041)	(0.575)	(0.000)	(0.000)
LN(GDP)	-3.570 [2]** (0.011)	-2.119 [1] (0.520)	-5.411 [1]*** (0.000)	-6.299 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.820 [5]***	0.135 [4]*	0.489 [1]**	0.080 [2]
LN(GDP)	0.840 [5]***	0.195 [4]**	0.594 [3]**	0.076 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 32 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(OIL)	-2.460 [0] (0.132)	-2.511 [0] (0.321)	-6.295 [0]*** (0.000)	-6.219 [0]*** (0.000)
LN(GDP)	-3.284 [0]** (0.021)	-2.101 [0] (0.530)	-4.846 [1]*** (0.000)	-5.849 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-2.504 [2] (0.121)	-2.720 [2] (0.233)	-6.305 [1]*** (0.000)	-6.222 [1]*** (0.000)
LN(GDP)	-3.570 [2]** (0.011)	-2.119 [1] (0.520)	-5.411 [1]*** (0.000)	-6.299 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.588 [5]**	0.104 [4]	0.123 [2]	0.082 [1]
LN(GDP)	0.840 [5]***	0.195 [4]**	0.594 [3]**	0.076 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 33 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-0.955 [3] (0.768)	-1.021 [3] * (0.093)	-5.479 [2]*** (0.000)	-5.511 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.078 [7] (0.724)	-0.754 [7] (0.966)	-13.989 [7]*** (0.000)	-14.034 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.679 [10]***	0.298 [10]***	0.275 [7]	0.168 [7]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 34 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1]	-3.547 [2] **	-11.178 [0]***	-11.146 [0]***

	(0.732)	(0.037)	(0.000)	(0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2] ** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.955 [3] (0.768)	-1.021 [3] * (0.093)	-5.479 [2]*** (0.000)	-5.511 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-1.078 [7] (0.724)	-0.754 [7] (0.966)	-13.989 [7]*** (0.000)	-14.034 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[9]
LN(M2)	1.679 [10]***	0.298 [10]***	0.275 [7]	0.168 [7]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 35 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.845 [1] (0.357)	-1.566 [1] (0.802)	-8.459 [0]*** (0.000)	-8.510 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.681 [7] (0.439)	-1.442 [7] (0.845)	-8.654 [5]*** (0.000)	-8.689 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.681 [10]**	0.309 [10]***	0.161[7]	0.070 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 36 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.845 [1] (0.357)	-1.566 [1] (0.802)	-8.459 [0]*** (0.000)	-8.510 [0]*** (0.000)

	PP (Level)		PP (First Difference)	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.681 [7] (0.439)	-1.442 [7] (0.845)	-8.654 [5]*** (0.000)	-8.689 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[9]
LN(SI)	0.681 [10]**	0.309 [10]***	0.161[7]	0.070 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 37 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-0.856 [0] (0.800)	-0.758 [0] (0.966)	-6.091 [2]*** (0.000)	-6.149 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-0.816 [6] (0.811)	-1.009 [6] (0.939)	-14.825 [6]*** (0.000)	-14.841 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.770 [11]***	0.241 [11]***	0.211 [6]	0.163 [6]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 38 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]*** (0.006)
LN(IP)	-0.856 [0] (0.800)	-0.758 [0] (0.966)	-6.091 [2]*** (0.000)	-6.149 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9]	-2.429 [9]	-13.746 [9]***	-13.722 [9]***

	(0.626)	(0.363)	(0.000)	(0.000)
LN(IP)	-0.816 [6] (0.811)	-1.009 [6] (0.939)	-14.825 [6]*** (0.000)	-14.841 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.770 [11]***	0.241 [11]***	0.211 [6]	0.163 [6]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 39 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-1.845 [1] (0.357)	-1.566 [1] (0.802)	-8.459 [0]*** (0.000)	-8.510 [0]*** (0.000)
LN(IP)	-0.955 [3] (0.768)	-1.021 [3] (0.937)	-5.479 [2]*** (0.000)	-5.511 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.681 [7] (0.439)	-1.442 [7] (0.845)	-8.654 [5]*** (0.000)	-8.689 [5]*** (0.000)
LN(IP)	-1.078 [7] (0.724)	-0.754 [7] (0.966)	-13.989 [7]*** (0.000)	-14.034 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.681 [10]**	0.309 [10]***	0.161[7]	0.070 [7]
LN(IP)	1.679 [10]***	0.298 [10]***	0.275 [7]	0.168 [7]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 40 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [1]	H0: r=0 H1: r≤1	0.229283 0.063702	11.41893 2.303759	0.1870 0.1291	9.115169 2.303759	0.2767 0.1291
NGC GDP [1]	H0: r=0 H1: r≤1	0.182870 0.152202	15.41695* 6.93473***	0.0514 0.0084	8.482219 6.93473***	0.3318 0.0084
OILC GDP [1]	H0: r=0 H1: r≤1	0.171565 0.105796	12.60162 4.696515**	0.1303 0.0302	7.905107 4.696515**	0.3884 0.0302
BRENT PRICE M2 [4]	H0: r=0 H1: r≤1	0.090207 0.008622	18.05946** 1.515365	0.0201 0.2183	16.54409** 1.515365	0.0214 0.2183
WTI PRICE M2 [4]	H0: r=0 H1: r≤1	0.101492 0.008321	20.19067*** 1.462273	0.0091 0.2266	18.72840*** 1.462273	0.0092 0.2266
DUBAI PRICE M2 [4]	H0: r=0 H1: r≤1	0.094573 0.008139	18.81618** 1.430122	0.0152 0.2317	17.38606** 1.430122	0.0155 0.2317
HH PRICE M2 [1]	H0: r=0 H1: r≤1	0.075382 0.018375	17.25187** 3.301135	0.0269 0.0692	13.95074* 3.301135*	0.0560 0.0692
LNG PRICE M2 [4]	H0: r=0 H1: r≤1	0.045492 0.003943	8.839183 0.691305	0.3805 0.4057	8.147878 0.691305	0.3639 0.4057
RUS PRICE M2 [7]	H0: r=0 H1: r≤1	0.104093 0.008965	20.45499*** 1.548930	0.0082 0.2133	18.90606*** 1.548930	0.0086 0.2133
BRENT PRICE SI [4]	H0: r=0 H1: r≤1	0.026969 0.014271	7.383247 2.544135	0.5335 0.1107	4.839112 2.544135	0.7620 0.1107
WTI PRICE SI [2]	H0: r=0 H1: r≤1	0.030630 0.016183	8.393954 2.887747*	0.4243 0.0893	5.506207 2.887747*	0.6770 0.0893
DUBAI PRICE SI [2]	H0: r=0 H1: r≤1	0.027835 0.014124	7.514439 2.517777	0.5187 0.1126	4.996663 2.517777	0.7423 0.1126
HH PRICE SI [2]	H0: r=0 H1: r≤1	0.049040 0.017834	12.08512 3.185053*	0.1529 0.0743	8.900070 3.185053*	0.2946 0.0743
LNG PRICE SI [4]	H0: r=0 H1: r≤1	0.020619 0.003890	4.328112 0.682008	0.8754 0.4089	3.646104 0.682008	0.8947 0.4089
RUS PRICE SI [7]	H0: r=0 H1: r≤1	0.033721 0.018317	9.079792 3.179683*	0.3581 0.0746	5.900109 3.179683*	0.6261 0.0746

BRENT PRICE **IP [4]**	H0: r=0 H1: r≤1	0.075846 0.013487	18.39843** 2.702083	0.0178 0.1002	15.69634** 2.702083	0.0295 0.1002
WTI PRICE **IP [4]**	H0: r=0 H1: r≤1	0.081269 0.013343	19.54079** 2.673174	0.0116 0.1021	16.86762** 2.673174	0.0190 0.1021
DUBAI PRICE **IP [4]**	H0: r=0 H1: r≤1	0.079935 0.014750	19.53601** 2.957198*	0.0116 0.0855	16.57881** 2.957198*	0.0212 0.0855
HH PRICE **IP [1]**	H0: r=0 H1: r≤1	0.051174 0.011931	13.42878 2.705545	0.1135 0.1195	10.61093 2.424461	0.1748 0.1195
LNG PRICE **IP [4]**	H0: r=0 H1: r≤1	0.048197 0.007869	11.40229 1.572147	0.1879 0.2099	9.830146 1.572147	0.2233 0.2099
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.096779 0.006719	21.59739*** 1.341559	0.0053 0.2468	20.25583*** 1.341559	0.0050 0.2468
SI **IP [8]**	H0: r=0 H1: r≤1	0.103928 0.017218	21.73455*** 2.969873	0.0050 0.0848	18.76468*** 2.969873	0.0091 0.0848

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 41 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	1.109 6.497*	0.292 0.010	1	GDP→EC
OILC does not granger cause GDP GDP does not granger cause OILC	0.282 0.883	0.595 0.347	1	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	7.588 8.986*	0.107 0.061	4	M2→LNG
BRENT does not granger cause SI SI does not granger cause BRENT	1.521 24.803***	0.822 0.000	4	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	1.694 17.964***	0.428 0.000	2	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	1.518 19.977***	0.468 0.000	2	SI→DUBAI
HH does not granger cause SI SI does not granger cause HH	0.076 2.951	0.962 0.228	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	4.252 41.963***	0.373 0.000	4	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	5.056 27.132***	0.653 0.000	7	SI→RUSSIA
HH does not granger cause IP IP does not granger cause HH	6.486* 0.162	0.010 0.686	1	HH→IP
LNG does not granger cause IP IP does not granger cause LNG	7.122 10.371**	0.129 0.034	4	IP→LNG

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 42 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
NGC does not granger cause GDP GDP does not granger cause NGC	0.460 0.051	0.497 0.820	1	No causal relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	16.440*** 4.911	0.002 0.296	4	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	17.100*** 5.938	0.001 0.203	4	WTI→M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	17.128*** 4.956	0.001 0.291	4	DUBAI→M2
HH does not granger cause M2 M2 does not granger cause HH	0.744 0.265	0.388 0.606	1	No causal relation
RUSSIA does not granger cause M2	4.784	0.686	7	No causal relation

M2 does not granger cause RUSSIA	9.960	0.190		
BRENT does not granger cause IP IP does not granger cause BRENT	15.865*** 8.374*	0.003 0.078	4	BRENT↔IP
WTI does not granger cause IP IP does not granger cause WTI	17.385*** 8.056*	0.001 0.089	4	WTI↔IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	16.121*** 7.713	0.002 0.102	4	DUBAI→IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	3.541 1.491	0.471 0.828	4	No causal relation
SI does not granger cause IP IP does not granger cause SI	16.566** 3.314	0.035 0.913	8	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

BELGIUM

UNIT ROOT TEST RESULTS

Table 43 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.197 [1] (0.664)	-1.707 [1] (0.726)	-5.488 [0]*** (0.000)	-5.424 [0]*** (0.000)
LN(GDP)	-2.047 [0] (0.266)	-1.104 [0] (0.914)	-5.621 [0]*** (0.000)	-5.788 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(EC)	-1.623 [1] (0.460)	-1.693 [1] (0.733)	-5.491 [3]*** (0.000)	-5.429 [3]*** (0.000)
LN(GDP)	-1.974 [2] (0.296)	-1.104 [0] (0.914)	-5.625 [2]*** (0.000)	-5.786 [3]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.592 [5]**	0.107 [4]	0.137 [1]	0.078 [1]
LN(GDP)	0.721 [5]**	0.136 [3]*	0.362 [1]*	0.080 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 44 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-3.509 [0]** (0.012)	-3.736 [0]** (0.030)	-5.451 [0]*** (0.000)	-5.374 [0]*** (0.000)
LN(GDP)	-3.209 [0]** (0.026)	-1.239 [0] (0.889)	-5.530 [0]*** (0.000)	-6.487 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(NG)	-2.953 [4]** (0.047)	-3.748 [4]** (0.029)	-5.520 [5]*** (0.000)	-5.391 [4]*** (0.000)
LN(GDP)	-3.209 [0]** (0.026)	-1.254 [1] (0.885)	-5.530 [0]*** (0.000)	-6.487 [0]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.777 [5]***	0.078 [4]	0.240 [3]	0.125 [3]*
LN(GDP)	0.835 [5]***	0.178 [4]**	0.569 [2]**	0.084 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 45 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-1.084 [0] (0.713)	-1.615[0] (0.770)	-5.837 [0]*** (0.000)	-5.782 [0]*** (0.000)
LN(GDP)	-3.209 [0]** (0.026)	-1.239 [0] (0.889)	-5.530 [0]*** (0.000)	-6.487 [0]*** (0.000)

	PP (Level)		PP (First Difference)	
LN(OIL)	-1.202 [2] (0.664)	-1.691[1]** (0.737)	-5.837 [0]*** (0.000)	-5.782 [0]*** (0.000)
LN(GDP)	-3.209 [0]** (0.026)	-1.254 [1] (0.885)	-5.530 [0]*** (0.000)	-6.487 [0]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.465 [5]**	0.143 [5]*	0.134 [0]	0.116 [0]
LN(GDP)	0.835 [5]***	0.178 [4]**	0.569 [2]**	0.084 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 46 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-1.072 [0] (0.726)	-1.173 [0] (0.912)	-12.450 [0]*** (0.000)	-12.465 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.174 [11] (0.685)	-0.989 [9] (0.941)	-12.470 [12]*** (0.000)	-12.543 [12]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.669 [10]***	00.366 [10]***	0.268 [11]	00.125 [12]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 47 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-1.072 [0] (0.726)	-1.173 [0] (0.912)	-12.450 [0]*** (0.000)	-12.465 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-1.174 [11] (0.685)	-0.989 [9] (0.941)	-12.470 [12]*** (0.000)	-12.543 [12]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]

LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048 [4]
LN(M2)	1.669 [10]***	00.366 [10]***	0.268 [11]	00.125 [12]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 48 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.779 [1] (0.389)	-1.763 [1] (0.718)	-9.913 [0]*** (0.000)	-9.892 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.969 [7] (0.300)	-1.946 [7] (0.625)	-10.237 [6]*** (0.000)	-10.218 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.131 [10]	0.129 [10]*	0.084 [7]	0.073 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 49 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.779 [1] (0.389)	-1.763 [1] (0.718)	-9.913 [0]*** (0.000)	-9.892 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.969 [7] (0.300)	-1.946 [7] (0.625)	-10.237 [6]*** (0.000)	-10.218 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.131 [10]	0.129 [10]*	0.084 [7]	0.073 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 50 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-2.108 [1] (0.241)	-1.653 [1] (0.768)	-18.980 [0]*** (0.000)	-19.121 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-2.010 [9] (0.282)	-1.920 [5] (0.639)	-19.027 [2]*** (0.000)	-19.121 [0]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.602 [11]***	0.307 [11]***	0.229 [8]	0.028 [10]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 51 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-2.108 [1] (0.241)	-1.653 [1] (0.768)	-18.980 [0]*** (0.000)	-19.121 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-2.010 [9] (0.282)	-1.920 [5] (0.639)	-19.027 [2]*** (0.000)	-19.121 [0]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.602 [11]***	0.307 [11]***	0.229 [8]	0.028 [10]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 52 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-1.779 [1] (0.389)	-1.763 [1] (0.718)	-9.913 [0]*** (0.000)	-9.892 [0]*** (0.000)

LN(IP)	-1.986 [1] (0.292)	-2.390 [1] (0.383)	-18.556 [0]*** (0.000)	-18.625[0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.969 [7] (0.300)	-1.946 [7] (0.625)	-10.237 [6]*** (0.000)	-10.218 [6]*** (0.000)
LN(IP)	-2.079 [15] (0.253)	-2.927 [3] (0.156)	-18.824 [5]*** (0.000)	-18.845 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.131 [10]	0.129 [10]*	0.084 [7]	0.073 [7]
LN(IP)	1.613 [10]***	0.253 [10]***	0.204 [17]	0.043 [20]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 53 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC **GDP [1]**	H0: r=0 H1: r≤1	0.185986 0.046863	8.882104 1.679879	0.3764 0.1949	7.202225 1.679879	0.4655 0.1949
OILC **GDP [1]**	H0: r=0 H1: r≤1	0.253105 0.060532	14.87944* 2.622563	0.0617 0.1054	12.25688 2.622563	0.1014 0.1054
BRENT PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.056896 0.007310	11.66710 1.298680	0.1736 0.2545	10.36842 1.298680	0.1889 0.2545
WTI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.072881 0.009415	14.98337* 1.664929	0.0596 0.1969	13.31844* 1.664929	0.0701 0.1969
DUBAI PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.063046 0.006614	12.70108 1.174614	0.1262 0.2785	11.52647 1.174614	0.1297 0.2785
HH PRICE **M2 [1]**	H0: r=0 H1: r≤1	0.045366 0.008122	9.715659 1.451553	0.3033 0.2283	8.264106 1.451553	0.3525 0.2283
LNG PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.059137 0.008742	12.27396 1.545408	0.1443 0.2138	10.72855 1.545408	0.1683 0.2138
RUS PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.098909 0.006732	19.40824** 1.182064	0.0122 0.2769	18.22617** 1.182064	0.0112 0.2769
BRENT PRICE **SI [2]**	H0: r=0 H1: r≤1	0.022154 0.011278	5.972965 2.007627	0.6987 0.1565	3.965338 2.007627	0.8630 0.1565
WTI PRICE **SI [7]**	H0: r=0 H1: r≤1	0.034771 0.013928	8.499558 2.412504	0.4136 0.1204	6.087055 2.412504	0.6021 0.1204
DUBAI PRICE **SI [2]**	H0: r=0 H1: r≤1	0.022754 0.011301	6.085628 2.011722	0.6854 0.1561	4.073906 2.011722	0.8515 0.1561
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.057933 0.019360	14.02361 3.460370*	0.0823 0.0629	10.56324 3.460370*	0.1775 0.0629
LNG PRICE **SI [6]**	H0: r=0 H1: r≤1	0.031989 0.002945	6.134865 0.510303	0.6796 0.4750	5.624561 0.510303	0.6617 0.4750
RUS PRICE **SI [7]**	H0: r=0 H1: r≤1	0.034273 0.008879	7.532303 1.533958	0.5167 0.2155	5.998344 1.533958	0.6134 0.2155
BRENT PRICE **IP [2]**	H0: r=0 H1: r≤1	0.081962 0.023594	21.98812*** 4.799270**	0.0046 0.0285	17.18885** 4.799270**	0.0168 0.0285
WTI PRICE **IP [3]**	H0: r=0 H1: r≤1	0.076416 0.023575	20.67011*** 4.771500**	0.0076 0.0289	15.89861** 4.771500**	0.0273 0.0289
DUBAI PRICE **IP [2]**	H0: r=0 H1: r≤1	0.074211 0.026281	20.85214*** 5.353189**	0.0071 0.0207	15.49895** 5.353189**	0.0317 0.0207
HH PRICE **IP [3]**	H0: r=0 H1: r≤1	0.030867 0.017907	9.884407 3.613818*	0.2897 0.0573	6.270589 3.613818*	0.5788 0.0573
LNG PRICE **IP [3]**	H0: r=0 H1: r≤1	0.027308 0.021871	9.960380 4.422824**	0.2838 0.0355	5.537556 4.422824**	0.6730 0.0355
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.075369 0.023377	20.40303*** 4.730819**	0.0084 0.0296	15.67222** 4.730819**	0.0298 0.0296
SI **IP [6]**	H0: r=0 H1: r≤1	0.034459 0.017512	9.122974 3.056499*	0.3541 0.0804	6.066475 3.056499*	0.6047 0.0804

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level.
MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 54 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	3.396* 0.329	0.065 0.565	1	EC→GDP
OILC does not granger cause GDP GDP does not granger cause OILC	0.412 1.168	0.520 0.279	1	No causal relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	0.332 7.274**	0.846 0.026	2	M2→BRENT
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	0.053 8.474**	0.973 0.014	2	M2→DUBAI
HH does not granger cause M2 M2 does not granger cause HH	0.520 1.100	0.470 0.294	1	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	1.306 9.016**	0.727 0.029	3	M2→LNG
BRENT does not granger cause SI SI does not granger cause BRENT	0.293 16.458***	0.863 0.000	2	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	7.950 18.578***	0.337 0.009	7	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	0.357 13.650***	0.836 0.001	2	SI→DUBAI
HH does not granger cause SI SI does not granger cause HH	0.355 5.487*	0.837 0.064	2	SI→HH
LNG does not granger cause SI SI does not granger cause LNG	11.599* 20.220***	0.071 0.002	6	SI↔LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	5.531 16.785**	0.595 0.018	7	SI→RUSSIA
HH does not granger cause IP IP does not granger cause HH	8.318** 1.285	0.039 0.732	3	HH→IP
LNG does not granger cause IP IP does not granger cause LNG	15.010*** 4.787	0.001 0.188	3	LNG→IP
SI does not granger cause IP IP does not granger cause SI	31.039*** 7.437	0.000 0.282	6	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 55 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
WTI does not granger cause M2 M2 does not granger cause WTI	1.843 3.009	0.605 0.390	3	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	2.200 1.032	0.698 0.904	4	No causal relation
BRENT does not granger cause IP IP does not granger cause BRENT	3.299 3.264	0.192 0.195	2	No causal relation
WTI does not granger cause IP IP does not granger cause WTI	5.769 1.905	0.123 0.592	3	No causal relation
DUBAI does not granger cause IP IP does not granger cause DUBAI	2.448 4.190	0.294 0.123	2	No causal relation
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	1.249 2.984	0.869 0.560	4	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

CANADA

UNIT ROOT TEST RESULTS

Table 56 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-2.728 [1]*	-3.004 [1]	-3.952 [0]***	-4.024 [0]**

	(0.079)	(0.145)	(0.004)	(0.016)
LN(GDP)	-0.754 [1] (0.819)	-2.771 [1] (0.126)	-4.336 [0]*** (0.001)	-4.271 [0]*** (0.009)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-2.237 [2] (0.197)	-1.859 [2] (0.654)	-3.643 [10]*** (0.009)	-3.711 [11]** (0.034)
LN(GDP)	-1.090 [2] (0.708)	-1.932 [0] (0.617)	-4.176 [6]*** (0.002)	-4.089 [0]** (0.014)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.472 [4]**	0.100 [2]	0.188 [3]	0.092 [5]
LN(GDP)	0.713 [5]**	0.071 [4]	0.085 [2]	0.063 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 57 NG Consumption and GDP (1970-2013) -Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(NG)	-2.042 [0] (0.268)	-2.554 [0] (0.301)	-6.231 [1]*** (0.000)	-6.396 [1]*** (0.000)
LN(GDP)	-1.860 [0] (0.347)	-3.026 [1] (0.137)	-4.661 [0]*** (0.000)	-4.778 [0]*** (0.002)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-2.256 [2] (0.190)	-2.557 [0] (0.300)	-6.626 [1]*** (0.000)	-7.001 [3]*** (0.000)
LN(GDP)	-1.713 [2] (0.417)	-2.196 [0] (0.479)	-4.516 [5]*** (0.000)	-4.623 [5]*** (0.003)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.836 [5]***	0.139 [0]*	0.248 [0]	0.071 [3]
LN(GDP)	0.832 [5]***	0.070 [4]	0.193 [1]	0.062 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 58 Oil Consumption and GDP (1970-2013)-Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(OIL)	-1.487 [1] (0.529)	-2.304 [1] (0.422)	-4.063 [0]*** (0.002)	-4.234 [1]*** (0.009)
LN(GDP)	-1.860 [0] (0.347)	-3.026 [1] (0.137)	-4.661 [0]*** (0.000)	-4.778 [0]*** (0.002)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-1.191 [2] (0.669)	-1.786 [2] (0.693)	-4.021 [2]*** (0.003)	-3.927 [3]** (0.019)
LN(GDP)	-1.713 [2] (0.417)	-2.196 [0] (0.479)	-4.516 [5]*** (0.000)	-4.623 [5]*** (0.003)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.570 [5]**	0.149 [5]**	0.082 [2]	0.078 [2]
LN(GDP)	0.832 [5]***	0.070 [4]	0.193 [1]	0.062 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 59 Oil Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-0.307 [1] (0.978)	-1.663 [1] (0.763)	-9.619 [0]*** (0.000)	-9.607 [0]*** (0.000)

	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-0.211 [6] (0.972)	-1.617 [6] (0.782)	-9.784 [4]*** (0.000)	-9.768 [4]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.741 [0]***	0.224 [10]***	0.189 [6]	0.171 [6]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 60 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.307 [1] (0.978)	-1.663 [1] (0.763)	-9.619 [0]*** (0.000)	-9.607 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-0.211 [6] (0.972)	-1.617 [6] (0.782)	-9.784 [4]*** (0.000)	-9.768 [4]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.741 [0]***	0.224 [10]***	0.189 [6]	0.171 [6]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 61 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.360 [1] (0.600)	-2.649 [1] (0.259)	-9.342 [0]*** (0.000)	-9.329 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4]	-1.995 [4]	-9.132 [1]***	-9.204 [2]***

	(0.461)	(0.599)	(0.000)	(0.000)
LN(SI)	-1.391 [6] (0.585)	-2.389 [6] (0.383)	-9.356 [3]*** (0.000)	-9.340 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	1.166 [10]**	0.117 [10]	0.051 [6]	0.050 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 62 NG Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.360 [1] (0.600)	-2.649 [1] (0.259)	-9.342 [0]*** (0.000)	-9.329 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.391 [6] (0.585)	-2.389 [6] (0.383)	-9.356 [3]*** (0.000)	-9.340 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	1.166 [10]**	0.117 [10]	0.051 [6]	0.050 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 63 Oil Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-2.335 [3] (0.161)	-2.320 [3] (0.420)	-6.110 [2]*** (0.000)	-6.102 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-2.458 [8] (0.127)	-2.413 [8] (0.371)	-13.901 [8]*** (0.000)	-13.883[0]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]

LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	0.176 [11]	0.188 [11]**	0.154 [8]	0.124 [8]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 64 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-2.335 [3] (0.161)	-2.320 [3] (0.420)	-6.110 [2]*** (0.000)	-6.102 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-2.458 [8] (0.127)	-2.413 [8] (0.371)	-13.901 [8]*** (0.000)	-13.883[0]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	0.176 [11]	0.188 [11]**	0.154 [8]	0.124 [8]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 65 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-1.360 [1] (0.600)	-2.649 [1] (0.259)	-9.342 [0]*** (0.000)	-9.329 [0]*** (0.000)
LN(IP)	-2.092[3] (0.248)	-1.996[3] (0.598)	-5.542 [2]*** (0.000)	-5.564 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.391 [6] (0.585)	-2.389 [6] (0.383)	-9.356 [3]*** (0.000)	-9.340 [3]*** (0.000)
LN(IP)	-1.826 [8] (0.366)	-1.732 [8] (0.732)	-12.742 [8]*** (0.000)	-12.716 [8]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	1.166 [10]**	0.117 [10]	0.051 [6]	0.050 [6]
LN(IP)	0.376 [10]*	0.156 [10]**	0.108 [8]	0.082 [8]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 66 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC	H0: r=0	0.124212	4.622512	0.8475	4.510321	0.8019
GDP [2]	H1: r≤1	0.00323	0.112121	0.7377	0.112332	0.7377
NGC	H0: r=0	0.190222	9.63812	0.3096	8.46712	0.3331
GDP [3]	H1: r≤1	0.02833	1.17021	0.2793	1.17033	0.2793
OILC	H0: r=0	0.123211	6.85713	0.5943	5.42621	0.6873
GDP [2]	H1: r≤1	0.034322	1.43031	0.2317	1.43012	0.2317

BRENT PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.069380 0.003418	13.25782 0.602589	0.1057 0.4376	12.65523* 0.602589	0.0884 0.4376
WTI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.075239 0.002356	14.18184* 0.415160	0.0781 0.5194	13.76668* 0.415160	0.0598 0.5194
DUBAI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.073946 0.003554	13.42878* 2.705545	0.0790 0.4286	13.52087* 0.626689	0.0653 0.4286
HH PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.068517 0.000530	12.65675 0.093850	0.1280 0.7593	12.56290* 0.093850	0.0913 0.7593
LNG PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.073265 0.002524	13.83615* 0.444704	0.0875 0.5049	13.39144* 0.444704	0.0683 0.5049
RUS PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.104754 4.43E-06	19.36579** 0.000776	0.0124 0.9785	19.36501*** 0.000776	0.0072 0.9785
BRENT PRICE **SI [7]**	H0: r=0 H1: r≤1	0.059702 0.013810	12.97997 2.391934	0.1156 0.1220	10.58804 2.391934	0.1761 0.1220
WTI PRICE **SI [7]**	H0: r=0 H1: r≤1	0.069422 0.015063	14.98582* 2.610502	0.0595 0.1062	12.37532* 2.610502	0.0973 0.1062
DUBAI PRICE **SI [8]**	H0: r=0 H1: r≤1	0.045259 0.012201	10.01914 2.099249	0.2793 0.1474	7.919891 2.099249	0.3869 0.1474
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.041626 0.008202	8.983201 1.457748	0.3669 0.2273	7.525453 1.457748	0.4290 0.2273
LNG PRICE **SI [3]**	H0: r=0 H1: r≤1	0.029899 0.006907	6.562315 1.219850	0.6290 0.2694	5.342464 1.219850	0.6981 0.2694
RUS PRICE **SI [4]**	H0: r=0 H1: r≤1	0.120804 0.007093	23.77643*** 1.245718	0.0023 0.2644	22.53071*** 1.245718	0.0020 0.2644
BRENT PRICE **IP [4]**	H0: r=0 H1: r≤1	0.046067 0.011231	11.63283 2.247612	0.1754 0.1338	9.385221 2.247612	0.2555 0.1338
WTI PRICE **IP [4]**	H0: r=0 H1: r≤1	0.050978 0.011674	12.74908 2.336797	0.1243 0.1263	10.41228 2.336797	0.1862 0.1263
DUBAI PRICE **IP [5]**	H0: r=0 H1: r≤1	0.056210 0.011329	13.71057* 2.255949	0.0912 0.1331	11.45462 2.255949	0.1328 0.1331
HH PRICE **IP [5]**	H0: r=0 H1: r≤1	0.083593 0.031633	23.64899*** 6.364593**	0.0024 0.0116	17.28440** 6.364593**	0.0162 0.0116
LNG PRICE **IP [5]**	H0: r=0 H1: r≤1	0.042799 0.004836	9.620653 0.959799	0.3111 0.3272	8.660854 0.959799	0.3155 0.3272
RUS PRICE **IP [5]**	H0: r=0 H1: r≤1	0.050990 0.008220	11.99685 1.634353	0.1571 0.2011	10.36249 1.634353	0.1892 0.2011
SI **IP [4]**	H0: r=0 H1: r≤1	0.0346 0.0079	7.5623 1.3933	0.5133 0.2378	6.1689 1.3933	0.5916 0.2378

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 67 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	6.534** 1.555	0.038 0.459	2	EC→GDP
NGC does not granger cause GDP GDP does not granger cause NGC	5.375 17.325***	0.146 0.000	3	GDP→NGC
OILC does not granger cause GDP GDP does not granger cause OILC	0.854 2.470	0.652 0.290	2	No causal relation
BRENT does not granger cause SI SI does not granger cause BRENT	10.815 47.340***	0.146 0.000	7	SI→BRENT
DUBAI does not granger cause SI SI does not granger cause DUBAI	12.971 59.603***	0.112 0.000	8	SI→DUBAI
HH does not granger cause SI SI does not granger cause HH	0.603 0.204	0.739 0.902	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	2.219 52.268***	0.528 0.000	3	SI→LNG
BRENT does not granger cause IP IP does not granger cause BRENT	11.701** 1.702	0.019 0.790	4	BRENT→IP

WTI does not granger cause IP IP does not granger cause WTI	10.065** 1.678	0.039 0.794	4	WTI→IP
LNG does not granger cause IP IP does not granger cause LNG	6.884 7.382	0.229 0.193	5	No causal relation
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	3.646 17.540***	0.601 0.003	5	IP→RUSSIA
SI does not granger cause IP IP does not granger cause SI	31.278*** 5.796	0.000 0.214	4	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 68 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	11.705*** 2.153	0.008 0.541	3	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	11.746*** 1.892	0.008 0.594	3	WTI→M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	12.444*** 2.138	0.006 0.544	3	DUBAI→M2
HH does not granger cause M2 M2 does not granger cause HH	4.078 1.114	0.130 0.572	2	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	2.008 6.462*	0.570 0.091	3	M2→LNG
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	1.669 3.293	0.796 0.510	4	No causal relation
WTI does not granger cause SI SI does not granger cause WTI	9.716 38.323***	0.205 0.000	7	SI→WTI
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	2.979 9.832**	0.561 0.043	4	SI→RUSSIA
DUBAI does not granger cause IP IP does not granger cause DUBAI	15.844*** 0.678	0.007 0.984	5	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	19.675*** 3.752	0.001 0.585	5	HH→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

CHILE

UNIT ROOT TEST RESULTS

Table 69 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(EC)	-0.209 [0] (0.928)	-2.247 [1] (0.450)	-4.109 [0]*** (0.002)	-4.044 [0]** (0.016)
LN(GDP)	-0.496 [0] (0.880)	-1.617 [0] (0.766)	-3.950 [0]*** (0.004)	-3.901 [0]** (0.022)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-0.309 [2] (0.913)	-1.788 [2] (0.689)	-4.117 [1]*** (0.002)	-4.051 [1]** (0.015)
LN(GDP)	-0.519 [1] (0.875)	-1.915 [1] (0.625)	-3.836 [4]*** (0.005)	-3.786 [0]** (0.029)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.695 [5]**	0.104 [4]	0.104[2]	0.114 [1]
LN(GDP)	0.719 [5]**	0.088 [4]	0.072 [1]	0.070 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 70 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**

LN(NG)	-0.948 [2] (0.762)	-2.758 [1] (0.219)	-4.941 [1]*** (0.000)	-4.861 [1]*** (0.001)
LN(GDP)	-0.332 [2] (0.977)	-3.737 [1]** (0.030)	-4.014 [1]*** (0.003)	-4.130 [1]** (0.011)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-0.877 [3] (0.785)	-2.058 [2] (0.553)	-3.363 [13]** (0.018)	-3.270 [14]* (0.085)
LN(GDP)	-0.549 [1] (0.986)	-2.446 [0] (0.351)	-4.624 [1]*** (0.000)	-4.776 [0]*** (0.002)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.745 [5]***	0.100[4]	0.103 [3]	0.103 [3]
LN(GDP)	0.808 [5]***	0.144 [0]*	0.211 [2]	0.103 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 71 Oil Consumption and GDP (1970-2013)-Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(OIL)	-0.078 [1] (0.960)	-3.142 [1] (0.110)	-4.287 [0]*** (0.001)	-4.420 [0]*** (0.005)
LN(GDP)	-0.332 [2] (0.977)	-3.737 [1]** (0.030)	-4.014 [1]*** (0.003)	-4.130 [1]** (0.011)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-0.383 [0] (0.979)	-1.820 [0] (0.677)	-4.330 [3]*** (0.001)	-4.439 [3]*** (0.005)
LN(GDP)	-0.549 [1] (0.986)	-2.446 [0] (0.351)	-4.624 [1]*** (0.000)	-4.776 [0]*** (0.002)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.783 [5]***	0.143 [5]*	0.165 [1]	0.103 [0]
LN(GDP)	0.808 [5]***	0.144 [0]*	0.211 [2]	0.103 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 72 Oil Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-0.239 [1] (0.974)	-1.873 [1] (0.664)	-9.507 [0]*** (0.000)	-9.5000 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-0.422 [4] (0.983)	-1.931 [5] (0.633)	-9.507 [0]*** (0.000)	-9.500[0]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	7.725 [10]**	0.144 [10]*	0.172 [4]	0.138 [4]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 73 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.239 [1] (0.974)	-1.873 [1] (0.664)	-9.507 [0]*** (0.000)	-9.5000 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-0.422 [4] (0.983)	-1.931 [5] (0.633)	-9.507 [0]*** (0.000)	-9.500[0]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	7.725 [10]**	0.144 [10]*	0.172 [4]	0.138 [4]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 74 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-0.968 [1] (0.763)	-1.357 [1] (0.870)	-10.421 [0]*** (0.000)	-10.419 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-0.944 [5] (0.772)	-1.445 [5] (0.844)	-10.492 [3]*** (0.000)	-10.484 [3]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	1.637 [10]***	0.225 [10]***	0.150 [5]	0.112 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 75 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)

LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-0.968 [1] (0.763)	-1.357 [1] (0.870)	-10.421 [0]*** (0.000)	-10.419 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-0.944 [5] (0.772)	-1.445 [5] (0.844)	-10.492 [3]*** (0.000)	-10.484 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	1.637 [10]***	0.225 [10]***	0.150 [5]	0.112 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 76 Oil Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-0.859 [2] (0.788)	-2.096 [2] (0.544)	-14.480 [1]*** (0.000)	-14.447 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-0.893 [13] (0.788)	-3.298 [4] (0.069)	-23.395 [13]*** (0.000)	-23.360 [13]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.651 [11]**	0.217 [11]***	0.073 [19]	0.069 [19]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 77 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-0.859 [2] (0.788)	-2.096 [2] (0.544)	-14.480 [1]*** (0.000)	-14.447 [0]*** (0.000)

	PP (Level)		PP (First Difference)	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-0.893 [13] (0.788)	-3.298 [4] (0.069)	-23.395 [13]*** (0.000)	-23.360 [13]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.651 [11]**	0.217 [11]***	0.073 [19]	0.069 [19]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 78 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-0.968 [1] (0.763)	-1.357 [1] (0.870)	-10.421 [0]*** (0.000)	-10.419 [0]*** (0.000)
LN(IP)	-1.192 [2] (0.677)	-1.822 [2] (0.689)	-14.028 [1]*** (0.000)	-14.010 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-0.944 [5] (0.772)	-1.445 [5] (0.844)	-10.492 [3]*** (0.000)	-10.484 [3]*** (0.000)
LN(IP)	-1.073 [11] (0.725)	-3.038 [4] (0.124)	-22.731 [14]*** (0.000)	-22.831 [15]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	1.637 [10]***	0.225 [10]***	0.150 [5]	0.112 [5]
LN(IP)	1.515 [10]***	0.243 [10]***	0.081 [18]	0.068 [18]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 79 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [3]	H0: r=0 H1: r≤1	0.169817 2.62E-05	6.142464 0.000866	0.6787 0.9774	6.141598 0.000866	0.5951 0.9774
NGC GDP [2]	H0: r=0 H1: r≤1	0.106991 0.000682	4.667457 0.027961	0.8431 0.8671	4.639496 0.027961	0.7865 0.8671
OILC GDP [2]	H0: r=0 H1: r≤1	0.224437 0.001442	10.47995 0.059156	0.2456 0.8078	10.42080 0.059156	0.1857 0.8078
BRENT PRICE M2 [2]	H0: r=0 H1: r≤1	0.111241 0.003986	21.58039*** 0.706857	0.0053 0.4005	20.87354*** 0.706857	0.0039 0.4005
WTI PRICE M2 [2]	H0: r=0 H1: r≤1	0.109563 0.002382	20.96173*** 0.422064	0.0068 0.5159	20.53967*** 0.422064	0.0045 0.5159
DUBAI PRICE M2 [2]	H0: r=0 H1: r≤1	0.108001 0.003458	20.84256*** 0.613195	0.0071 0.4336	20.22937*** 0.613195	0.0051 0.4336
HH PRICE M2 [2]	H0: r=0 H1: r≤1	0.076105 0.000243	14.05389* 0.043054	0.0815 0.8356	14.01084* 0.043054	0.0548 0.8356
LNG PRICE M2 [2]	H0: r=0 H1: r≤1	0.088025 0.000374	16.37550** 0.066251	0.0368 0.7969	16.30925** 0.066251	0.0234 0.7969
RUS PRICE M2 [7]	H0: r=0 H1: r≤1	0.079004 5.87E-05	14.16569* 0.010101	0.0785 0.9196	14.15559* 0.010101	0.0520 0.9196
BRENT PRICE SI [2]	H0: r=0 H1: r≤1	0.097338 0.009683	19.28757** 1.673612	0.0127 0.1958	17.61396** 1.673612	0.0142 0.1958
WTI PRICE SI [2]	H0: r=0 H1: r≤1	0.080257 0.005968	15.86758** 1.059548	0.0439 0.3033	14.80804** 1.059548	0.0410 0.3033
DUBAI PRICE SI [2]	H0: r=0 H1: r≤1	0.087614 0.005878	17.27307** 1.043547	0.0267 0.3070	16.22952** 1.043547	0.0241 0.3070

HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.045479 0.009299	9.892156 1.653663	0.2891 0.1985	8.238493 1.653663	0.3550 0.1985
LNG PRICE **SI [2]**	H0: r=0 H1: r≤1	0.071330 0.009264	14.74554* 1.647293	0.0646 0.1993	13.09825* 1.647293	0.0758 0.1993
RUS PRICE **SI [4]**	H0: r=0 H1: r≤1	0.110771 0.009133	22.15061*** 1.605605	0.0043 0.2051	20.54501*** 1.605605	0.0043 0.2051
BRENT PRICE **IP [3]**	H0: r=0 H1: r≤1	0.086479 0.006854	19.46542** 1.375587	0.0119 0.2409	18.08983** 1.375587	0.0118 0.2409
WTI PRICE **IP [3]**	H0: r=0 H1: r≤1	0.087526 0.006750	19.67366** 1.354603	0.0110 0.2445	18.31906** 1.354603	0.0108 0.2445
DUBAI PRICE **IP [3]**	H0: r=0 H1: r≤1	0.086234 0.007035	19.44808** 1.411931	0.0120 0.2347	18.03615** 1.411931	0.0121 0.2347
HH PRICE **IP [3]**	H0: r=0 H1: r≤1	0.033875 0.005264	7.948006 1.055619	0.4710 0.3042	6.892386 1.055619	0.5020 0.3042
LNG PRICE **IP [3]**	H0: r=0 H1: r≤1	0.058490 0.004074	12.87049 0.816410	0.1196 0.3662	12.05408 0.816410	0.1086 0.3662
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.099742 0.003407	21.58888*** 0.679164	0.0053 0.4099	20.90972*** 0.679164	0.0039 0.4099
SI **IP [3]**	H0: r=0 H1: r≤1	0.039933 0.009098	8.780976 1.608528	0.3860 0.2047	7.172447 1.608528	0.4689 0.2047

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 80 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	2.833 5.797	0.418 0.121	3	No causal relation
NGC does not granger cause GDP GDP does not granger cause NGC	1.258 7.072**	0.532 0.029	2	GDP→NGC
OILC does not granger cause GDP GDP does not granger cause OILC	0.106 13.090***	0.948 0.001	2	GDP→OILC
HH does not granger cause SI SI does not granger cause HH	2.069 1.753	0.355 0.416	2	No causal relation
HH does not granger cause IP IP does not granger cause HH	0.415 4.587	0.937 0.204	3	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	7.044* 12.548**	0.070 0.005	3	LNG↔IP
SI does not granger cause IP IP does not granger cause SI	7.519* 4.363	0.057 0.224	3	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 81 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	2.782 0.593	0.248 0.743	2	No causal relation
WTI does not granger cause M2 M2 does not granger cause WTI	1.834 0.661	0.399 0.718	2	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	1.719 1.434	0.423 0.488	2	No causal relation
HH does not granger cause M2 M2 does not granger cause HH	3.822 0.651	0.147 0.721	2	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	1.201 1.707	0.548 0.425	2	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	15.511** 17.187**	0.030 0.016	7	RUSSIA↔M2
BRENT does not granger cause SI SI does not granger cause BRENT	1.125 0.261	0.569 0.877	2	No causal relation
WTI does not granger cause SI	0.764	0.682	2	No causal relation

SI does not granger cause WTI	0.144	0.930		
DUBAI does not granger cause SI SI does not granger cause DUBAI	1.358 0.212	0.506 0.899	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	3.542 3.535	0.170 0.170	2	No causal relation
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	10.780** 16.715***	0.029 0.002	4	RUSSIA↔SI
BRENT does not granger cause IP IP does not granger cause BRENT	3.215 7.458*	0.359 0.058	3	IP→BRENT
WTI does not granger cause IP IP does not granger cause WTI	4.564 7.386*	0.206 0.060	3	IP→WTI
DUBAI does not granger cause IP IP does not granger cause DUBAI	8.513 3.529**	0.317 0.036	3	IP→DUBAI
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	0.620 2.616	0.960 0.623	4	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

CZECH

UNIT ROOT TEST RESULTS

Table 82 EC and GDP (1990-2012) -Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(EC)	-3.165 [0]** (0.036)	-3.290 [0]* (0.093)	-4.416 [0]*** (0.002)	-4.159 [0]** (0.018)
LN(GDP)	-0.066 [0] (0.955)	-1.691 [1] (0.718)	-4.953 [0]*** (0.000)	-4.437 [0]** (0.011)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-3.159 [1]** (0.036)	-3.255 [1]* (0.099)	-4.601 [4]*** (0.001)	-4.268 [0]** (0.014)
LN(GDP)	-0.080 [1] (0.940)	-3.809 [2]** (0.035)	-4.888[2]*** (0.000)	-4.564 [3]*** (0.008)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.111 [2]	0.112 [2]	0.236 [0]	0.166 [0]**
LN(GDP)	0.632 [3]**	0.115 [2]	0.216 [1]	0.152 [1]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 83 NG Consumption and GDP (1990-2013) -Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(NG)	-2.619 [0] (0.103)	-1.494 [0] (0.801)	-4.429 [0]*** (0.002)	-4.949 [0]*** (0.003)
LN(GDP)	-1.516 [1] (0.506)	-1.442 [1] (0.818)	-4.938 [0]*** (0.000)	-4.595 [0]*** (0.007)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-2.631 [1] (0.101)	-1.442 [2] (0.819)	-4.432 [1]*** (0.002)	-4.960 [2]*** (0.003)
LN(GDP)	-0.222 [1] (0.922)	-3.434 [2]* (0.071)	-4.789 [1]*** (0.001)	-4.735 [3]*** (0.005)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.478 [3]**	0.176 [3]**	0.432 [1]*	0.073 [3]
LN(GDP)	0.653[3]**	0.107 [2]	0.197 [1]	0.148 [2]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 84 Oil Consumption and GDP (1990-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-1.203 [0] (0.654)	-2.217 [0] (0.458)	-4.545 [0]*** (0.001)	-4.578 [0]*** (0.007)
LN(GDP)	-1.516 [1] (0.506)	-1.442 [1] (0.818)	-4.938 [0]*** (0.000)	-4.595 [0]*** (0.007)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-1.356 [1] (0.585)	-2.668 [2] (0.257)	-4.593 [2]*** (0.001)	-6.505 [8]*** (0.000)
LN(GDP)	-0.222 [1] (0.922)	-3.434 [2]* (0.071)	-4.789 [1]*** (0.001)	-4.735 [3]*** (0.005)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.509 [3]**	0.108 [2]	0.129 [1]	0.129 [1]*
LN(GDP)	0.653[3]**	0.107 [2]	0.197 [1]	0.148 [2]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 85 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-1.433 [13] (0.564)	-2.004 [12] (0.594)	-2.771 [12]* (0.064)	-3.040 [0] (0.124)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.477 [4] (0.543)	-1.748 [2] (0.725)	-15.583 [0]*** (0.000)	-16.127 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.734 [10]***	0.2940 [10]***	0.194 [2]	0.056 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 86 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-1.433 [13] (0.564)	-2.004 [12] (0.594)	-2.771 [12]* (0.064)	-3.040 [0] (0.124)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)

LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.477 [4] (0.543)	-1.748 [2] (0.725)	-15.583 [0]*** (0.000)	-16.127 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.734 [10]***	0.2940 [10]***	0.194 [2]	0.056 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 87 Oil Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.33 [1] (0.627)	-1.297 [1] (0.885)	-9.971 [0]*** (0.000)	-9.950 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.516 [7] (0.523)	-1.310 [7] (0.882)	-10.099 [6]*** (0.000)	-10.077 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.792 [10]***	0.326 [10]***	0.169 [7]	0.085 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 88 NG Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.33 [1] (0.627)	-1.297 [1] (0.885)	-9.971 [0]*** (0.000)	-9.950 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.516 [7] (0.523)	-1.310 [7] (0.882)	-10.099 [6]*** (0.000)	-10.077 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]

LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.792 [10]***	0.326 [10]***	0.169 [7]	0.085 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 89 Oil Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-0.645 [1] (0.856)	-1.582 [1] (0.796)	-20.309 [0]*** (0.000)	-20.257 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-0.577 [3] (0.871)	-2.176 [5] (0.499)	-19.522 [6]*** (0.000)	-19.477 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.571 [11]***	0.270 [11]***	0.110 [2]	0.117 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 90 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-0.645 [1] (0.856)	-1.582 [1] (0.796)	-20.309 [0]*** (0.000)	-20.257 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-0.577 [3] (0.871)	-2.176 [5] (0.499)	-19.522 [6]*** (0.000)	-19.477 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.571 [11]***	0.270 [11]***	0.110 [2]	0.117 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 91 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-1.33 [1] (0.627)	-1.297 [1] (0.885)	-9.971 [0]*** (0.000)	-9.950 [0]*** (0.000)
LN(IP)	-2.125 [1] (0.235)	-1.852 [1] (0.674)	-16.055 [0]*** (0.000)	-16.158 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(SI)	-1.516 [7] (0.523)	-1.310 [7] (0.882)	-10.099 [6]*** (0.000)	-10.077 [6]*** (0.000)
LN(IP)	-2.090 [8] (0.248)	-2.331 [8] (0.414)	-15.874 [8]*** (0.000)	-15.928 [8]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(SI)	0.792 [10]***	0.326 [10]***	0.169 [7]	0.085 [6]
LN(IP)	1.434 [10]***	0.282 [10]***	0.190 [8]	0.061 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 92 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
NGC GDP [2]	H0: r=0 H1: r≤1	0.516975 0.147546	18.63377** 3.352364*	0.0163 0.0671	15.28141** 3.352364*	0.0344 0.0671
OILC GDP [2]	H0: r=0 H1: r≤1	0.313581 0.021815	8.364787 0.463189	0.4272 0.4961	7.901598 0.463189	0.3888 0.4961
BRENT PRICE M2 [4]	H0: r=0 H1: r≤1	0.081825 0.019385	18.36504** 3.425747*	0.0180 0.0642	14.93929** 3.425747*	0.0391 0.0642
WTI PRICE M2 [4]	H0: r=0 H1: r≤1	0.091907 0.020460	20.48914*** 3.617645*	0.0081 0.0572	16.87150** 3.617645*	0.0189 0.0572
DUBAI PRICE M2 [4]	H0: r=0 H1: r≤1	0.087171 0.019213	19.35604** 3.394935*	0.0124 0.0654	15.96111** 3.394935*	0.0267 0.0654
HH PRICE M2 [4]	H0: r=0 H1: r≤1	0.077886 0.024638	18.55588** 4.365729**	0.0167 0.0367	14.19016* 4.365729**	0.0514 0.0367
LNG PRICE M2 [4]	H0: r=0 H1: r≤1	0.077791 0.015324	16.87453** 2.702461	0.0308 0.1002	14.17207* 2.702461	0.0517 0.1002
RUS PRICE M2 [4]	H0: r=0 H1: r≤1	0.081570 0.018348	18.13133** 3.240675*	0.0196 0.0718	14.89065** 3.240675*	0.0398 0.0718
BRENT PRICE SI [2]	H0: r=0 H1: r≤1	0.034349 0.012382	8.391955 2.205232	0.4245 0.1375	6.186723 2.205232	0.5894 0.1375
WTI PRICE SI [7]	H0: r=0 H1: r≤1	0.023859 0.015675	6.870853 2.717441*	0.5927 0.0993	4.153412 2.717441*	0.8428 0.0993
DUBAI PRICE SI [4]	H0: r=0 H1: r≤1	0.026750 0.018295	7.976315 3.231244*	0.4679 0.0722	4.745071 3.231244*	0.7736 0.0722
HH PRICE SI [2]	H0: r=0 H1: r≤1	0.047680 0.007578	9.993668 1.346394	0.2812 0.2459	8.647274 1.346394	0.3167 0.2459
LNG PRICE SI [3]	H0: r=0 H1: r≤1	0.019000 0.011240	5.365598 1.989468	0.7688 0.1584	3.376130 1.989468	0.9186 0.1584
RUS PRICE SI [7]	H0: r=0 H1: r≤1	0.047164 0.012477	10.46934 2.159564	0.2464 0.1417	8.309775 2.159564	0.3481 0.1417
BRENT PRICE IP [2]	H0: r=0 H1: r≤1	0.050517 0.004921	11.41103 0.991647	0.1874 0.3193	10.41938 0.991647	0.1858 0.3193
WTI PRICE IP [2]	H0: r=0 H1: r≤1	0.069222 0.004220	15.26867* 0.850096	0.0541 0.3565	14.41857** 0.850096	0.0473 0.3565
DUBAI PRICE IP [2]	H0: r=0 H1: r≤1	0.055510 0.004673	12.42068 0.941458	0.1378 0.3319	11.47923 0.941458	0.1318 0.3319
HH PRICE IP [2]	H0: r=0 H1: r≤1	0.038024 0.002849	8.365472 0.573519	0.4272 0.4489	7.791953 0.573519	0.4002 0.4489
LNG PRICE	H0: r=0	0.030203	6.651766	0.6184	6.164379	0.5922

IP [2]	H1: r≤1	0.002422	0.487387	0.4851	0.487387	0.4851
RUS PRICE	H0: r=0	0.088613	19.61604**	0.0113	18.46481**	0.0102
IP [4]	H1: r≤1	0.005768	1.151227	0.2833	1.151227	0.2833
SI	H0: r=0	0.039382	9.374637	0.3319	7.071382	0.4807
IP [3]	H1: r≤1	0.013001	2.303256	0.1291	2.303256	0.1291

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 93 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
OILC does not granger cause GDP	0.991	0.609	2	No causal relation
GDP does not granger cause OILC	3.776	0.151		
BRENT does not granger cause SI	0.880	0.643	2	SI→BRENT
SI does not granger cause BRENT	11.556***	0.003		
WTI does not granger cause SI	11.659	0.112	7	SI→WTI
SI does not granger cause WTI	12.437*	0.087		
DUBAI does not granger cause SI	5.247	0.262	4	DUBAI→SI
SI does not granger cause DUBAI	15.492***	0.003		
HH does not granger cause SI	0.452	0.797	2	No causal relation
SI does not granger cause HH	1.900	0.386		
LNG does not granger cause SI	5.865	0.118	3	SI→LNG
SI does not granger cause LNG	23.480***	0.000		
RUSSIA does not granger cause SI	12.979*	0.072	7	RUSSIA↔SI
SI does not granger cause RUSSIA	27.046***	0.000		
BRENT does not granger cause IP	3.609	0.164	2	No causal relation
IP does not granger cause BRENT	3.087	0.213		
DUBAI does not granger cause IP	3.569	0.167	2	No causal relation
IP does not granger cause DUBAI	4.148	0.125		
HH does not granger cause IP	1.181	0.554	2	No causal relation
IP does not granger cause HH	0.088	0.956		
LNG does not granger cause IP	0.747	0.688	2	IP→LNG
IP does not granger cause LNG	5.869*	0.053		
SI does not granger cause IP	10.431**	0.015	3	SI→IP
IP does not granger cause SI	4.640	0.200		

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 94 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
NGC does not granger cause GDP	0.016	0.991	2	No causal relation
GDP does not granger cause NGC	3.838	0.146		
BRENT does not granger cause M2	12.181**	0.016	4	BRENT→M2
M2 does not granger cause BRENT	3.557	0.469		
WTI does not granger cause M2	14.166***	0.006	4	WTI→M2
M2 does not granger cause WTI	5.219	0.265		
DUBAI does not granger cause M2	11.501**	0.021	4	DUBAI→M2
M2 does not granger cause DUBAI	3.142	0.534		
HH does not granger cause M2	16.043***	0.003	4	HH→M2
M2 does not granger cause HH	3.106	0.540		
LNG does not granger cause M2	8.859*	0.064	4	LNG→M2
M2 does not granger cause LNG	5.830	0.212		
RUSSIA does not granger cause M2	0.788	0.940	4	No causal relation
M2 does not granger cause RUSSIA	4.707	0.318		
WTI does not granger cause IP	2.148	0.341	2	No causal relation
IP does not granger cause WTI	1.168	0.557		
RUSSIA does not granger cause IP	1.004	0.909	4	IP→RUSSIA
IP does not granger cause RUSSIA	7.828*	0.098		

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

DENMARK

UNIT ROOT TEST RESULTS

Table 95 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-2.934 [0]* (0.0513)	-3.147 [0] (0.111)	-6.386 [0]*** (0.000)	-6.329 [0]*** (0.000)
LN(GDP)	-2.383 [0] (0.153)	-2.383 [0] (0.153)	-4.618 [0]*** (0.000)	-4.813 [0]*** (0.002)
	PP (Level)		PP (First Difference)	
LN(EC)	-3.048 [1]** (0.039)	-3.147 [0] (0.111)	-7.067 [5]*** (0.000)	-6.972 [5]*** (0.000)
LN(GDP)	-2.181 [2] (0.216)	-1.066 [1] (0.920)	-4.614 [3]*** (0.000)	-4.744 [0]*** (0.002)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.180 [1]	0.102 [1]	0.110 [3]	0.044 [3]
LN(GDP)	0.708 [5]**	0.161 [3]**	0.381 [0]*	0.070 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 96 NG Consumption and GDP (1983-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-17.800 [0]*** (0.000)	-14.603 [0]*** (0.000)	-14.945 [1]*** (0.000)	-5.350 [0]*** (0.000)
LN(GDP)	-2.790 [0]* (0.071)	-0.337 [0] (0.985)	-3.596 [0]** (0.012)	-4.091 [0]** (0.016)
	PP (Level)		PP (First Difference)	
LN(NG)	-12.717 [3]*** (0.000)	-11.010 [3]*** (0.000)	-11.963 [7]*** (0.000)	-11.670 [9]*** (0.000)
LN(GDP)	-2.790 [0]* (0.071)	-0.659 [2] (0.967)	-3.499 [4]** (0.015)	-3.975 [6]** (0.021)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.540 [4]**	0.195 [3]**	0.498 [3]**	0.155 [2]**
LN(GDP)	0.688 [4]**	0.154 [4]**	0.510 [1]**	0.091 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 97 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-1.419 [0] (0.564)	-1.948 [1] (0.611)	-4.602 [0]*** (0.000)	-4.611 [0]*** (0.003)
LN(GDP)	-2.112 [0] (0.240)	-0.027 [0] (0.995)	-4.854 [0]*** (0.000)	-5.253 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(OIL)	-1.420 [2] (0.563)	-1.681 [2] (0.742)	-4.599 [1]*** (0.000)	-4.611 [0]*** (0.003)
LN(GDP)	-1.9890 [1] (0.290)	-0.189 [2] (0.991)	-4.865 [1]*** (0.000)	-5.161 [4]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(OIL)	0.677 [5]**	0.150 [5]**	0.140 [2]	0.082 [2]
LN(GDP)	0.815 [5]***	0.171 [4]**	0.407 [1]*	0.102 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 98 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)	ADF (First Difference)

	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-1.654 [9] (0.452)	-1.191 [9] (0.908)	-3.277 [8]** (0.017)	-3.501 [8]** (0.042)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.116 [4] (0.709)	-1.041 [1] (0.934)	-21.197 [4]*** (0.000)	-21.343 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.529 [10]**	0.369 [10]***	0.359 [5]*	0.207 [5]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 99 NG Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.023)
LN(M2)	-1.654 [9] (0.452)	-1.191 [9] (0.908)	-3.277 [8]*** (0.017)*	-3.501 [8]** (0.042)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-1.116 [4] (0.709)	-1.041 [1] (0.934)	-21.197 [4]*** (0.000)	-21.343 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.529 [10]**	0.369 [10]***	0.359 [5]*	0.207 [5]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 100 Oil Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)

LN(SI)	-0.800 [1] (0.816)	-2.016 [1] (0.588)	-9.706 [0]*** (0.000)	-9.709 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-0.913 [7] (0.782)	-2.048 [7] (0.570)	-9.878 [5]*** (0.000)	-9.870 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	1.124 [10]***	0.096 [10]	0.078 [7]	0.060 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 101 NG Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-0.800 [1] (0.816)	-2.016 [1] (0.588)	-9.706 [0]*** (0.000)	-9.709 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-0.913 [7] (0.782)	-2.048 [7] (0.570)	-9.878 [5]*** (0.000)	-9.870 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	1.124 [10]***	0.096 [10]	0.078 [7]	0.060 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 102 Oil Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-2.112 [0] (0.240)	-2.577[2] (0.291)	-15.479 [1]*** (0.000)	-15.471 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)

LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-3.283 [3]** (0.016)	-3.786 [3]** (0.019)	-24.144 [20]*** (0.000)	-24.815 [21]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	0.558 [11]**	0.283[11]***	0.190 [32]	0.103 [34]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 103 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-2.112 [0] (0.240)	-2.577[2] (0.291)	-15.479 [1]*** (0.000)	-15.471 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-3.283 [3]** (0.016)	-3.786 [3]** (0.019)	-24.144 [20]*** (0.000)	-24.815 [21]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	0.558 [11]**	0.283[11]***	0.190 [32]	0.103 [34]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 104 SI and IP (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-0.800 [1] (0.816)	-2.016 [1] (0.588)	-9.706 [0]*** (0.000)	-9.709 [0]*** (0.000)
LN(IP)	-1.345 [2] (0.608)	-2.069 [2] (0.559)	-13.892 [1]*** (0.000)	-13.858 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-0.913 [7] (0.782)	-2.048 [7] (0.570)	-9.878 [5]*** (0.000)	-9.870 [5]*** (0.000)
LN(IP)	-1.930 [4] (0.317)	-3.079 [6] (0.114)	-20.873 [3]*** (0.000)	-20.827 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	1.124 [10]***	0.096 [10]	0.078 [7]	0.060 [7]
LN(IP)	0.943 [10]***	0.195 [10]**	0.093 [5]	0.079 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 105 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC **GDP [3]**	H0: r=0 H1: r≤1	0.447430 0.098086	22.98160*** 3.406800*	0.0031 0.0649	19.57480*** 3.406800*	0.0066 0.0649
OILC **GDP [3]**	H0: r=0 H1: r≤1	0.127783 0.066031	8.201165 2.732481*	0.4441 0.0983	5.468684 2.732481*	0.6819 0.0983
BRENT PRICE **M2 [14]**	H0: r=0 H1: r≤1	0.098999 0.023405	21.10882*** 3.907707**	0.0064 0.0481	17.20112** 3.907707**	0.0167 0.0481
WTI PRICE **M2 [14]**	H0: r=0 H1: r≤1	0.102530 0.027710	22.48554*** 4.636633**	0.0038 0.0313	17.84891** 4.636633	0.0130 0.0313
DUBAI PRICE **M2 [14]**	H0: r=0 H1: r≤1	0.097977 0.024122	21.04297*** 4.028914**	0.0066 0.0447	17.01406** 4.028914**	0.0179 0.0447
HH PRICE **M2 [35]**	H0: r=0 H1: r≤1	0.187687 0.023353	33.33591*** 3.402734*	0.0000 0.0651	29.93317*** 3.402734*	0.0001 0.0651
LNG PRICE **M2 [14]**	H0: r=0 H1: r≤1	0.085487 0.007888	16.05175** 1.306749	0.0412 0.2530	14.74500** 1.306749	0.0419 0.2530
RUS PRICE **M2 [5]**	H0: r=0 H1: r≤1	0.122140 0.007761	24.02234*** 1.355757	0.0021 0.2443	22.66658*** 1.355757	0.0019 0.2443
BRENT PRICE **SI [2]**	H0: r=0 H1: r≤1	0.018522 0.004088	4.034167 0.725066	0.9008 0.3945	3.309101 0.725066	0.9240 0.3945
WTI PRICE **SI [7]**	H0: r=0 H1: r≤1	0.022887 0.013554	6.329604 2.347281	0.6566 0.1255	3.982323 2.347281	0.8612 0.1255
DUBAI PRICE **SI [7]**	H0: r=0 H1: r≤1	0.019235 0.014078	5.779215 2.438546	0.7214 0.1184	3.340668 2.438546	0.9215 0.1184
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.043369 0.000983	8.021906 0.174162	0.4631 0.6764	7.847744 0.174162	0.3944 0.6764
LNG PRICE **SI [3]**	H0: r=0 H1: r≤1	0.028219 0.004092	5.759685 0.721753	0.7237 0.3956	5.037932 0.721753	0.7370 0.3956
RUS PRICE **SI [7]**	H0: r=0 H1: r≤1	0.041632 0.004048	8.011642 0.697644	0.4642 0.4036	7.313997 0.697644	0.4527 0.4036
BRENT PRICE **IP [7]**	H0: r=0 H1: r≤1	0.031899 0.007930	7.914719 1.560556	0.4746 0.2116	6.354163 1.560556	0.5682 0.2116
WTI PRICE **IP [7]**	H0: r=0 H1: r≤1	0.030804 0.008420	7.789853 1.657388	0.4881 0.1980	6.132465 1.657388	0.5963 0.1980
DUBAI PRICE **IP [7]**	H0: r=0 H1: r≤1	0.027699 0.008914	7.260537 1.754887	0.5476 0.1853	5.505650 1.754887	0.6771 0.1853
HH PRICE **IP [5]**	H0: r=0 H1: r≤1	0.050437 0.013674	12.97331 2.726145*	0.1158 0.0987	10.24716 2.726145*	0.1962 0.0987
LNG PRICE **IP [5]**	H0: r=0 H1: r≤1	0.044641 0.005513	10.13695 1.094602	0.2704 0.2955	9.042351 1.094602	0.2826 0.2955
RUS PRICE **IP [5]**	H0: r=0 H1: r≤1	0.044641 0.005513	10.13695 1.094602	0.2704 0.2955	9.042351 1.094602	0.2826 0.2955
SI **IP [4]**	H0: r=0 H1: r≤1	0.025301 0.004210	5.223031 0.738386	0.7847 0.3902	4.484645 0.738386	0.8050 0.3902

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 106 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
OILC does not granger cause GDP GDP does not granger cause OILC	10.493** 4.368	0.014 0.224	3	OILC→GDP
BRENT does not granger cause SI SI does not granger cause BRENT	0.326 10.687***	0.849 0.004	2	BRENT→SI
WTI does not granger cause SI SI does not granger cause WTI	11.517 17.843**	0.117 0.012	7	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	12.059* 17.600**	0.098 0.013	7	DUBAI↔SI
HH does not granger cause SI SI does not granger cause HH	0.397 0.161	0.819 0.922	2	No causal relation

LNG does not granger cause SI SI does not granger cause LNG	2.395 26.272***	0.494 0.000	3	LNG→SI
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	6.325 23.805***	0.502 0.001	7	RUSSIA→SI
BRENT does not granger cause IP IP does not granger cause BRENT	24.725*** 7.930	0.000 0.338	7	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	24.932*** 7.618	0.000 0.367	7	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	20.429*** 6.610	0.004 0.470	7	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	3.621 8.382	0.605 0.136	5	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	5.039 3.531	0.411 0.618	5	No causal relation
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	10.981* 4.410	0.051 0.491	5	RUSSIA→IP
SI does not granger cause IP IP does not granger cause SI	10.223** 6.384	0.036 0.172	4	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 107 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	2.290 6.552*	0.514 0.087	3	GDP→EC
BRENT does not granger cause M2 M2 does not granger cause BRENT	24.826** 14.633	0.036 0.403	14	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	19.310 13.661	0.153 0.475	14	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	26.091** 11.252	0.025 0.666	14	DUBAI→M2
HH does not granger cause M2 M2 does not granger cause HH	48.766* 40.188	0.061 0.251	35	HH→M2
LNG does not granger cause M2 M2 does not granger cause LNG	22.631* 5.404	0.066 0.979	14	LNG→M2
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	3.134 6.662	0.679 0.247	5	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

ESTONIA

UNIT ROOT TEST RESULTS

Table 108 EC and GDP (1995-2012) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.9330 [0] (0.310)	-2.442 [0] (0.347)	-4.921 [0]*** (0.001)	-5.075 [0]*** (0.005)
LN(GDP)	-1.481 [2] (0.515)	-2.179 [1] (0.467)	-2.434 [0] (0.148)	-3.553 [1]* (0.069)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-1.933 [0] (0.310)	-2.376 [2] (0.376)	-5.502 [6]*** (0.000)	-10.997 [15]*** (0.000)
LN(GDP)	-1.774 [2] (0.379)	-1.425 [1] (0.814)	-2.244 [4]*** (0.199)	-2.226 [5]*** (0.445)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.373 [2]*	0.131 [1]*	0.500 [16]**	0.500 [16]***
LN(GDP)	0.532 [3]**	0.143 [2]*	0.308 [0]	0.065 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 109 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-3.643 [0]*** (0.005)	-1.086 [0] (0.927)	-2.386 [9] (0.147)	-13.671 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-3.296 [6]** (0.016)	-1.138 [6] (0.918)	-13.354 [7]*** (0.000)	-13.771 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	0.656 [10]***	0.377 [10]***	0.798 [7]***	0.133 [6]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 110 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-3.643 [0]*** (0.005)	-1.086 [0] (0.927)	-2.386 [9] (0.147)	-13.671 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-3.296 [6]** (0.016)	-1.138 [6] (0.918)	-13.354 [7]*** (0.000)	-13.771 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	0.656 [10]***	0.377 [10]***	0.798 [7]***	0.133 [6]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 111 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1]	-2.266 [1]	-9.643 [0]***	-9.666 [0]***

	(0.396)	(0.449)	(0.000)	(0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.361 [1] (0.600)	-1.638 [1] (0.773)	-8.613 [0]*** (0.000)	-8.604 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.578 [7] (0.491)	-1.649 [7] (0.769)	-8.580 [4]*** (0.000)	-8.525 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	1.176 [10]**	0.251 [10]***	0.134 [7]	0.066 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 112 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.361 [1] (0.600)	-1.638 [1] (0.773)	-8.613 [0]*** (0.000)	-8.604 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.578 [7] (0.491)	-1.649 [7] (0.769)	-8.580 [4]*** (0.000)	-8.525 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	1.176 [10]**	0.251 [10]***	0.134 [7]	0.066 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 113 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-0.725 [1] (0.837)	-1.622 [1] (0.780)	-18.570 [0]*** (0.000)	-18.524 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	

LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-0.727 [4] (0.836)	-2.184 [6] (0.495)	-18.017 [6]*** (0.000)	-18.978 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.540 [11]**	0.213 [11]**	0.080 [4]	0.081 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 114 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757 [0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-0.725 [1] (0.837)	-1.622 [1] (0.780)	-18.570 [0]*** (0.000)	-18.524 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-0.727 [4] (0.836)	-2.184 [6] (0.495)	-18.017 [6]*** (0.000)	-18.978 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.540 [11]**	0.213 [11]**	0.080 [4]	0.081 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 115 SI and IP (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-1.361 [1] (0.600)	-1.638 [1] (0.773)	-8.613 [0]*** (0.000)	-8.604 [0]*** (0.000)
LN(IP)	-1.449 [0] (0.556)	-1.818 [0] (0.691)	-15.777 [0]*** (0.000)	-15.766 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.578 [7] (0.491)	-1.649 [7] (0.769)	-8.580 [4]*** (0.000)	-8.525 [3]*** (0.000)
LN(IP)	-1.470[7] (0.546)	-2.041 [7] (0.574)	-15.619 [7]*** (0.000)	-15.604 [0]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	1.176 [10]**	0.251 [10]***	0.134 [7]	0.066 [7]
LN(IP)	1.380 [10]***	0.177 [10]**	0.103 [7]	0.062 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 116 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC **GDP [1]**	H0: r=0 H1: r≤1	0.554673 0.183632	15.17755* 3.043349*	0.0558 0.0811	12.13420 3.043349*	0.1057 0.0811
BRENT PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.095070 0.025479	21.99874*** 4.516549**	0.0045 0.0336	17.48219** 4.516549**	0.0150 0.0336
WTI PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.122281 0.025519	27.34896*** 4.523849**	0.0005 0.0334	22.82511*** 4.523849**	0.0018 0.0334
DUBAI PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.091492 0.040358	24.27509*** 7.291568***	0.0019 0.0069	16.98353** 7.291568***	0.0181 0.0069
HH PRICE **M2 [1]**	H0: r=0 H1: r≤1	0.089185 0.043895	24.61784*** 7.989917***	0.0016 0.0047	16.62792** 7.989917***	0.0208 0.0047
LNG PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.066147 0.029837	17.37604** 5.331267**	0.0257 0.0209	12.04477 5.331267**	0.1090 0.0209
RUS PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.108451 0.031783	25.74152*** 5.652404**	0.0010 0.0174	20.08912*** 5.652404**	0.0054 0.0174
BRENT PRICE **SI [2]**	H0: r=0 H1: r≤1	0.051201 0.009474	10.98765 1.684865	0.2123 0.1943	9.302784 1.684865	0.2618 0.1943
WTI PRICE **SI [4]**	H0: r=0 H1: r≤1	0.055872 0.014883	12.68543 2.624046	0.1269 0.1053	10.06138 2.624046	0.2079 0.1053
DUBAI PRICE **SI [2]**	H0: r=0 H1: r≤1	0.045532 0.009188	9.882304 1.633881	0.2899 0.2012	8.248423 1.633881	0.3540 0.2012
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.054876 0.005528	10.97074 0.981086	0.2133 0.3219	9.989651 0.981086	0.2126 0.3219
LNG PRICE **SI [2]**	H0: r=0 H1: r≤1	0.034278 0.013694	8.614236 2.440647	0.4023 0.1182	6.173589 2.440647	0.5910 0.1182
RUS PRICE **SI [7]**	H0: r=0 H1: r≤1	0.081290 0.019591	17.98610** 3.403183*	0.0206 0.0651	14.58291** 3.403183*	0.0445 0.0651
BRENT PRICE **IP [4]**	H0: r=0 H1: r≤1	0.032708 0.007781	8.172219 1.554419	0.4472 0.2125	6.617800 1.554419	0.5353 0.2125
WTI PRICE **IP [4]**	H0: r=0 H1: r≤1	0.039685 0.007335	9.523261 1.464944	0.3192 0.2261	8.058316 1.464944	0.3728 0.2261
DUBAI PRICE **IP [2]**	H0: r=0 H1: r≤1	0.044425 0.007942	10.73651 1.602757	0.2282 0.2055	9.133755 1.602757	0.2752 0.2055
HH PRICE **IP [2]**	H0: r=0 H1: r≤1	0.031034 0.001941	6.727386 0.390621	0.6095 0.5320	6.336765 0.390621	0.5704 0.5320
LNG PRICE **IP [4]**	H0: r=0 H1: r≤1	0.032257 0.007585	8.040053 1.515124	0.4611 0.2184	6.524929 1.515124	0.5468 0.2184
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.054396 0.005274	12.18257 1.052305	0.1484 0.3050	11.13027 1.052305	0.1478 0.3050
SI **IP [7]**	H0: r=0 H1: r≤1	0.034537 0.022569	9.971659 3.926257*	0.2829 0.0475	6.045401 3.926257*	0.6074 0.0475

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 117 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause SI SI does not granger cause BRENT	0.825 9.524***	0.661 0.008	2	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	3.694 13.604***	0.449 0.008	4	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	0.771 8.547**	0.680 0.013	2	SI→DUBAI
HH does not granger cause SI SI does not granger cause HH	1.799 0.369	0.406 0.831	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	0.752 15.819***	0.686 0.000	2	SI→LNG

BRENT does not granger cause IP IP does not granger cause BRENT	19.280*** 4.129	0.000 0.388	4	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	18.192*** 3.882	0.001 0.422	4	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	9.695*** 2.278	0.007 0.320	2	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	4.613* 0.120	0.099 0.941	2	HH→IP
LNG does not granger cause IP IP does not granger cause LNG	12.327** 14.790***	0.015 0.005	4	LNG↔IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	3.719 28.477***	0.445 0.000	4	IP→RUSSIA
SI does not granger cause IP IP does not granger cause SI	22.316*** 4.827	0.002 0.681	7	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 118 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	0.002 0.037	0.964 0.846	1	No causal relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	2.055 16.967***	0.725 0.002	4	M2→BRENT
WTI does not granger cause M2 M2 does not granger cause WTI	2.392 18.780***	0.663 0.000	4	M2→WTI
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	0.175 1.916	0.915 0.383	2	No causal relation
HH does not granger cause M2 M2 does not granger cause HH	0.237 0.204	0.626 0.651	1	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	0.955 2.087	0.812 0.554	3	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	4.180 4.653	0.382 0.324	4	No causal relation
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	14.927** 20.295***	0.036 0.005	7	RUSSIA↔SI

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

FINLAND

UNIT ROOT TEST RESULTS

Table 119 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-2.173 [0] (0.218)	-2.989 [0] (0.148)	-7.102 [0]*** (0.000)	-7.247 [0]*** (0.000)
LN(GDP)	-1.144 [1] (0.686)	-3.108 [1] (0.120)	-3.696 [0]*** (0.008)	-3.693 [0]** (0.036)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-2.394 [6] (0.150)	-2.956 [1] (0.158)	-7.572 [5]*** (0.000)	-9.635 [9]*** (0.000)
LN(GDP)	-00.872 [1] (0.785)	-1.633 [0] (0.759)	-3.498 [5]** (0.013)	-3.478 [5]* (0.057)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.695 [5]**	0.128 [3]*	0.353 [6]*	0.152 [13]**
LN(GDP)	0.703 [5]**	0.063 [4]	0.076 [1]	0.063 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 120 NG Consumption and GDP (1974-2013) -Annual

Variable	ADF (Level)	ADF (First Difference)

	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-2.623 [0]* (0.097)	-0.504 [0] (0.979)	-3.125 [1]** (0.033)	-5.344 [0]*** (0.000)
LN(GDP)	-1.345 [1] (0.598)	-2.506 [1] (0.323)	-3.650 [0]*** (0.009)	-3.719 [0]** (0.033)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-2.247 [4] (0.193)	-1.075 [3] (0.920)	-5.238 [3]*** (0.000)	-5.366 [3]*** (0.000)
LN(GDP)	-1.204 [1] (0.663)	-1.590 [1] (0.778)	-3.536 [4]** (0.012)	-3.506 [5]* (0.052)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.669 [5]**	0.159 [5]**	0.378 [3]*	0.069 [3]
LN(GDP)	0.745 [5]***	0.061 [4]**	0.141 [1]	0.116 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 121 Oil Consumption and GDP (1970-2013)-Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(OIL)	-1.057 [0] (0.723)	-3.024 [0] (0.137)	-7.279 [0]*** (0.000)	-7.430 [0]*** (0.000)
LN(GDP)	-1.722 [1] (0.412)	-2.885 [1] (0.177)	-3.783 [0]*** (0.006)	-3.985 [0]** (0.016)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-0.960 [2] (0.758)	-3.113 [3] (0.116)	-7.339 [2]*** (0.000)	-7.489 [2]*** (0.000)
LN(GDP)	-1.965 [0] (0.300)	-1.794 [1] (0.690)	-3.568 [5]** (0.010)	-3.773 [5]** (0.028)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.605 [5]**	0.072 [4]	0.188 [1]	0.080 [1]
LN(GDP)	0.820 [5]***	0.072 [4]	0.220 [1]	0.096 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 122 Oil Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-0.004 [1] (0.957)	-1.852 [1] (0.674)	-19.078 [0]*** (0.000)	-19.032 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	0.0017 [5] (0.958)	-2.214 [7] (0.478)	-19.063 [5]*** (0.000)	-19.015 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.719 [10]**	0.196 [10]**	0.200 [5]	0.195 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 123 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.004 [1] (0.957)	-1.852 [1] (0.674)	-19.078 [0]*** (0.000)	-19.032 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471 [9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	0.0017 [5] (0.958)	-2.214 [7] (0.478)	-19.063 [5]*** (0.000)	-19.015 [5]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.719 [10]**	0.196 [10]**	0.200 [5]	0.195 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 124 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-3.138 [1]** (0.025)	-2.852 [1] (0.180)	-9.912 [0]*** (0.000)	-10.007 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-2.542 [2] (0.107)	-2.058 [0] (0.564)	-9.741 [5]*** (0.000)	-9.817 [7]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.328 [10]	0.103 [10]	0.198 [1]	0.104 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 125 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)

LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-3.138 [1]** (0.025)	-2.852 [1] (0.180)	-9.912 [0]*** (0.000)	-10.007 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-2.542 [2] (0.107)	-2.058 [0] (0.564)	-9.741 [5]*** (0.000)	-9.817 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.328 [10]	0.103 [10]	0.198 [1]	0.104 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 126 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-2.112 [2] (0.240)	-2.577 [2] (0.291)	-15.479 [1]*** (0.000)	-15.471 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-3.283 [3]** (0.016)	-3.786 [3]** (0.019)	-24.144 [20]*** (0.000)	-24.815 [21]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	0.558 [11]**	0.283 [11]***	0.190 [32]	0.103 [34]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 127 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-2.112 [2] (0.240)	-2.577 [2] (0.291)	-15.479 [1]*** (0.000)	-15.471 [1]*** (0.000)

	PP (Level)		PP (First Difference)	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-3.283 [3]** (0.016)	-3.786 [3]** (0.019)	-24.144 [20]*** (0.000)	-24.815 [21]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	0.558 [11]**	0.283 [11]***	0.190 [32]	0.103 [34]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 128 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-3.138 [1]** (0.025)	-2.852 [1] (0.180)	-9.912 [0]*** (0.000)	-10.007 [0]*** (0.000)
LN(IP)	-1.345 [2] (0.608)	-2.069 [2] (0.559)	-13.892 [1]*** (0.000)	-13.858 [1]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(SI)	-2.542 [2] (0.107)	-2.058 [0] (0.564)	-9.741 [5]*** (0.000)	-9.817 [7]*** (0.000)
LN(IP)	-1.930 [4] (0.317)	-3.079 [6] (0.114)	-20.873 [3]*** (0.000)	-20.827 [3]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(SI)	0.328 [10]	0.103 [10]	0.198 [1]	0.104 [0]
LN(IP)	0.943 [10]***	0.195 [10]**	0.093 [5]	0.079 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 129 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [1]	H0: r=0 H1: r≤1	0.198504 0.057801	9.828480 2.083862	0.2942 0.1489	7.744617 2.083862	0.4053 0.1489
NGC GDP [1]	H0: r=0 H1: r≤1	0.108513 0.043831	6.068046 1.703190	0.6875 0.1919	4.364856 1.703190	0.8190 0.1919
OILC GDP [2]	H0: r=0 H1: r≤1	0.140582 0.023112	7.170221 0.958734	0.5580 0.3275	6.211487 0.958734	0.5862 0.3275
BRENT PRICE M2 [2]	H0: r=0 H1: r≤1	0.095142 0.004775	18.54317** 0.847227	0.0168 0.3573	17.69595** 0.847227	0.0138 0.3573
WTI PRICE M2 [3]	H0: r=0 H1: r≤1	0.122268 0.004568	23.75871*** 0.805872	0.0023 0.3693	22.95284*** 0.805872	0.0017 0.3693
DUBAI PRICE M2 [2]	H0: r=0 H1: r≤1	0.103416 0.004673	20.15097*** 0.829053	0.0092 0.3625	19.32192*** 0.829053	0.0073 0.3625
HH PRICE M2 [4]	H0: r=0 H1: r≤1	0.098604 0.003171	18.72267** 0.555811	0.0157 0.4560	18.16686** 0.555811	0.0115 0.4560
LNG PRICE M2 [3]	H0: r=0 H1: r≤1	0.064552 5.08E-06	11.74540 0.000894	0.1695 0.9769	11.74450 0.000894	0.1206 0.9769
RUS PRICE M2 [4]	H0: r=0 H1: r≤1	0.084192 0.000651	15.50484** 0.113893	0.0498 0.7357	15.39095** 0.113893	0.0330 0.7357
BRENT PRICE SI [7]	H0: r=0 H1: r≤1	0.045303 0.024073	12.16548 4.191275**	0.1492 0.0406	7.974205 4.191275**	0.3813 0.0406
WTI PRICE SI [7]	H0: r=0 H1: r≤1	0.046519 0.027886	13.05796 4.864568**	0.1127 0.0274	8.193389 4.864568**	0.3594 0.0274
DUBAI PRICE	H0: r=0	0.045484	12.18255	0.1484	8.006696	0.3780

SI [7]	H1: r≤1	0.023986	4.175855**	0.0410	4.175855**	0.0410
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.087703 0.029097	21.47327*** 5.226579**	0.0056 0.0222	16.24670** 5.226579**	0.0240 0.0222
LNG PRICE **SI [3]**	H0: r=0 H1: r≤1	0.046538 0.007851	9.774684 1.387215	0.2985 0.2389	8.387469 1.387215	0.3407 0.2389
RUS PRICE **SI [4]**	H0: r=0 H1: r≤1	0.063383 0.012753	13.70538* 2.246140	0.0914 0.1339	11.45924 2.246140	0.1326 0.1339
BRENT PRICE **IP [7]**	H0: r=0 H1: r≤1	0.031899 0.007930	7.914719 1.560556	0.4746 0.2116	6.354163 1.560556	0.5682 0.2116
WTI PRICE **IP [7]**	H0: r=0 H1: r≤1	0.030804 0.008420	7.789853 1.657388	0.4881 0.1980	6.132465 1.657388	0.5963 0.1980
DUBAI PRICE **IP [7]**	H0: r=0 H1: r≤1	0.027699 0.008914	7.260537 1.754887	0.5476 0.1853	5.505650 1.754887	0.6771 0.1853
HH PRICE **IP [5]**	H0: r=0 H1: r≤1	0.050437 0.013674	12.97331 2.726145*	0.1158 0.0987	10.24716 2.726145*	0.1962 0.0987
LNG PRICE **IP [3]**	H0: r=0 H1: r≤1	0.051427 0.004638	11.48909 0.929850	0.1831 0.3349	10.55924 0.929850	0.1777 0.3349
RUS PRICE **IP [7]**	H0: r=0 H1: r≤1	0.034922 0.004664	7.883285 0.916216	0.4780 0.3385	6.967069 0.916216	0.4930 0.3385
SI **IP [4]**	H0: r=0 H1: r≤1	0.076545 0.011739	16.00228** 2.066544	0.0419 0.1506	13.93573* 2.066544	0.0563 0.1506

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 130 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	6.134** 2.590	0.013 0.107	1	EC→GDP
NGC does not granger cause GDP GDP does not granger cause NGC	0.801 0.059	0.370 0.807	1	No causal relation
OILC does not granger cause GDP GDP does not granger cause OILC	1.970 7.733**	0.373 0.020	2	GDP→OIL
LNG does not granger cause M2 M2 does not granger cause LNG	2.939 10.869**	0.401 0.012	3	M2→LNG
BRENT does not granger cause SI SI does not granger cause BRENT	14.098** 16.807**	0.049 0.018	7	BRENT↔SI
WTI does not granger cause SI SI does not granger cause WTI	14.848** 16.764**	0.038 0.019	7	WTI↔SI
DUBAI does not granger cause SI SI does not granger cause DUBAI	18.816*** 20.303***	0.008 0.004	7	DUBAI↔SI
LNG does not granger cause SI SI does not granger cause LNG	1.315 5.150	0.725 0.161	3	No causal relation
BRENT does not granger cause IP IP does not granger cause BRENT	24.725*** 7.930	0.000 0.338	7	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	24.932*** 7.618	0.000 0.367	7	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	20.429*** 6.610	0.004 0.470	7	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	3.621 8.382	0.605 0.136	5	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	3.954 1.782	0.266 0.618	3	No causal relation
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	14.769** 4.760	0.039 0.689	7	RUSSIA→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 131 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2	6.305**	0.042	2	BRENT→M2

M2 does not granger cause BRENT	4.371	0.112		
WTI does not granger cause M2 M2 does not granger cause WTI	6.753* 6.945*	0.080 0.073	3	WTI→M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	6.325** 3.677	0.042 0.159	2	DUBAI→M2
HH does not granger cause M2 M2 does not granger cause HH	5.781 5.761	0.216 0.217	4	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	2.924 1.981	0.570 0.739	4	No causal relation
HH does not granger cause SI SI does not granger cause HH	2.080 1.044	0.353 0.593	2	No causal relation
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	2.224 13.834***	0.694 0.007	4	SI→RUSSIA
SI does not granger cause IP IP does not granger cause SI	19.059*** 5.312	0.000 0.256	4	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

FRANCE

UNIT ROOT TEST RESULTS

Table 132 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-2.450 [0] (0.135)	-0.241 [1] (0.989)	-6.882 [0]*** (0.000)	-7.509 [0]*** (0.000)
LN(GDP)	-2.702 [0]* (0.083)	-2.096 [1] (0.529)	-3.811 [0]*** (0.006)	-3.999 [0]** (0.018)
	PP (Level)		PP (First Difference)	
LN(EC)	-2.540 [3] (0.114)	-1.012 [2] (0.929)	-6.901 [4]*** (0.000)	-8.630 [13]*** (0.000)
LN(GDP)	-2.702 [0]* (0.083)	-1.549 [1] (0.792)	-3.697 [4]*** (0.008)	-3.742 [5]** (0.032)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.630 [5]**	0.194 [4]**	0.459 [2]*	0.164 [11]**
LN(GDP)	0.721 [5]**	0.162 [3]**	0.345 [2]	0.060 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 133 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-3.975 [1]*** (0.003)	-4.634 [0]*** (0.003)	-6.132 [0]*** (0.000)	-6.961 [0]*** (0.000)
LN(GDP)	-2.487 [1] (0.125)	-1.375 [1] (0.853)	-4.456 [0]*** (0.000)	-5.187 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(NG)	-4.824 [3]*** (0.000)	-4.894 [2]*** (0.001)	-6.134 [3]*** (0.000)	-6.981 [2]*** (0.000)
LN(GDP)	-3.504 [2]** (0.012)	-1.543 [1] (0.798)	-4.376 [2]*** (0.001)	-5.076 [6]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.805 [5]***	0.150 [4]**	0.506 [4]**	0.144 [3]*
LN(GDP)	0.832 [5]***	0.204 [4]**	0.587 [3]**	0.064 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 134 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend

LN(OIL)	-1.630 [1] (0.458)	-2.475 [1] (0.338)	-4.680 [0]*** (0.000)	-4.597 [0]*** (0.003)
LN(GDP)	-2.487 [1] (0.125)	-1.375 [1] (0.853)	-4.456 [0]*** (0.000)	-5.187 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-1.264 [2] (0.637)	-2.555 [3] (0.301)	-4.636 [1]*** (0.000)	-4.550 [1]*** (0.003)
LN(GDP)	-3.504 [2]** (0.012)	-1.543 [1] (0.798)	-4.376 [2]*** (0.001)	-5.076 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.465 [5]**	0.104 [5]	0.126 [2]	0.097 [2]
LN(GDP)	0.832 [5]***	0.204 [4]**	0.587 [3]**	0.064 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 135 Oil Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-1.275 [12] (0.640)	-1.705 [12] (0.744)	-2.258 [11] (0.186)	-2.507 [11] (0.324)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.154 [16] (0.693)	-1.575 [2] (0.799)	-19.379 [9]*** (0.000)	-19.934 [12]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.733 [10]***	0.293 [10]***	0.190 [15]	0.092 [17]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 136 NG Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-1.275 [12] (0.640)	-1.705 [12] (0.744)	-2.258 [11] (0.186)	-2.507 [11] (0.324)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-1.154 [16]	-1.575 [2]	-19.379 [9]***	-19.934 [12]***

	(0.693)	(0.799)	(0.000)	(0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.733 [10]***	0.293 [10]***	0.190 [15]	0.092 [17]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 137 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-2.331 [1] (0.163)	-2.112 [1] (0.534)	-10.695 [0]*** (0.000)	-10.738 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	2.138 [6] (0.229)	-1.994 [6] (0.599)	-10.687 [3]*** (0.000)	-1.685 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.275 [10]	0.096 [10]	0.110 [6]	0.068 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 138 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-2.331 [1] (0.163)	-2.112 [1] (0.534)	-10.695 [0]*** (0.000)	-10.738 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	2.138 [6] (0.229)	-1.994 [6] (0.599)	-10.687 [3]*** (0.000)	-1.685 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]

LN(SI)	0.275 [10]	0.096 [10]	0.110 [6]	0.068 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 139 Oil Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-1.372 [3] (0.595)	-2.481 [3] (0.337)	-6.621 [2]*** (0.000)	-17.586 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-1.297 [6] (0.630)	-2.430 [6] (0.362)	-17.187 [6]*** (0.000)	-17.202 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.035 [11]***	0.227 [11]***	0.121 [5]	0.056 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 140 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-1.372 [3] (0.595)	-2.481 [3] (0.337)	-6.621 [2]*** (0.000)	-17.586 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-1.297 [6] (0.630)	-2.430 [6] (0.362)	-17.187 [6]*** (0.000)	-17.202 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.035 [11]***	0.227 [11]***	0.121 [5]	0.056 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 141 SI and IP (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	

	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-2.331 [1] (0.163)	-2.112 [1] (0.534)	-10.695 [0]*** (0.000)	-10.738 [0]*** (0.000)
LN(IP)	-1.415 [3] (0.573)	-2.573 [3] (0.293)	-16.440 [0]*** (0.000)	-16.412 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	2.138 [6] (0.229)	-1.994 [6] (0.599)	-10.687 [3]*** (0.000)	-1.685 [2]*** (0.000)
LN(IP)	-1.200 [5] (0.674)	-2.503 [6] (0.326)	-16.093 [6]*** (0.000)	-16.069 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.275 [10]	0.096 [10]	0.110 [6]	0.068 [5]
LN(IP)	1.197 [10]***	0.146 [10]**	0.074 [5]	0.057 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 142 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC **GDP [1]**	H0: r=0 H1: r≤1	0.122444 0.053513	6.496427 1.924915	0.6368 0.1653	4.571513 1.924915	0.7946 0.1653
OILC **GDP [1]**	H0: r=0 H1: r≤1	0.185488 0.135146	14.71514* 6.098158**	0.0653 0.0135	8.616979 6.098158**	0.3194 0.0135
BRENT PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.091843 0.018646	20.15288*** 3.293768*	0.0092 0.0695	16.85912** 3.293768*	0.0190 0.0695
WTI PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.091733 0.019633	20.30793*** 3.469885*	0.0087 0.0625	16.83804** 3.469885*	0.0192 0.0625
DUBAI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.094376 0.019519	20.91646*** 3.469338*	0.0069 0.0625	17.44712** 3.469338*	0.0152 0.0625
HH PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.060734 0.017882	14.20335* 3.175714*	0.0775 0.0747	11.02764 3.175714*	0.1528 0.0747
LNG PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.069233 0.015965	15.45974* 2.832446*	0.0506 0.0924	12.62729* 2.832446*	0.0893 0.0924
RUS PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.090036 0.016864	19.48755** 2.976336*	0.0118 0.0845	16.51122** 2.976336*	0.0217 0.0845
BRENT PRICE **SI [6]**	H0: r=0 H1: r≤1	0.047188 0.019439	11.75849 3.396020*	0.1689 0.0653	8.362474 3.396020*	0.3431 0.0653
WTI PRICE **SI [6]**	H0: r=0 H1: r≤1	0.047845 0.022794	12.47078 3.989008**	0.1357 0.0458	8.481767 3.989008**	0.3318 0.0458
DUBAI PRICE **SI [7]**	H0: r=0 H1: r≤1	0.052227 0.017746	12.30592 3.079721*	0.1428 0.0793	9.226198 3.079721*	0.2678 0.0793
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.057625 0.026774	15.30892* 4.803645**	0.0533 0.0284	10.50527 4.803645**	0.1808 0.0284
LNG PRICE **SI [3]**	H0: r=0 H1: r≤1	0.033711 0.009507	7.716704 1.681226	0.4962 0.1948	6.035479 1.681226	0.6087 0.1948
RUS PRICE **SI [7]**	H0: r=0 H1: r≤1	0.053314 0.015361	12.08608 2.662523	0.1528 0.1027	9.423557 2.662523	0.2526 0.1027
BRENT PRICE **IP [4]**	H0: r=0 H1: r≤1	0.047025 0.008262	11.23613 1.650956	0.1974 0.1988	9.585176 1.650956	0.2406 0.1988
WTI PRICE **IP [4]**	H0: r=0 H1: r≤1	0.047883 0.008667	11.49667 1.732224	0.1827 0.1881	9.764442 1.732224	0.2279 0.1881
DUBAI PRICE **IP [4]**	H0: r=0 H1: r≤1	0.044650 0.009378	10.96491 1.875090	0.2137 0.1709	9.089822 1.875090	0.2787 0.1709
HH PRICE **IP [4]**	H0: r=0 H1: r≤1	0.043873 0.011697	11.26957 2.341512	0.1954 0.1260	8.928063 2.341512	0.2922 0.1260
LNG PRICE **IP [3]**	H0: r=0 H1: r≤1	0.053814 0.000743	11.21186 0.148636	0.1988 0.6998	11.06322 0.148636	0.1511 0.6998
RUS PRICE **IP [5]**	H0: r=0 H1: r≤1	0.034966 0.001906	7.424959 0.377721	0.5288 0.5388	7.047238 0.377721	0.4836 0.5388
SI **IP [4]**	H0: r=0 H1: r≤1	0.044101 0.004921	8.756439 0.863382	0.3884 0.3528	7.893057 0.863382	0.3896 0.3528

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level.

MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**
GRANGER CAUSALITY TEST RESULTS

Table 143 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	1.211 0.315	0.271 0.574	1	No causal relation
BRENT does not granger cause SI SI does not granger cause BRENT	8.771 18.304***	0.186 0.005	6	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	12.583** 15.137**	0.050 0.019	6	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	9.043 16.825**	0.249 0.018	7	SI→DUBAI
LNG does not granger cause SI SI does not granger cause LNG	1.904 17.382***	0.592 0.000	3	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	7.004 9.443	0.428 0.222	7	No causal relation
BRENT does not granger cause IP IP does not granger cause BRENT	28.945*** 2.323	0.000 0.676	4	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	31.058*** 2.516	0.000 0.641	4	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	27.064*** 2.799	0.000 0.591	4	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	8.373* 7.737	0.078 0.101	4	HH→IP
LNG does not granger cause IP IP does not granger cause LNG	30.356*** 5.368	0.000 0.146	3	LNG→IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	10.501* 27.950***	0.062 0.000	5	RUSSIA↔IP
SI does not granger cause IP IP does not granger cause SI	18.456*** 4.281	0.001 0.369	4	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 144 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
OILC does not granger cause GDP GDP does not granger cause OILC	3.557* 1.011	0.059 0.314	1	OILC→GDP
BRENT does not granger cause M2 M2 does not granger cause BRENT	6.941 10.488**	0.139 0.033	4	M2→BRENT
WTI does not granger cause M2 M2 does not granger cause WTI	3.298 10.772**	0.509 0.029	4	M2→WTI
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	4.903 8.533**	0.179 0.036	3	M2→DUBAI
HH does not granger cause M2 M2 does not granger cause HH	2.628 3.003	0.452 0.391	3	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	5.839 4.461	0.119 0.215	3	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	5.506 10.527**	0.239 0.032	4	M2→RUSSIA
HH does not granger cause SI SI does not granger cause HH	0.160 0.457	0.922 0.795	2	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GERMANY

UNIT ROOT TEST RESULTS

Table 145 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend

LN(EC)	-1.0437 [2] (0.552)	-3.696 [2]** (0.036)	-3.548 [1]** (0.012)	-3.518[0]* (0.053)
LN(GDP)	-2.060 [0] (0.261)	-2.554 [0] (0.302)	-5.024 [0]*** (0.000)	-4.875 [1]*** (0.002)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-1.592 [2] (0.476)	-4.191 [2]** (0.011)	-7.272 [7]*** (0.000)	-7.965 [8]*** (0.000)
LN(GDP)	-3.856 [13]*** (0.005)	-2.537 [5] (0.309)	-5.428 [24]*** (0.000)	-8.868 [34]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.607 [4]**	00.116 [3]	0.310 [1]	0.079 [2]
LN(GDP)	0.725 [5]**	0.202 [4]**	0.367 [6]*	0.228 [14]***

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 146 NG Consumption and GDP (1970-2013)

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(NG)	-8.107 [0]*** (0.000)	-7.032 [0]*** (0.000)	-4.000 [0]*** (0.003)	-4.044 [0]** (0.014)
LN(GDP)	-2.136 [0] (0.232)	-1.976 [0] (0.597)	-5.457 [0]*** (0.000)	-5.945 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-6.695 [3]*** (0.000)	-6.459 [2]*** (0.000)	-4.013 [8]*** (0.003)	-3.850 [5]** (0.023)
LN(GDP)	-7.423 [42]*** (0.000)	-1.728 [13] (0.721)	-5.360 [18]*** (0.000)	-11.853 [41]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.741 [5]***	0.167 [4]**	0.472 [4]**	0.142 [4]*
LN(GDP)	0.836 [5]***	0.208 [5]**	0.424 [11]*	0.500 [42]***

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 147 Oil Consumption and GDP (1970-2013)-Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(OIL)	-1.023 [0] (0.736)	-2.637 [0] (0.266)	-6.116 [0]*** (0.000)	-6.057 [0]*** (0.000)
LN(GDP)	-2.136 [0] (0.232)	-1.976 [0] (0.597)	-5.457 [0]*** (0.000)	-5.945 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-1.122 [2] (0.698)	-2.756 [1] (0.220)	-6.149 [4]*** (0.000)	-6.072 [4]*** (0.000)
LN(GDP)	-7.423 [42]*** (0.000)	-1.728 [13] (0.721)	-5.360 [18]*** (0.000)	-11.853 [41]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.613 [5]**	0.081 [4]	0.105 [4]	0.066 [4]
LN(GDP)	0.836 [5]***	0.208 [5]**	0.424 [11]*	0.500 [42]***

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 148 Oil Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)

LN(M2)	-0.544 [3] (0.987)	-3.137 [3] (0.101)	-5.323 [2]*** (0.000)	-5.431 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.001 [6] (0.996)	-2.817 [6] (0.193)	-11.681 [5]*** (0.000)	-11.805 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.713 [10]***	0.253 [10]***	0.302 [6]	0.100 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 149 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.544 [3] (0.987)	-3.137 [3] (0.101)	-5.323 [2]*** (0.000)	-5.431 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-1.001 [6] (0.996)	-2.817 [6] (0.193)	-11.681 [5]*** (0.000)	-11.805 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.713 [10]***	0.253 [10]***	0.302 [6]	0.100 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 150 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.189 [1] (0.678)	-2.589 [1] (0.285)	-10.172 [0]*** (0.000)	-10.325 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4]	-2.250 [4]	-9.601 [1]***	-9.626 [0]***

	(0.385)	(0.458)	(0.000)	(0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.069 [5] (0.727)	-2.163 [4] (0.506)	-10.172 [0]*** (0.000)	-10.342 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.773 [10]***	0.147 [10]**	0.230 [5]	0.073 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 151 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.189 [1] (0.678)	-2.589 [1] (0.285)	-10.172 [0]*** (0.000)	-10.325 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.069 [5] (0.727)	-2.163 [4] (0.506)	-10.172 [0]*** (0.000)	-10.342 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.773 [10]***	0.147 [10]**	0.230 [5]	0.073 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 152 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-1.813 [3] (0.373)	-3.351 [3] (0.061)	-5.422 [2]*** (0.000)	-5.407 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-1.556 [8] (0.503)	-2.764 [8] (0.212)	-15.477 [8]*** (0.000)	-15.448 [8]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	

LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.361 [11]***	0.074 [11]	0.037 [7]	0.035 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 153 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-1.813 [3] (0.373)	-3.351 [3] (0.061)	-5.422 [2]*** (0.000)	-5.407 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-1.556 [8] (0.503)	-2.764 [8] (0.212)	-15.477 [8]*** (0.000)	-15.448 [8]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.361 [11]***	0.074 [11]	0.037 [7]	0.035 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 154 SI and IP (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-1.189 [1] (0.678)	-2.589 [1] (0.285)	-10.172 [0]*** (0.000)	-10.325 [0]*** (0.000)
LN(IP)	-1.884 [3] (0.339)	-3.193 [3]* (0.089)	-5.041 [2]*** (0.000)	-5.021 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.069 [5] (0.727)	-2.163 [4] (0.506)	-10.172 [0]*** (0.000)	-10.342 [1]*** (0.000)
LN(IP)	-1.775 [7] (0.391)	-2.638 [8] (0.263)	-14.281 [7]*** (0.000)	-14.249 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.773 [10]***	0.147 [10]**	0.230 [5]	0.073 [4]
LN(IP)	1.136 [10]***	0.077 [10]	0.044 [7]	0.041 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 155 Johansen Cointegration Test Results

Variables	**Hypothesis**	**Eigenvalue**	**Trace Statistic**	**Prob.**	**Max-Eigen Statistic**	**Prob.**
EC	H0: r=0	0.249866	13.10263	0.1111	9.200105	0.2699
GDP [4]	H1: r≤1	0.114811	3.902529**	0.0482	3.902529**	0.0482
OILC	H0: r=0	0.193555	11.35601	0.1905	9.035032	0.2832
GDP [1]	H1: r≤1	0.053762	2.320975	0.1276	2.320975	0.1276

BRENT PRICE	H0: r=0	0.113541	21.71321***	0.0051	21.33202***	0.0033
M2 [2]	H1: r≤1	0.002151	0.381186	0.5370	0.381186	0.5370
WTI PRICE	H0: r=0	0.085945	15.99183**	0.0421	15.72628**	0.0292
M2 [4]	H1: r≤1	0.001516	0.265552	0.6063	0.265552	0.6063
DUBAI PRICE	H0: r=0	0.112147	21.36810***	0.0058	21.05400***	0.0036
M2 [2]	H1: r≤1	0.001773	0.314102	0.5752	0.314102	0.5752
HH PRICE	H0: r=0	0.102708	19.32033**	0.0126	19.29052***	0.0074
M2 [1]	H1: r≤1	0.000167	0.029804	0.8629	0.029804	0.8629
LNG PRICE	H0: r=0	0.082949	15.53503**	0.0493	15.15358**	0.0361
M2 [4]	H1: r≤1	0.002177	0.381453	0.5368	0.381453	0.5368
RUS PRICE	H0: r=0	0.070712	13.34294	0.1028	12.83398*	0.0831
M2 [4]	H1: r≤1	0.002904	0.508961	0.4756	0.508961	0.4756
BRENT PRICE	H0: r=0	0.043214	11.08868	0.2061	7.819099	0.3974
SI [2]	H1: r≤1	0.018303	3.269577*	0.0706	3.269577*	0.0706
WTI PRICE	H0: r=0	0.050372	13.23225	0.1066	8.889873	0.2954
SI [7]	H1: r≤1	0.024930	4.342375**	0.0372	4.342375**	0.0372
DUBAI PRICE	H0: r=0	0.043534	11.31642	0.1928	7.878276	0.3912
SI [2]	H1: r≤1	0.019237	3.438146*	0.0637	3.438146*	0.0637
HH PRICE	H0: r=0	0.043758	9.075707	0.3584	7.919808	0.3869
SI [2]	H1: r≤1	0.006509	1.155899	0.2823	1.155899	0.2823
LNG PRICE	H0: r=0	0.047598	9.254677	0.3424	8.583173	0.3225
SI [3]	H1: r≤1	0.003808	0.671505	0.4125	0.671505	0.4125
RUS PRICE	H0: r=0	0.059225	12.56378	0.1318	10.50081	0.1811
SI [7]	H1: r≤1	0.011922	2.0629720	0.1509	2.062972	0.1509
BRENT PRICE	H0: r=0	0.031476	10.99185	0.2120	6.332429	0.5709
IP [5]	H1: r≤1	0.023258	4.659423**	0.0309	4.659423**	0.0309
WTI PRICE	H0: r=0	0.030718	10.50731	0.2437	6.177470	0.5905
IP [5]	H1: r≤1	0.021631	4.329843**	0.0374	4.329843**	0.0374
DUBAI PRICE	H0: r=0	0.032967	10.95407	0.2143	6.637492	0.5329
IP [5]	H1: r≤1	0.021565	4.316583**	0.0377	4.316583**	0.0377
HH PRICE	H0: r=0	0.046353	11.44086	0.1858	9.444774	0.2510
IP [4]	H1: r≤1	0.009980	1.996089	0.1577	1.996089	0.1577
LNG PRICE	H0: r=0	0.044291	11.03410	0.2094	9.015157	0.2849
IP [4]	H1: r≤1	0.010094	2.018947	0.1553	2.018947	0.1553
RUS PRICE	H0: r=0	0.052834	13.02179	0.1140	10.80185	0.1644
IP [4]	H1: r≤1	0.011094	2.219945	0.1362	2.219945	0.1362
SI	H0: r=0	0.057153	11.55292	0.1797	10.18130	0.2003
IP [6]	H1: r≤1	0.007897	1.371618	0.2415	1.371618	0.2415

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 156 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP	1.762	0.779	4	GDP→EC
GDP does not granger cause EC	19.046***	0.000		
OILC does not granger cause GDP	1.720	0.189	1	GDP→OIL
GDP does not granger cause OILC	6.258**	0.012		
BRENT does not granger cause SI	4.444	0.108	2	SI→BRENT
SI does not granger cause BRENT	9.533***	0.008		
WTI does not granger cause SI	14.942**	0.036	7	WTI↔SI
SI does not granger cause WTI	14.763**	0.039		
DUBAI does not granger cause SI	4.573	0.101	2	SI→DUBAI
SI does not granger cause DUBAI	9.258***	0.009		
HH does not granger cause SI	0.340	0.843	2	No causal relation
SI does not granger cause HH	0.528	0.767		
LNG does not granger cause SI	5.988	0.112	3	SI→LNG
SI does not granger cause LNG	13.229***	0.004		
RUSSIA does not granger cause SI	10.930	0.141	7	No causal relation
SI does not granger cause RUSSIA	11.450	0.120		
BRENT does not granger cause IP	34.524***	0.000	5	BRENT→IP

IP does not granger cause BRENT	4.308	0.505		
WTI does not granger cause IP IP does not granger cause WTI	36.411*** 4.956	0.000 0.421	5	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	34.532*** 5.994	0.000 0.306	5	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	2.061 8.867*	0.724 0.064	4	IP→HH
LNG does not granger cause IP IP does not granger cause LNG	24.210*** 25.345***	0.000 0.000	4	LNG↔IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	7.534 39.039***	0.110 0.000	4	IP→RUSSIA
SI does not granger cause IP IP does not granger cause SI	35.616 7.596	0.000 0.269	6	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 157 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	2.785 2.507	0.248 0.285	2	No causal relation
WTI does not granger cause M2 M2 does not granger cause WTI	3.857 3.084	0.425 0.543	4	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	2.423 2.305	0.297 0.315	2	No causal relation
HH does not granger cause M2 M2 does not granger cause HH	0.100 0.000	0.751 0.981	1	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	1.174 1.075	0.882 0.898	4	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	12.922** 1.056	0.011 0.901	4	RUSSIA→M2

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GREECE

UNIT ROOT TEST RESULTS

Table 158 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-2.563 [0] (0.109)	-0.107 [0] (0.992)	-4.326 [0]*** (0.001)	-4.801 [0]*** (0.002)
LN(GDP)	-1.772 [3] (0.386)	-3.256 [3]* (0.091)	-1.965 [0] (0.300)	-0.713 [2] (0.963)
	PP (Level)		PP (First Difference)	
LN(EC)	-2.563 [0] (0.109)	-0.387 [1] (0.984)	-4.291 [3]*** (0.001)	-4.784 [3]*** (0.002)
LN(GDP)	-1.250 [3] (0.641)	-1.642 [3] (0.755)	-2.037 [3]*** (0.27)	-2.036 [3]*** (0.561)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.691 [5]**	0.161 [4]**	0.477 [1]**	0.094 [1]
LN(GDP)	0.633 [5]**	0.151 [4]**	0.119 [3]	0.116 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 159 NG Consumption and GDP (1984-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-1.562 [1] (0.487)	-2.871 [1] (0.186)	-2.866 [0]*** (0.006)	-2.804 [0] (0.207)
LN(GDP)	-1.587 [1]	-3.038 [3]	-2.043 [0]***	-2.228 [0]

	(0.475)	(0.141)	(0.267)	(0.456)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-0.766 [0] (0.813)	-1.509 [0] (0.802)	-2.650 [5]* (0.095)	-2.579 [5] (0.291)
LN(GDP)	-1.393 [4] (0.571)	-0.749 [4] (0.959)	-2.119 [3] (0.238)	-2.260 [3]*** (0.440)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.584 [4]**	0.089 [3]	0.132 [0]	0.131 [0]*
LN(GDP)	0.559 [4]**	0.096 [4]	0.215 [4]	0.141 [4]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 160 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(OIL)	-1.481 [2] (0.532)	-0.550 [0] (0.999)	-2.567 [1] (0.107)	-3.247 [0]* (0.089)
LN(GDP)	-1.810 [1] (0.370)	-1.889 [1] (0.642)	-3.761 [0]*** (0.006)	-3.950 [0]** (0.018)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-2.925 [4]* (0.050)	-0.074 [3] (0.993)	-3.739 [3]*** (0.006)	-4.966 [3]*** (0.001)
LN(GDP)	-2.246 [4] (0.193)	-1.855 [4] (0.660)	-3.744 [4]*** (0.006)	-3.988 [4]** (0.016)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.735 [5]**	0.183 [4]**	0.568 [4]**	0.118 [3]
LN(GDP)	0.735 [5]**	0.072 [4]	0.250 [4]	0.107 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 161 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-2.263 [12] (0.185)	-1.708 [12] (0.743)	-1.569 [11] (0.495)	-2.136 [11] (0.521)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.759 [8] (0.399)	-0.066 [8] (0.995)	-14.153 [9]*** (0.000)	-1.4.175 [8]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.344 [10]***	0.372 [10]***	0.639 [8]**	0.211 [8]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 162 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**

LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-2.263 [12] (0.185)	-1.708 [12] (0.743)	-1.569 [11] (0.495)	-2.136 [11] (0.521)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-1.759 [8] (0.399)	-0.066 [8] (0.995)	-14.153 [9]*** (0.000)	-1.4.175 [8]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.344 [10]***	0.372 [10]***	0.639 [8]**	0.211 [8]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 163 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.278 [1] (0.639)	-1.651 [1] (0.768)	-9.764 [0]*** (0.000)	-9.736 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.264 [6] (0.645)	-1.668 [6] (0.761)	-9.840 [4]*** (0.000)	-9.814 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.944 [10]***	0.252 [10]***	0.100 [6]	0.101 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 164 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)

LN(SI)	-1.278 [1] (0.639)	-1.651 [1] (0.768)	-9.764 [0]*** (0.000)	-9.736 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.264 [6] (0.645)	-1.668 [6] (0.761)	-9.840 [4]*** (0.000)	-9.814 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.944 [10]***	0.252 [10]***	0.100 [6]	0.101 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 165 Oil Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	0.028 [2] (0.959)	-1.618 [2] (0.782)	-15.778 [1]*** (0.000)	-15.952 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-0.665 [5] (0.851)	-2.674 [2] (0.248)	-31.825 [16]*** (0.000)	-39.469 [26]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.095 [11]***	0.425 [11]***	0.512 [22]**	0.095 [31]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 166 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	0.028 [2] (0.959)	-1.618 [2] (0.782)	-15.778 [1]*** (0.000)	-15.952 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5]	-3.325 [6]*	-11.889 [4]***	-11.860 [4]***

	(0.739)	(0.065)	(0.000)	(0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-0.665 [5] (0.851)	-2.674 [2] (0.248)	-31.825 [16]*** (0.000)	-39.469 [26]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.095 [11]***	0.425 [11]***	0.512 [22]**	0.095 [31]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 167 SI and IP (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-1.278 [1] (0.639)	-1.651 [1] (0.768)	-9.764 [0]*** (0.000)	-9.736 [0]*** (0.000)
LN(IP)	0.025 [2] (0.958)	-1.762 [2] (0.718)	-14.933 [1]*** (0.000)	-11.886 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.264 [6] (0.645)	-1.668 [6] (0.761)	-9.840 [4]*** (0.000)	-9.814 [4]*** (0.000)
LN(IP)	-0.477 [6] (0.891)	-3.255 [6]* (0.077)	-32.696 [22]*** (0.000)	-37.964 [29]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.944 [10]***	0.252 [10]***	0.100 [6]	0.101 [6]
LN(IP)	1.358 [10]***	0.394 [10]***	0.325 [28]	0.101 [33]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 168 Johansen Cointegration Test Results

Variables	**Hypothesis**	**Eigenvalue**	**Trace Statistic**	**Prob.**	**Max-Eigen Statistic**	**Prob.**
EC **GDP [2]**	H0: r=0 H1: r≤1	0.153726 0.097889	9.177617 3.502608*	0.3492 0.0613	5.675009 3.502608*	0.6552 0.0613
NGC **GDP [2]**	H0: r=0 H1: r≤1	0.313698 0.098185	12.95416 2.790349*	0.1165 0.0948	10.16381 2.790349*	0.2014 0.0948
OILC **GDP [2]**	H0: r=0 H1: r≤1	0.245506 0.095831	15.68031** 4.130283**	0.0469 0.0421	11.55003 4.130283**	0.1287 0.0421
BRENT PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.044681 0.018564	11.08498 3.222939*	0.2063 0.0726	7.862038 3.222939*	0.3929 0.0726
WTI PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.048702 0.017790	11.67508 3.087394*	0.1732 0.0789	8.587688 3.087394*	0.3221 0.0789
DUBAI PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.045458 0.018615	11.23415 3.232008*	0.1975 0.0722	8.002143 3.232008*	0.3785 0.0722
HH PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.111139 0.021361	23.97799*** 3.713881*	0.0021 0.0540	20.26411*** 3.713881*	0.0050 0.0540
LNG PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.027694 0.009911	6.543750 1.713132	0.6312 0.1906	4.830617 1.713132	0.7631 0.1906
RUS PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.057936 0.017465	13.29592 3.030580*	0.1044 0.0817	10.26534 3.030580*	0.1951 0.0817
BRENT PRICE **SI [2]**	H0: r=0 H1: r≤1	0.022025 0.012042	6.086373 2.144398	0.6853 0.1431	3.941975 2.144398	0.8654 0.1431
WTI PRICE **SI [2]**	H0: r=0 H1: r≤1	0.025462 0.011205	6.559518 1.994404	0.6293 0.1579	4.565114 1.994404	0.7954 0.1579
DUBAI PRICE **SI [2]**	H0: r=0 H1: r≤1	0.024148 0.012555	6.563047 2.236319	0.6289 0.1348	4.326728 2.236319	0.8234 0.1348
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.088119 0.006001	17.39281** 1.065313	0.0256 0.3020	16.32750** 1.065313	0.0233 0.3020
LNG PRICE	H0: r=0	0.035296	6.751455	0.6067	6.324326	0.5720

SI [3]	H1: r≤1	0.002424	0.427129	0.5134	0.427129	0.5134
RUS PRICE	H0: r=0	0.018487	4.533797	0.8561	3.209516	0.9318
SI [7]	H1: r≤1	0.007670	1.324281	0.2498	1.324281	0.2498
BRENT PRICE	H0: r=0	0.040914	8.714022	0.3925	8.354814	0.3438
IP [3]	H1: r≤1	0.001794	0.359208	0.5489	0.359208	0.5489
WTI PRICE	H0: r=0	0.042585	9.053274	0.3605	8.703607	0.3117
IP [3]	H1: r≤1	0.001747	0.349667	0.5543	0.349667	0.5543
DUBAI PRICE	H0: r=0	0.042858	9.187374	0.3484	8.760791	0.3066
IP [3]	H1: r≤1	0.002131	0.426583	0.5137	0.426583	0.5137
HH PRICE	H0: r=0	0.067511	14.03188*	0.0821	13.83978*	0.0583
IP [5]	H1: r≤1	0.000970	0.192097	0.6612	0.192097	0.6612
LNG PRICE	H0: r=0	0.042271	8.793137	0.3849	8.638150	0.3175
IP [3]	H1: r≤1	0.000775	0.154987	0.6938	0.154987	0.6938
RUS PRICE	H0: r=0	0.067171	13.87441*	0.0865	13.83716*	0.0583
IP [4]	H1: r≤1	0.000187	0.037249	0.8469	0.037249	0.8469
SI	H0: r=0	0.056512	10.48760	0.2451	10.18000	0.2004
IP [4]	H1: r≤1	0.001756	0.307597	0.5792	0.307597	0.5792

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level.
MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 169 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	6.325** 7.381**	0.042 0.025	2	EC↔GDP
NGC does not granger cause GDP GDP does not granger cause NGC	0.572 5.330*	0.751 0.069	2	GDP→NGC
BRENT does not granger cause M2 M2 does not granger cause BRENT	4.921 8.648	0.669 0.278	7	No causal relation
WTI does not granger cause M2 M2 does not granger cause WTI	6.250 9.723	0.510 0.204	7	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	3.678 10.935	0.815 0.141	7	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	3.326 8.765	0.853 0.269	7	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	2.335 11.021	0.938 0.137	7	No causal relation
BRENT does not granger cause SI SI does not granger cause BRENT	2.551 9.797***	0.279 0.007	2	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	2.058 5.031*	0.357 0.080	2	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	2.586 10.473***	0.274 0.005	2	SI→DUBAI
LNG does not granger cause SI SI does not granger cause LNG	4.017 16.016***	0.259 0.001	3	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	16.279** 8.311	0.022 0.306	7	RUSSIA→SI
BRENT does not granger cause IP IP does not granger cause BRENT	6.339* 0.898	0.096 0.825	3	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	6.519* 0.909	0.088 0.823	3	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	6.844* 1.097	0.077 0.777	3	DUBAI→IP
LNG does not granger cause IP IP does not granger cause LNG	5.583 2.863	0.133 0.413	3	No causal relation
SI does not granger cause IP IP does not granger cause SI	6.854 10.111**	0.143 0.038	4	IP→SI

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 170 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
OILC does not granger cause GDP	1.679	0.431	2	GDP→OILC
GDP does not granger cause OILC	10.821***	0.004		
HH does not granger cause M2	13.345*	0.064	7	HH↔M2
M2 does not granger cause HH	15.776**	0.027		
HH does not granger cause SI	0.702	0.704	2	No causal relation
SI does not granger cause HH	0.588	0.745		
HH does not granger cause IP	6.935	0.225	5	No causal relation
IP does not granger cause HH	3.715	0.591		
RUSSIA does not granger cause IP	4.090	0.393	4	No causal relation
IP does not granger cause RUSSIA	1.760	0.779		

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

HUNGARY

UNIT ROOT TEST RESULTS

Table 171 EC and GDP (1991-2012) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-2.179 [0] (0.218)	-2.194 [0] (0.468)	-5.918 [0]*** (0.000)	-6.015 [0]*** (0.000)
LN(GDP)	-0.649 [0] (0.838)	-2.030 [3] (0.546)	-2.968 [0]* (0.055)	-3.057 [0] (0.142)
	PP (Level)		PP (First Difference)	
LN(EC)	-2.410 [2] (0.151)	2.491 [2] (0.328)	-5.918 [0]*** (0.000)	-6.015 [1]*** (0.000)
LN(GDP)	-0.690 [2] (0.828)	-1.351 [2] (0.845)	-2.942 [1]* (0.058)	-3.019 [1] (0.151)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.171 [2]	0.107 [2]	0.155 [1]	0.143 [1]*
LN(GDP)	0.608 [3]**	0.108 [3]**	0.193 [2]	0.179 [2]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 172 NG Consumption and GDP (1991-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-1.382 [0] (0.571)	-0.565 [0] (0.971)	-4.529 [0]*** (0.002)	-5.576[0]*** (0.001)
LN(GDP)	-0.659 [0] (0.837)	-0.793 [0] (0.951)	-3.195 [0]** (0.034)	-3.320[0]* (0.090)
	PP (Level)		PP (First Difference)	
LN(NG)	-1.393 [1] (0.566)	-0.565 [0] (0.971)	-4.536 [1]*** (0.001)	-5.691 [2]*** (0.000)
LN(GDP)	-0.697 [2] (0.827)	-1.289 [2] (0.863)	-3.174 [1]** (0.036)	-3.320 [0]* (0.090)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.299 [3]	0.174 [2]**	0.307 [1]	0.100 [1]
LN(GDP)	0.629 [3]**	0.119 [3]*	0.185 [2]	0.169 [2]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 173 Oil Consumption and GDP (1991-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-2.199 [1] (0.212)	-2.694 [1] (0.248)	-3.233 [0]** (0.032)	-3.128 [0] (0.125)
LN(GDP)	-0.659 [0]	-0.793 [0]	-3.195 [0]**	-3.320[0]*

	(0.837)	(0.951)	(0.034)	(0.090)
	PP (Level)		PP (First Difference)	
LN(OIL)	-1.363 [1] (0.581)	-1.857 [1] (0.641)	-3.217 [2]** (0.033)	-3.110 [2] (0.129)
LN(GDP)	-0.697 [2] (0.827)	-1.289 [2] (0.863)	-3.174 [1]** (0.036)	-3.320 [0]* (0.090)
	KPSS (Level)		KPSS (First Difference)	
LN(OIL)	0.371 [3]*	0.086 [2]	0.105 [0]	0.104 [0]
LN(GDP)	0.629 [3]**	0.119 [3]*	0.185 [2]	0.169 [2]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 174 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-2.855 [0]* (0.052)	-1.437 [0] (0.846)	-14.599 [0]*** (0.000)	-15.179 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-3.233 [5]** (0.019)	-1.396 [5] (0.859)	-14.553 [7]*** (0.000)	-15.230 [5]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.635 [10]***	0.430 [10]***	0.836 [7]***	0.093 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 175 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-2.855 [0]* (0.052)	-1.437 [0] (0.846)	-14.599 [0]*** (0.000)	-15.179 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-3.233 [5]** (0.019)	-1.396 [5] (0.859)	-14.553 [7]*** (0.000)	-15.230 [5]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	

LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.635 [10]***	0.430 [10]***	0.836 [7]***	0.093 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 176 Oil Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.373 [1] (0.594)	-1.524 [1] (0.817)	-9.624 [0]*** (0.000)	-9.610 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.434 [7] (0.564)	-1.480 [7] (0.832)	-9.702 [5]*** (0.000)	-9.685 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	1.046 [10]***	0.291 [10]***	0.127 [7]	0.080 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 177 NG Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.373 [1] (0.594)	-1.524 [1] (0.817)	-9.624 [0]*** (0.000)	-9.610 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.434 [7] (0.564)	-1.480 [7] (0.832)	-9.702 [5]*** (0.000)	-9.685 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	1.046 [10]***	0.291 [10]***	0.127 [7]	0.080 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 178 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-2543 [1] (0.106)	-2.009 [1] (0.592)	-18.718 [0]*** (0.000)	-18.908 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-2.592 [5]* (0.096)	-2.300 [6] (0.431)	-18.153 [7]*** (0.000)	-18.462 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.501 [11]***	0.331 [11]***	0.355 [5]*	0.063 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 179 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-2543 [1] (0.106)	-2.009 [1] (0.592)	-18.718 [0]*** (0.000)	-18.908 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-2.592 [5]* (0.096)	-2.300 [6] (0.431)	-18.153 [7]*** (0.000)	-18.462 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.501 [11]***	0.331 [11]***	0.355 [5]*	0.063 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 180 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)	ADF (First Difference)

	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-1.373 [1] (0.594)	-1.524 [1] (0.817)	-9.624 [0]*** (0.000)	-9.610 [0]*** (0.000)
LN(IP)	-1.903 [1] (0.330)	-1.937 [1] (0.630)	-17.608 [0]*** (0.000)	-17.641 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.434 [7] (0.564)	-1.480 [7] (0.832)	-9.702 [5]*** (0.000)	-9.685 [5]*** (0.000)
LN(IP)	-1.944 [5] (0.311)	-2.290 [6] (0.436)	-17.188 [6]*** (0.000)	-17.237 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	1.046 [10]***	0.291 [10]***	0.127 [7]	0.080 [7]
LN(IP)	1.348 [10]***	0.261 [10]***	0.160 [5]	0.060 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 181 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [1]	H0: r=0 H1: r≤1	0.168252 0.006322	3.811372 0.126851	0.9182 0.7217	3.684521 0.126851	0.8911 0.7217
NGC GDP [1]	H0: r=0 H1: r≤1	0.269940 0.068204	8.090659 1.483471	0.4558 0.2232	6.607189 1.483471	0.5366 0.2232
OILC GDP [1]	H0: r=0 H1: r≤1	0.482036 0.087144	15.72954** 1.914711	0.0461 0.1664	13.81483* 1.914711	0.0588 0.1664
BRENT PRICE M2 [2]	H0: r=0 H1: r≤1	0.084116 0.053792	25.33901*** 9.786830***	0.0012 0.0018	15.55218** 9.786830***	0.0311 0.0018
WTI PRICE M2 [3]	H0: r=0 H1: r≤1	0.093060 0.064737	28.97075*** 1.77921***	0.0003 0.0006	17.19154** 1.77921***	0.0167 0.0006
DUBAI PRICE M2 [2]	H0: r=0 H1: r≤1	0.090365 0.055012	26.77924*** 10.01525***	0.0007 0.0016	16.76399** 10.01525***	0.0197 0.0016
HH PRICE M2 [2]	H0: r=0 H1: r≤1	0.076416 0.044744	22.17283*** 8.102390***	0.0042 0.0044	14.07044** 8.102390***	0.0536 0.0044
LNG PRICE M2 [2]	H0: r=0 H1: r≤1	0.065215 0.042867	19.69168** 7.754950***	0.0110 0.0054	11.93673 7.754950***	0.1130 0.0054
RUS PRICE M2 [4]	H0: r=0 H1: r≤1	0.082058 0.050719	24.09250*** 9.108824***	0.0020 0.0025	14.98368** 9.108824***	0.0384 0.0025
BRENT PRICE SI [3]	H0: r=0 H1: r≤1	0.058967 0.017468	13.79828* 3.101531*	0.0886 0.0782	10.69675 3.101531*	0.1701 0.0782
WTI PRICE SI [5]	H0: r=0 H1: r≤1	0.064948 0.016961	14.66110* 2.976535*	0.0665 0.0845	11.68456 2.976535*	0.1231 0.0845
DUBAI PRICE SI [4]	H0: r=0 H1: r≤1	0.045855 0.019483	11.65745 3.443098*	0.1741 0.0635	8.214351 3.443098*	0.3573 0.0635
HH PRICE SI [2]	H0: r=0 H1: r≤1	0.042766 0.008590	9.263285 1.527009	0.3416 0.2166	7.736276 1.527009	0.4061 0.2166
LNG PRICE SI [4]	H0: r=0 H1: r≤1	0.021312 0.016809	6.736523 2.966578*	0.6085 0.0850	3.769945 2.966578*	0.8828 0.0850
RUS PRICE SI [4]	H0: r=0 H1: r≤1	0.145317 0.010621	29.34795*** 1.868547	0.0002 0.1716	27.47940*** 1.868547	0.0003 0.1716
BRENT PRICE IP [3]	H0: r=0 H1: r≤1	0.038993 0.032960	14.65765* 6.703019***	0.0666 0.0096	7.954631 6.703019***	0.3833 0.0096
WTI PRICE IP [3]	H0: r=0 H1: r≤1	0.053027 0.032457	17.49591 6.599038*	0.0247 0.0102	10.89687 6.599038*	0.1594 0.0102
DUBAI PRICE IP [3]	H0: r=0 H1: r≤1	0.034416 0.028435	12.77394 5.769406**	0.1234 0.0163	7.004529 5.769406**	0.4886 0.0163
HH PRICE IP [2]	H0: r=0 H1: r≤1	0.038677 0.023997	12.81053 4.882180**	0.1219 0.0271	7.928346 4.882180**	0.3860 0.0271
LNG PRICE IP [3]	H0: r=0 H1: r≤1	0.034872 0.018699	10.87429 3.775279*	0.2193 0.0520	7.099011 3.775279*	0.4775 0.0520
RUS PRICE IP [5]	H0: r=0 H1: r≤1	0.074346 0.026781	20.67155*** 5.375016**	0.0076 0.0204	15.29653 5.375016	0.0342 0.0204
SI IP [3]	H0: r=0 H1: r≤1	0.070531 0.014902	15.51550** 2.642555	0.0497 0.1040	12.87295* 2.642555	0.0820 0.1040

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 182 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	0.293 0.942	0.588 0.331	1	No causal relation
NGC does not granger cause GDP GDP does not granger cause NGC	1.544 0.069	0.213 0.792	1	No causal relation
DUBAI does not granger cause SI SI does not granger cause DUBAI	4.862 16.865***	0.301 0.002	4	SI→DUBAI
HH does not granger cause SI SI does not granger cause HH	0.149 1.056	0.928 0.589	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	8.342* 22.934***	0.079 0.001	4	LNG↔SI
WTI does not granger cause IP IP does not granger cause WTI	14.880*** 7.606*	0.001 0.054	3	WTI↔IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	17.689*** 2.593	0.000 0.458	3	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	3.627 0.550	0.163 0.759	2	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	14.071*** 2.444	0.002 0.485	3	LNG→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 183 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
OILC does not granger cause GDP GDP does not granger cause OILC	4.313** 0.100	0.037 0.750	1	OILC→GDP
BRENT does not granger cause M2 M2 does not granger cause BRENT	4.973* 1.349	0.083 0.509	2	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	5.122 0.399	0.163 0.940	3	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	3.662 1.675	0.160 0.432	2	No causal relation
HH does not granger cause M2 M2 does not granger cause HH	4.883* 1.054	0.087 0.590	2	HH→M2
LNG does not granger cause M2 M2 does not granger cause LNG	0.358 3.842	0.835 0.146	2	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	5.873 5.465	0.208 0.242	4	No causal relation
BRENT does not granger cause SI SI does not granger cause BRENT	3.886 5.750	0.273 0.124	3	No causal relation
WTI does not granger cause SI SI does not granger cause WTI	14.125** 6.503	0.014 0.260	5	WTI→SI
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	16.561*** 4.850	0.002 0.303	4	RUSSIA→SI
BRENT does not granger cause IP IP does not granger cause BRENT	11.200** 0.412	0.010 0.937	3	BRENT→IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	3.871 20.434***	0.568 0.001	5	IP→RUSSIA
SI does not granger cause IP IP does not granger cause SI	5.538 4.277	0.136 0.233	3	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

ICELAND

UNIT ROOT TEST RESULTS

Table 184 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.597 [4] (0.999)	-1.143 [0] (0.907)	-5.305 [0]*** (0.000)	-5.257 [0]*** (0.000)
LN(GDP)	-1.437 [1] (0.552)	-3.098 [1] (0.122)	-3.722 [0]*** (0.008)	-3.742 [0]** (0.032)
	PP (Level)		PP (First Difference)	
LN(EC)	-0.291 [1] (0.974)	-1.264 [1] (0.880)	-5.305 [0]*** (0.000)	-5.262 [1]*** (0.000)
LN(GDP)	-1.784 [2] (0.382)	-2.464 [2] (0.342)	-3.722 [0]*** (0.008)	-3.742 [0]** (0.032)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.714 [5]**	0.151 [4]**	0.176 [0]	0.108 [2]
LN(GDP)	0.702 [5]**	0.084 [4]	0.161 [2]	0.093 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 185 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-1.118 [1] (0.708)	-0.987 [1] (0.942)	-17.634 [0]*** (0.000)	-17.638 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.115 [8] (0.709)	-1.035 [4] (0.935)	-18.166 [3]*** (0.000)	-18.306 [4]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.627 [10]***	0.286 [10]***	0.242 [8]	0.150 [9]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 186 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-1.118 [1] (0.708)	-0.987 [1] (0.942)	-17.634 [0]*** (0.000)	-17.638 [0]*** (0.000)
	PP (Level)		PP (First Difference)	

LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-1.115 [8] (0.709)	-1.035 [4] (0.935)	-18.166 [3]*** (0.000)	-18.306 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.627 [10]***	0.286 [10]***	0.242 [8]	0.150 [9]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 187 Oil Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.528 [0] (0.517)	-1.686 [1] (0.753)	-6.222 [0]*** (0.000)	-6.198 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.299 [8] (0.629)	-1.561 [8] (0.804)	-6.222 [0]*** (0.000)	-6.198 [0]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.567 [10]**	0.247 [10]***	0.130 [8]	0.112 [8]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 188 NG Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.528 [0] (0.517)	-1.686 [1] (0.753)	-6.222 [0]*** (0.000)	-6.198 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.299 [8]	-1.561 [8]	-6.222 [0]***	-6.198 [0]***

	(0.629)	(0.804)	(0.000)	(0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.567 [10]**	0.247 [10]***	0.130 [8]	0.112 [8]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 189 Oil Prices and IP (1998-2012)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.376 [1] (0.592)	-3.112 [1] (0.106)	-11.116 [0]*** (0.000)	-11.093 [0]*** (0.000)
LN(WTI)	-1.577 [1] (0.492)	-3.028 [1] (0.127)	-10.267 [0]*** (0.000)	-10.255 [0]*** (0.000)
LN(DUBAI)	-1.471 [1] (0.545)	-3.426 [1]* (0.051)	-9.914[0]*** (0.000)	-9.898 [0]*** (0.000)
LN(IP)	-0.616 [1] (0.862)	-3.790 [1]** (0.019)	-10.665 [0]*** (0.000)	-10.636 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.245 [4] (0.654)	-3.118 [5] (0.105)	-11.111 [1]*** (0.000)	-11.087 [1]*** (0.000)
LN(WTI)	-1.474 [4] (0.544)	-2.907 [4] (0.162)	-10.267 [0]*** (0.000)	-10.224 [1]*** (0.000)
LN(DUBAI)	-1.251 [3] (0.651)	-3.141 [4] (0.100)	-9.917 [2]*** (0.000)	-9.899 [2]*** (0.000)
LN(IP)	-0.130 [20] (0.943)	-2.970 [12] (0.143)	-11.725 [27]*** (0.000)	-11.755 [27]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.597 [10]***	0.115 [10]	0.033 [4]	0.027 [4]
LN(WTI)	1.570 [10]***	0.156 [10]**	0.045 [4]	0.027 [4]
LN(DUBAI)	1.627 [10]***	0.103 [10]	0.034 [3]	0.026 [3]
LN(IP)	1.690 [10]***	0.264 [10]***	0.091 [21]	0.074 [21]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 190 NG Prices and IP (1998-2012)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.185 [0] (0.212)	-1.976 [0] (0.609)	-12.616 [0]*** (0.000)	-12.638 [0]*** (0.000)
LN(LNG)	-0.946 [1] (0.771)	-3.428 [2]* (0.050)	-10.987 [0]*** (0.000)	-10.954 [0]*** (0.000)
LN(RUS)	-1.749 [3] (0.404)	-4.068 [3]*** (0.008)	-3.742 [2]*** (0.004)	-3.731 [2]** (0.022)
LN(IP)	-0.616 [1] (0.862)	-3.790 [1]** (0.019)	-10.665 [0]*** (0.000)	-10.636 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.401 [6] (0.142)	-2.229 [6] (0.469)	-12.646 [5]*** (0.000)	-12.661 [5]*** (0.000)
LN(LNG)	-0.774 [5] (0.823)	-3.157 [6]* (0.096)	-11.112 [4]*** (0.000)	-11.082 [4]*** (0.000)
LN(RUS)	-1.081 [9] (0.722)	-2.698 [9] (0.238)	-12.735 [8]*** (0.000)	-12.710 [8]*** (0.000)
LN(IP)	-0.130 [20] (0.943)	-2.970 [12] (0.143)	-11.725 [27]*** (0.000)	-11.755 [27]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.505 [10]**	0.338 [10]***	0.119 [5]	0.025 [5]
LN(LNG)	1.539 [10]***	0.064 [10]	0.041 [5]	0.029 [5]
LN(RUS)	1.519 [10]**	0.110 [10]	0.044 [9]	0.044 [9]
LN(IP)	1.690 [10]***	0.264 [10]***	0.091 [21]	0.074 [21]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 191 SI and IP (2000-2012)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-1.352 [1] (0.604)	-1.562 [1] (0.803)	-5.774 [0]*** (0.000)	-5.763 [0]*** (0.000)
LN(IP)	-0.847 [1] (0.802)	-3.664 [1]** (0.027)	-10.017 [0]*** (0.000)	-9.983[0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.113 [8] (0.709)	-1.407 [8] (0.855)	-5.774 [0]*** (0.000)	-5.914 [1]*** (0.000)
LN(IP)	-0.376 [17] (0.909)	-3.030 [10] (0.127)	-10.590 [23]*** (0.000)	-10.515 [23]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.429 [10]*	0.280 [10]***	0.172 [8]	0.099 [8]
LN(IP)	1.485 [10]***	0.208 [9]**	0.086 [18]	0.083 [18]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 192 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC **GDP [3]**	H0: r=0 H1: r≤1	0.234788 0.093895	12.08469 3.253801*	0.1529 0.0713	8.830892 3.253801*	0.3005 0.0713
BRENT PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.064289 0.011586	13.82418* 2.062682	0.0879 0.1509	11.76150 2.062682	0.1199 0.1509
WTI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.086573 0.013756	18.37501** 2.437825	0.0179 0.1184	15.93718** 2.437825	0.0270 0.1184
DUBAI PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.074633 0.011872	15.84298** 2.113908	0.0443 0.1460	13.72908* 2.113908	0.0606 0.1460
HH PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.100049 0.015586	21.31761*** 2.764672*	0.0059 0.0964	18.55294*** 2.764672*	0.0099 0.0964
LNG PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.043661 0.007332	9.152318 1.295173	0.3515 0.2551	7.857145 1.295173	0.3934 0.2551
RUS PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.115856 0.008263	23.00081*** 1.452092	0.0031 0.2282	21.54872*** 1.452092	0.0030 0.2282
BRENT PRICE **SI [4]**	H0: r=0 H1: r≤1	0.036421 0.010588	8.355456 1.862836	0.4282 0.1723	6.492620 1.862836	0.5508 0.1723
WTI PRICE **SI [7]**	H0: r=0 H1: r≤1	0.030684 0.010841	7.235096 1.874788	0.5505 0.1709	5.360308 1.874788	0.6958 0.1709
DUBAI PRICE **SI [4]**	H0: r=0 H1: r≤1	0.038792 0.010386	8.750974 1.827110	0.3889 0.1765	6.923864 1.827110	0.4982 0.1765
HH PRICE **SI [3]**	H0: r=0 H1: r≤1	0.103012 0.019428	22.58638*** 3.452938*	0.0036 0.0631	19.13344*** 3.452938*	0.0078 0.0631
LNG PRICE **SI [6]**	H0: r=0 H1: r≤1	0.023972 0.000732	4.324252 0.126604	0.8757 0.7220	4.197648 0.126604	0.8379 0.7220
RUS PRICE **SI [8]**	H0: r=0 H1: r≤1	0.030884 0.008078	6.751331 1.386924	0.6067 0.2389	5.364407 1.386924	0.6953 0.2389
BRENT PRICE **IP [3]**	H0: r=0 H1: r≤1	0.060959 0.002757	11.55560 0.485921	0.1795 0.4858	11.06968 0.485921	0.1507 0.4858
WTI PRICE **IP [3]**	H0: r=0 H1: r≤1	0.058821 0.003243	11.24116 0.571731	0.1971 0.4496	10.66943 0.571731	0.1716 0.4496
DUBAI PRICE **IP [3]**	H0: r=0 H1: r≤1	0.068843 0.003629	13.19353 0.639903	0.1079 0.4237	12.55363* 0.639903	0.0915 0.4237
HH PRICE **IP [2]**	H0: r=0 H1: r≤1	0.043091 0.005342	8.744385 0.947983	0.3896 0.3302	7.796402 0.947983	0.3998 0.3302
LNG PRICE **IP [3]**	H0: r=0 H1: r≤1	0.057079 0.001224	10.55952 0.215547	0.2401 0.6425	10.34397 0.215547	0.1903 0.6425
RUS PRICE	H0: r=0	0.097163	17.85714**	0.0216	17.78516*	0.0133

IP [5]	H1: r≤1	0.000414	0.071983	0.7885	0.071983	0.7885
SI **IP [8]**	H0: r=0 H1: r≤1	0.026333 0.005317	4.706445 0.783658	0.8392 0.3760	3.922787 0.783658	0.8674 0.3760

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 193 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	10.531 4.908**	0.178 0.014	3	GDP→EC
LNG does not granger cause M2 M2 does not granger cause LNG	1.219 13.260***	0.748 0.004	3	M2→LNG
BRENT does not granger cause SI SI does not granger cause BRENT	9.793** 14.192***	0.044 0.006	4	BRENT↔SI
WTI does not granger cause SI SI does not granger cause WTI	12.413* 16.383**	0.087 0.021	7	WTI↔SI
DUBAI does not granger cause SI SI does not granger cause DUBAI	12.004** 11.275**	0.017 0.023	4	DUBAI↔SI
LNG does not granger cause SI SI does not granger cause LNG	12.874** 50.150***	0.045 0.000	6	LNG↔SI
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	11.426 73.974***	0.178 0.000	8	SI→RUSSIA
BRENT does not granger cause IP IP does not granger cause BRENT	14.122*** 3.242	0.002 0.355	3	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	15.912*** 4.053	0.001 0.255	3	WTI→IP
HH does not granger cause IP IP does not granger cause HH	2.336 0.667	0.310 0.716	2	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	14.612*** 4.847	0.002 0.183	3	LNG→IP
SI does not granger cause IP IP does not granger cause SI	15.463* 10.133	0.050 0.255	8	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 194 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	8.601** 3.347	0.013 0.187	2	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	6.917* 1.963	0.074 0.580	3	WTI→M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	7.737** 2.556	0.020 0.278	2	DUBAI→M2
HH does not granger cause M2 M2 does not granger cause HH	6.133 4.914	0.105 0.178	3	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	1.087 3.305	0.896 0.508	4	No causal relation
HH does not granger cause SI SI does not granger cause HH	6.901* 1.207	0.075 0.751	3	HH→SI
DUBAI does not granger cause IP IP does not granger cause DUBAI	3.027 2.420	0.387 0.489	3	No causal relation
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	7.412 7.444	0.191 0.189	5	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

IRELAND

UNIT ROOT TEST RESULTS

Table 195 NG Consumption and GDP (1979-2013) –Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-6.439 [0]*** (0.000)	-9.624 [0]*** (0.000)	-7.637 [0]*** (0.000)	-7.103 [0]*** (0.000)
LN(GDP)	-1.311 [1] (0.612)	-1.227 [1] (0.888)	-2.350 [0] (0.163)	-2.525 [0] (0.314)
	PP (Level)		PP (First Difference)	
LN(NG)	-4.751 [4]*** (0.000)	-7.995 [2]*** (0.000)	-13.228 [10]*** (0.000)	-11.318 [9]*** (0.000)
LN(GDP)	-1.068 [4] (0.716)	-0.726 [4] (0.962)	-2.350 [0] (0.163)	-2.559 [1] (0.299)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.788 [4]***	0.187 [0]**	0.378 [2]*	0.121 [2]*
LN(GDP)	0.648 [5]**	0.126 [4]*	0.229 [4]	0.167 [4]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 196 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-1.460 [1] (0.543)	-1.918 [1] (0.627)	-4.280 [0]*** (0.001)	-4.212[0]*** (0.009)
LN(GDP)	-1.181 [1] (0.673)	-1.387 [1] (0.850)	-3.007 [0]** (0.042)	-3.111 [0] (0.116)
	PP (Level)		PP (First Difference)	
LN(OIL)	-1.506 [2] (0.520)	-1.565 [3] (0.790)	-4.267 [2]*** (0.001)	-4.202 [2]*** (0.009)
LN(GDP)	-0.998 [4] (0.745)	-1.073 [4] (0.921)	-2.954 [2]** (0.047)	-3.067 [2] (0.127)
	KPSS (Level)		KPSS (First Difference)	
LN(OIL)	0.526 [5]**	0.113 [5]	0.129 [2]	0.120 [2]*
LN(GDP)	0.808 [5]***	0.097 [5]	0.186 [4]	0.154 [4]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 197 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-3.039 [0]** (0.033)	-0.159 [0] (0.997)	-13.989 [0]*** (0.000)	-15.106 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-3.013 [4]** (0.035)	-0.159 [0] (0.997)	-14.249 [6]*** (0.000)	-15.028 [3]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]

LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.446 [10]***	0.400 [10]***	1.104 [6]***	0.215 [1]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 198 NG Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-3.039 [0]** (0.033)	-0.159 [0] (0.997)	-13.989 [0]*** (0.000)	-15.106 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-3.013 [4]** (0.035)	-0.159 [0] (0.997)	-14.249 [6]*** (0.000)	-15.028 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.446 [10]***	0.400 [10]***	1.104 [6]***	0.215 [1]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 199 Oil Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.401 [1] (0.580)	-1.385 [1] (0.862)	-9.482 [0]*** (0.000)	-9.464 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.545 [8] (0.508)	-1.597 [8] (0.790)	-9.814 [6]*** (0.000)	-9.794 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.548 [10]**	0.155 [10]**	0.113 [8]	0.111 [8]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 200 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.401 [1] (0.580)	-1.385 [1] (0.862)	-9.482 [0]*** (0.000)	-9.464 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.545 [8] (0.508)	-1.597 [8] (0.790)	-9.814 [6]*** (0.000)	-9.794 [6]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.548 [10]**	0.155 [10]**	0.113 [8]	0.111 [8]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 201 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-2.169 [2] (0.218)	-2.750 [2] (0.217)	-15.247 [1]*** (0.000)	-15.265 [1]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-2.477 [10] (0.122)	-3.830 [4]** (0.016)	-30.525 [15]*** (0.000)	-31.815 [16]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.445 [11]***	0.354 [11]***	0.288 [24]	0.137 [26]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 202 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)

LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-2.169 [2] (0.218)	-2.750 [2] (0.217)	-15.247 [1]*** (0.000)	-15.265 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-2.477 [10] (0.122)	-3.830 [4]** (0.016)	-30.525 [15]*** (0.000)	-31.815 [16]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.445 [11]***	0.354 [11]***	0.288 [24]	0.137 [26]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 203 SI and IP (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-1.401 [1] (0.580)	-1.385 [1] (0.862)	-9.482 [0]*** (0.000)	-9.464 [0]*** (0.000)
LN(IP)	-2.262 [3] (0.185)	-4.109 [2]*** (0.007)	-11.440 [2]*** (0.000)	-11.427 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.545 [8] (0.508)	-1.597 [8] (0.790)	-9.814 [6]*** (0.000)	-9.794 [6]*** (0.000)
LN(IP)	-3.229 [3]** (0.019)	-6.394 [7]*** (0.000)	-27.214 [9]*** (0.000)	-27.395 [10]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.548 [10]**	0.155 [10]**	0.113 [8]	0.111 [8]
LN(IP)	1.427 [10]***	0.261 [10]***	0.196 [16]	0.122 [16]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 204 Johansen Cointegration Test Results

Variables	**Hypothesis**	**Eigenvalue**	**Trace Statistic**	**Prob.**	**Max-Eigen Statistic**	**Prob.**
OILC GDP [2]	H0: r=0 H1: r≤1	0.114284 0.026947	6.095719 1.119983	0.6842 0.2899	4.975736 1.119983	0.7449 0.2899
BRENT PRICE M2 [2]	H0: r=0 H1: r≤1	0.058834 0.043174	18.54427** .811712***	0.0168 0.0052	10.73256 7.811712***	0.1681 0.0052
WTI PRICE M2 [4]	H0: r=0 H1: r≤1	0.077275 0.036727	20.62229*** 6.548168**	0.0077 0.0105	14.07412* 6.548168**	0.0535 0.0105
DUBAI PRICE M2 [4]	H0: r=0 H1: r≤1	0.071134 0.034622	19.07964** 6.166185**	0.0138 0.0130	12.91346* 6.166185**	0.0808 0.0130
HH PRICE M2 [2]	H0: r=0 H1: r≤1	0.097078 0.034645	24.31616*** 6.240990**	0.0018 0.0125	18.07517** 6.240990**	0.0119 0.0125
LNG PRICE M2 [4]	H0: r=0 H1: r≤1	0.043776 0.019783	11.33033 3.496746*	0.1920 0.0615	7.833587 3.496746*	0.3958 0.0615
RUS PRICE M2 [4]	H0: r=0 H1: r≤1	0.093739 0.035726	23.59139*** 6.366412**	0.0024 0.0116	17.22497** 6.366412**	0.0165 0.0116
BRENT PRICE SI [7]	H0: r=0 H1: r≤1	0.022237 0.009952	5.588099 1.720242	0.7436 0.1897	3.867857 1.720242	0.8730 0.1897
WTI PRICE SI [7]	H0: r=0 H1: r≤1	0.022269 0.010914	5.761038 1.887452	0.7236 0.1695	3.873586 1.887452	0.8724 0.1695

DUBAI PRICE **SI [7]**	H0: r=0 H1: r≤1	0.021483 0.009473	5.372461 1.637178	0.7680 0.2007	3.735283 1.637178	0.8862 0.2007
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.071886 0.015020	15.88306** 2.678763	0.0437 0.1017	13.20430* 2.678763	0.0730 0.1017
LNG PRICE **SI [6]**	H0: r=0 H1: r≤1	0.020776 0.004056	4.335248 0.703098	0.8747 0.4017	3.632149 0.703098	0.8960 0.4017
RUS PRICE **SI [7]**	H0: r=0 H1: r≤1	0.023281 0.008773	5.567187 1.515570	0.7460 0.2183	4.051616 1.515570	0.8539 0.2183
BRENT PRICE **IP [3]**	H0: r=0 H1: r≤1	0.042980 0.028236	14.51475* 5.728488**	0.0699 0.0167	8.786258 5.728488**	0.3044 0.0167
WTI PRICE **IP [3]**	H0: r=0 H1: r≤1	0.046681 0.029957	15.64397** 6.082876**	0.0475 0.0136	9.561097 6.082876**	0.2424 0.0136
DUBAI PRICE **IP [3]**	H0: r=0 H1: r≤1	0.041019 0.025859	13.61659* 5.239816**	0.0941 0.0221	8.376778 5.239816**	0.3417 0.0221
HH PRICE **IP [3]**	H0: r=0 H1: r≤1	0.037592 0.016419	10.97439 3.310984*	0.2131 0.0688	7.663401 3.310984*	0.4140 0.0688
LNG PRICE **IP [3]**	H0: r=0 H1: r≤1	0.042723 0.019405	12.65154 3.919129**	0.1282 0.0477	8.732409 3.919129**	0.3091 0.0477
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.048336 0.030918	16.10896** 6.249858**	0.0404 0.0124	9.859106 6.249858**	0.2213 0.0124
SI **IP [4]**	H0: r=0 H1: r≤1	0.028611 0.016607	8.010698 2.930707*	0.4643 0.0869	5.079991 2.930707*	0.7317 0.0869

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 205 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
OILC does not granger cause GDP GDP does not granger cause OILC	3.084 10.291***	0.213 0.005	2	GDP→OILC
LNG does not granger cause M2 M2 does not granger cause LNG	4.608 5.157	0.329 0.271	4	No causal relation
BRENT does not granger cause SI SI does not granger cause BRENT	11.301 19.510***	0.126 0.006	7	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	14.435** 16.273**	0.044 0.022	7	WTI↔SI
DUBAI does not granger cause SI SI does not granger cause DUBAI	12.649* 15.804**	0.081 0.027	7	DUBAI↔SI
LNG does not granger cause SI SI does not granger cause LNG	15.088** 18.045***	0.019 0.006	6	LNG↔SI
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	8.390 13.227*	0.299 0.066	7	SI→RUSSIA
HH does not granger cause IP IP does not granger cause HH	7.390* 2.316	0.060 0.509	3	HH→IP
LNG does not granger cause IP IP does not granger cause LNG	2.801 1.750	0.423 0.625	3	No causal relation
SI does not granger cause IP IP does not granger cause SI	2.584 4.747	0.629 0.314	4	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 206 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	3.756 1.323	0.152 0.515	2	No causal relation
WTI does not granger cause M2 M2 does not granger cause WTI	5.251 1.776	0.262 0.776	4	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	4.257 4.720	0.372 0.317	4	No causal relation

HH does not granger cause M2 M2 does not granger cause HH	1.415 7.232**	0.492 0.026	2	M2→HH
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	3.356 3.417	0.500 0.490	4	No causal relation
HH does not granger cause SI SI does not granger cause HH	0.855 0.001	0.652 0.999	2	No causal relation
BRENT does not granger cause IP IP does not granger cause BRENT	2.542 2.287	0.467 0.514	3	No causal relation
WTI does not granger cause IP IP does not granger cause WTI	2.165 1.186	0.538 0.756	3	No causal relation
DUBAI does not granger cause IP IP does not granger cause DUBAI	1.703 1.717	0.636 0.633	3	No causal relation
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	4.350 4.520	0.360 0.340	4	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

ISRAEL

UNIT ROOT TEST RESULTS

Table 207 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-0.879 [0] (0.783)	-2.510 [0] (0.321)	-7.096 [0]*** (0.000)	-2.936 [4] (0.165)
LN(GDP)	-0.069 [0] (0.958)	-2.315 [0] (0.415)	-4.889 [0]*** (0.000)	-4.809 [0]*** (0.002)
	PP (Level)		PP (First Difference)	
LN(EC)	-0.677 [7] (0.839)	-2.510 [0] (0.321)	-7.694 [6]*** (0.000)	-7.695 [6]*** (0.000)
LN(GDP)	-0.028 [3] (0.955)	-2.315 [0] (0.415)	-4.816 [5]*** (0.000)	-4.722 [5]*** (0.003)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.651 [5]**	0.137 [4]*	0.123 [9]	0.124 [9]*
LN(GDP)	0.715 [5]**	0.087 [4]	0.097 [3]	0.081 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 208 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-0.936 [0] (0.766)	-1.765 [0] (0.704)	-5.963 [0]*** (0.000)	-6.112 [0]*** (0.000)
LN(GDP)	-0.921 [0] (0.772)	-2.232 [0] (0.460)	-5.471 [0]*** (0.000)	-5.395 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(NG)	-1.035 [1] (0.732)	-1.721 [3] (0.724)	-5.942 [5]*** (0.000)	-6.496 [8]*** (0.000)
LN(GDP)	-0.907 [1] (0.776)	-2.448 [1] (0.350)	-5.424 [5]*** (0.000)	-5.330 [5]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.359 [5]*	0.168 [5]**	0.246 [4]	0.083 [8]
LN(GDP)	0.838 [5]***	0.093 [4]**	0.069 [2]	0.056 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 209 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-2.027 [0] (0.274)	-1.083 [0] (0.920)	-4.664 [0]*** (0.000)	-4.922 [0]*** (0.001)

LN(GDP)	-0.921 [0] (0.772)	-2.232 [0] (0.460)	-5.471 [0]*** (0.000)	-5.395 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-2.015 [1] (0.279)	-1.083 [0] (0.920)	-4.577 [2]*** (0.000)	-4.709 [4]*** (0.002)
LN(GDP)	-0.907 [1] (0.776)	-2.448 [1] (0.350)	-5.424 [5]*** (0.000)	-5.330 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.756 [5]***	0.118 [5]	0.322 [0]	0.086 [3]
LN(GDP)	0.838 [5]***	0.093 [4]**	0.069 [2]	0.056 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 210 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-0.025 [3] (0.954)	-1.859 [3] (0.671)	-5.386 [2]*** (0.000)	-5.374 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-0.100 [7] (0.946)	-1.675 [8] (0.758)	-11.482 [7]*** (0.000)	-11.455 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.730 [10]***	0.253 [10]***	0.096 [7]	0.088 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 211 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.025 [3] (0.954)	-1.859 [3] (0.671)	-5.386 [2]*** (0.000)	-5.374 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-0.100 [7] (0.946)	-1.675 [8] (0.758)	-11.482 [7]*** (0.000)	-11.455 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	

LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.730 [10]***	0.253 [10]***	0.096 [7]	0.088 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 212 Oil Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-0.861 [1] (0.798)	-2.434 [1] (0.360)	-9.847 [0]*** (0.000)	-9.827 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-0.853 [4] (0.800)	-2.232 [4] (0.468)	-9.865 [4]*** (0.000)	-9.844 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	1.430 [10]**	0.152 [10]**	0.070 [4]	0.070 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 213 NG Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-0.861 [1] (0.798)	-2.434 [1] (0.360)	-9.847 [0]*** (0.000)	-9.827 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-0.853 [4] (0.800)	-2.232 [4] (0.468)	-9.865 [4]*** (0.000)	-9.844 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	1.430 [10]**	0.152 [10]**	0.070 [4]	0.070 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. ***, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.

Table 214 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-0.586 [1] (0.869)	-2.565 [1] (0.296)	-18.108 [0]*** (0.000)	-18.061 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-0.888 [6] (0.790)	-2.801 [2] (0.198)	-18.052 [3]*** (0.000)	-18.007 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.713 [11]***	0.142 [11]*	0.046 [7]	0.046 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. ***, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.

Table 215 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-0.586 [1] (0.869)	-2.565 [1] (0.296)	-18.108 [0]*** (0.000)	-18.061 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-0.888 [6] (0.790)	-2.801 [2] (0.198)	-18.052 [3]*** (0.000)	-18.007 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.713 [11]***	0.142 [11]*	0.046 [7]	0.046 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. ***, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.

Table 216 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)	ADF (First Difference)

	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-0.861 [1] (0.798)	-2.434 [1] (0.360)	-9.847 [0]*** (0.000)	-9.827 [0]*** (0.000)
LN(IP)	-0.667 [1] (0.850)	-2.825 [0] (0.190)	-16.422 [0]*** (0.000)	-16.374 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-0.853 [4] (0.800)	-2.232 [4] (0.468)	-9.865 [4]*** (0.000)	-9.844 [4]*** (0.000)
LN(IP)	-0.936 [5] (0.774)	-2.825 [0] (0.190)	-16.453 [4]*** (0.000)	-16.406 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	1.430 [10]**	0.152 [10]**	0.070 [4]	0.070 [4]
LN(IP)	1.624 [10]***	0.146 [10]**	0.052 [7]	0.051 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 217 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC	H0: r=0	0.126769	5.160322	0.7916	4.744445	0.7737
GDP [1]	H1: r≤1	0.011812	0.415877	0.5190	0.415877	0.5190
NGC	H0: r=0	0.113224	5.077094	0.8006	5.046854	0.7359
GDP [1]	H1: r≤1	0.000720	0.030240	0.8619	0.030240	0.8619
OILC	H0: r=0	0.097345	5.003984	0.8084	4.301414	0.8263
GDP [1]	H1: r≤1	0.016589	0.702569	0.4019	0.702569	0.4019
BRENT PRICE	H0: r=0	0.042333	8.458018	0.4178	7.569626	0.4241
M2 [4]	H1: r≤1	0.005064	0.888392	0.3459	0.888392	0.3459
WTI PRICE	H0: r=0	0.049486	9.749476	0.3005	8.881642	0.2961
M2 [4]	H1: r≤1	0.004947	0.867835	0.3516	0.867835	0.3516
DUBAI PRICE	H0: r=0	0.045326	9.034433	0.3622	8.117509	0.3669
M2 [4]	H1: r≤1	0.005226	0.916924	0.3383	0.916924	0.3383
HH PRICE	H0: r=0	0.064722	11.88879	0.1623	11.70951	0.1220
M2 [4]	H1: r≤1	0.001024	0.179283	0.6720	0.179283	0.6720
LNG PRICE	H0: r=0	0.069500	12.61550	0.1297	12.60582*	0.0899
M2 [4]	H1: r≤1	5.53E-05	0.009678	0.9213	0.009678	0.9213
RUS PRICE	H0: r=0	0.078106	14.41188*	0.0723	14.23179*	0.0506
M2 [4]	H1: r≤1	0.001029	0.180085	0.6713	0.180085	0.6713
BRENT PRICE	H0: r=0	0.047529	9.284325	0.3397	8.619177	0.3192
SI [2]	H1: r≤1	0.003751	0.665147	0.4147	0.665147	0.4147
WTI PRICE	H0: r=0	0.058534	11.82407	0.1656	10.37445	0.1885
SI [7]	H1: r≤1	0.008393	1.449620	0.2286	1.449620	0.2286
DUBAI PRICE	H0: r=0	0.050762	10.31771	0.2571	8.960428	0.2895
SI [7]	H1: r≤1	0.007860	1.357281	0.2440	1.357281	0.2440
HH PRICE	H0: r=0	0.042013	8.108561	0.4539	7.596984	0.4212
SI [2]	H1: r≤1	0.002886	0.511577	0.4745	0.511577	0.4745
LNG PRICE	H0: r=0	0.037831	6.991066	0.5787	6.710339	0.5239
SI [5]	H1: r≤1	0.001612	0.280727	0.5962	0.280727	0.5962
RUS PRICE	H0: r=0	0.105071	19.77698**	0.0106	19.09386***	0.0080
SI [7]	H1: r≤1	0.003964	0.683120	0.4085	0.683120	0.4085
BRENT PRICE	H0: r=0	0.070693	17.12461**	0.0282	14.73654**	0.0421
IP [2]	H1: r≤1	0.011811	2.388069	0.1223	2.388069	0.1223
WTI PRICE	H0: r=0	0.080184	18.81057**	0.0152	16.79997**	0.0194
IP [2]	H1: r≤1	0.009953	2.010602	0.1562	2.010602	0.1562
DUBAI PRICE	H0: r=0	0.084829	20.20410***	0.0090	17.81755**	0.0132
IP [2]	H1: r≤1	0.011803	2.386550	0.1224	2.386550	0.1224
HH PRICE	H0: r=0	0.031754	6.688024	0.6142	6.486169	0.5516
IP [2]	H1: r≤1	0.001004	0.201854	0.6532	0.201854	0.6532
LNG PRICE	H0: r=0	0.060505	13.30462	0.1041	12.48265*	0.0938
IP [3]	H1: r≤1	0.004101	0.821973	0.3646	0.821973	0.3646
RUS PRICE	H0: r=0	0.069942	15.05298*	0.0582	14.42913**	0.0471
IP [4]	H1: r≤1	0.003130	0.623856	0.4296	0.623856	0.4296
SI	H0: r=0	0.128257	24.57353***	0.0016	24.29510***	0.0010

IP [2]	H1: r≤1	0.001572	0.278427	0.5977	0.278427	0.5977

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 218 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	1.678 2.745*	0.195 0.097	1	GDP→EC
NGC does not granger cause GDP GDP does not granger cause NGC	0.378 3.161*	0.538 0.075	1	GDP→NGC
OILC does not granger cause GDP GDP does not granger cause OILC	0.579 0.040	0.446 0.840	1	No causal relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	8.464* 1.954	0.076 0.744	4	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	9.392* 2.452	0.052 0.653	4	WTI→M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	8.623* 1.909	0.071 0.752	4	DUBAI→M2
HH does not granger cause M2 M2 does not granger cause HH	3.730 3.221	0.443 0.521	4	No causal relation
BRENT does not granger cause SI SI does not granger cause BRENT	0.145 13.089***	0.929 0.001	2	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	17.218** 19.204***	0.016 0.007	7	WTI↔SI
DUBAI does not granger cause SI SI does not granger cause DUBAI	19.774*** 20.005***	0.006 0.005	7	DUBAI↔SI
HH does not granger cause SI SI does not granger cause HH	0.232 0.088	0.890 0.956	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	8.633 22.904***	0.124 0.000	5	SI→LNG
HH does not granger cause IP IP does not granger cause HH	3.799 0.078	0.149 0.961	2	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 219 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
LNG does not granger cause M2 M2 does not granger cause LNG	4.549 6.899	0.336 0.141	4	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	10.033** 1.320	0.039 0.857	4	RUSSIA→M2
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	11.620 14.516**	0.113 0.042	7	SI→RUSSIA
BRENT does not granger cause IP IP does not granger cause BRENT	0.050 0.465	0.975 0.792	2	No causal relation
WTI does not granger cause IP IP does not granger cause WTI	0.056 0.012	0.972 0.993	2	No causal relation
DUBAI does not granger cause IP IP does not granger cause DUBAI	0.179 0.144	0.914 0.930	2	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	9.809** 1.453	0.020 0.693	3	LNG→IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	2.713 2.437	0.606 0.655	4	No causal relation
SI does not granger cause IP IP does not granger cause SI	0.782 0.248	0.676 0.883	2	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

ITALY

UNIT ROOT TEST RESULTS

Table 220 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.718 [0] (0.413)	-0.664 [0] (0.968)	-6.082 [0]*** (0.000)	-6.149 [0]*** (0.000)
LN(GDP)	-4.190 [0]*** (0.002)	-0.406 [0] (0.983)	-4.087 [0]*** (0.003)	-4.940 [0]*** (0.001)
	PP (Level)		PP (First Difference)	
LN(EC)	-1.684 [3] (0.430)	-0.975 [3] (0.935)	-6.058 [2]*** (0.000)	-6.125 [2]*** (0.000)
LN(GDP)	-3.806 [2]*** (0.006)	-0.385 [4] (0.984)	-4.067 [3]*** (0.003)	-5.189 [11]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.650 [5]**	0.120 [4]*	0.263 [3]	0.120 [2]
LN(GDP)	0.693 [5]**	0.211 [4]**	0.666 [3]**	0.078 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 221 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-2.708 [0]* (0.080)	-0.136 [0] (0.996)	-4.889 [0]*** (0.000)	-5.826 [0]*** (0.000)
LN(GDP)	-3.409 [1]** (0.016)	-1.277 [2] (0.999)	-4.265 [0]*** (0.001)	-5.580 [1]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(NG)	-2.517 [2] (0.118)	-0.078 [2] (0.993)	-5.056 [3]*** (0.000)	-5.834 [2]*** (0.000)
LN(GDP)	-3.671 [1]*** (0.008)	3.169 [11] (1.000)	-4.308 [3]*** (0.001)	-6.360 [3]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.812 [5]***	0.187 [4]**	0.422 [4]*	0.084 [2]
LN(GDP)	0.785 [5]***	0.212 [5]**	0.740 [4]***	0.127 [4]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 222 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-1.985 [0] (0.999)	-0.040 [0] (0.994)	-4.733 [0]*** (0.000)	-5.264 [0]*** (0.000)
LN(GDP)	-3.409 [1]** (0.016)	-1.277 [2] (0.999)	-4.265 [0]*** (0.001)	-5.580 [1]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(OIL)	-1.415 [2] (0.998)	-0.594 [3] (0.974)	-4.720 [3]*** (0.000)	-5.278 [3]*** (0.000)
LN(GDP)	-3.671 [1]*** (0.008)	3.169 [11] (1.000)	-4.308 [3]*** (0.001)	-6.360 [3]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(OIL)	0.503 [5]**	0.158 [4]**	0.504 [3]**	0.113 [3]
LN(GDP)	0.785 [5]***	0.212 [5]**	0.740 [4]***	0.127 [4]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 223 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)	ADF (First Difference)

	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-2.439 [12] (0.132)	-1.990 [12] (0.602)	-2.708 [11]* (0.074)	-3.347 [11]* (0.062)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.139 [37] (0.699)	-1.932 [10] (0.633)	-20.059 [15]*** (0.000)	-20.941 [17]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.707 [10]***	0.355 [10]***	0.211 [35]	0.128 [40]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 224 NG Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-2.439 [12] (0.132)	-1.990 [12] (0.602)	-2.708 [11]* (0.074)	-3.347 [11]* (0.062)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-1.139 [37] (0.699)	-1.932 [10] (0.633)	-20.059 [15]*** (0.000)	-20.941 [17]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.707 [10]***	0.355 [10]***	0.211 [35]	0.128 [40]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 225 Oil Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1]	-2.141 [1]	-9.147 [0]***	-9.181 [0]***

	(0.453)	(0.518)	(0.000)	(0.000)
LN(SI)	-1.721 [1] (0.418)	-1.965 [1] (0.615)	-11.349 [0]*** (0.000)	-11.337 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.503 [6] (0.529)	-1.986 [6] (0.604)	-11.410 [5]*** (0.000)	-11.391 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	1.068 [10]***	0.138 [10]*	0.071 [6]	0.069 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 226 NG Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.721 [1] (0.418)	-1.965 [1] (0.615)	-11.349 [0]*** (0.000)	-11.337 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.503 [6] (0.529)	-1.986 [6] (0.604)	-11.410 [5]*** (0.000)	-11.391 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	1.068 [10]***	0.138 [10]*	0.071 [6]	0.069 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 227 Oil Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-1.022 [3] (0.745)	-2.393 [3] (0.381)	-5.850 [2]*** (0.000)	-5.868 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)

LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-0.861 [8] (0.798)	-2.254 [8] (0.456)	-15.816 [8]*** (0.000)	-15.816 [8]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.250 [11]***	0.259 [11]***	0.100 [8]	0.039 [8]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 228 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-1.022 [3] (0.745)	-2.393 [3] (0.381)	-5.850 [2]*** (0.000)	-5.868 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-0.861 [8] (0.798)	-2.254 [8] (0.456)	-15.816 [8]*** (0.000)	-15.816 [8]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.250 [11]***	0.259 [11]***	0.100 [8]	0.039 [8]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 229 SI and IP (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-1.721 [1] (0.418)	-1.965 [1] (0.615)	-11.349 [0]*** (0.000)	-11.337 [0]*** (0.000)
LN(IP)	-1.158 [3] (0.691)	-2.488 [3] (0.333)	-5.377 [2]*** (0.000)	-5.360 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.503 [6] (0.529)	-1.986 [6] (0.604)	-11.410 [5]*** (0.000)	-11.391 [5]*** (0.000)
LN(IP)	-0.869 [8] (0.795)	-2.441 [8] (0.357)	-14.687 [8]*** (0.000)	-14.682 [8]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	1.068 [10]***	0.138 [10]*	0.071 [6]	0.069 [6]
LN(IP)	1.308 [10]***	0.198 [10]**	0.084 [8]	0.044 [8]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 230 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC **GDP [1]**	H0: r=0 H1: r≤1	0.309608 0.113091	17.16778** 4.200432**	0.0277 0.0404	12.96735* 4.200432**	0.0793 0.0404
NGC **GDP [4]**	H0: r=0 H1: r≤1	0.296392 0.046268	15.55738** 1.847534	0.0489 0.1741	13.70985* 1.847534	0.0610 0.1741
OILC **GDP [1]**	H0: r=0 H1: r≤1	0.256013 0.002070	12.50778 0.087022	0.1341 0.7680	12.42076* 0.087022	0.0958 0.7680
BRENT PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.032712 0.020560	9.293643 3.573143*	0.3389 0.0587	5.720499 3.573143*	0.6493 0.0587
WTI PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.031674 0.019013	8.837811 3.301767*	0.3806 0.0692	5.536043 3.301767*	0.6732 0.0692
DUBAI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.053722 0.006884	10.93430 1.215693	0.2156 0.2702	9.718606 1.215693	0.2311 0.2702
HH PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.046447 0.022510	12.09637 3.915952**	0.1524 0.0478	8.180417 3.915952**	0.3606 0.0478
LNG PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.071954 0.007203	14.41505* 1.272343	0.0722 0.2593	13.14271* 1.272343	0.0746 0.2593
RUS PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.078587 0.017248	17.07005** 2.992464*	0.0287 0.0836	14.07758* 2.992464*	0.0535 0.0836
BRENT PRICE **SI [2]**	H0: r=0 H1: r≤1	0.030166 0.015600	8.204529 2.782881*	0.4438 0.0953	5.421647 2.782881*	0.6879 0.0953
WTI PRICE **SI [7]**	H0: r=0 H1: r≤1	0.028452 0.015306	7.617648 2.652969	0.5071 0.1034	4.964679 2.652969	0.7463 0.1034
DUBAI PRICE **SI [4]**	H0: r=0 H1: r≤1	0.038432 0.013344	9.209189 2.350966	0.3464 0.1252	6.858223 2.350966	0.5060 0.1252
HH PRICE **SI [1]**	H0: r=0 H1: r≤1	0.071624 0.014634	15.85294** 2.624158	0.0442 0.1052	13.22878* 2.624158	0.0724 0.1052
LNG PRICE **SI [3]**	H0: r=0 H1: r≤1	0.039254 0.004927	7.917180 0.869219	0.4743 0.3512	7.047961 0.869219	0.4835 0.3512
RUS PRICE **SI [7]**	H0: r=0 H1: r≤1	0.026722 0.011379	6.627238 1.968470	0.6213 0.1606	4.658769 1.968470	0.7841 0.1606
BRENT PRICE **IP [5]**	H0: r=0 H1: r≤1	0.061166 0.012445	14.97654* 2.479529	0.0597 0.1153	12.49701* 2.479529	0.0934 0.1153
WTI PRICE **IP [5]**	H0: r=0 H1: r≤1	0.059995 0.011254	14.49133* 2.241025	0.0704 0.1344	12.25031 2.241025	0.1016 0.1344
DUBAI PRICE **IP [8]**	H0: r=0 H1: r≤1	0.053601 0.018004	14.28537* 3.542699*	0.0754 0.0598	10.74267 3.542699*	0.1676 0.0598
HH PRICE **IP [6]**	H0: r=0 H1: r≤1	0.045017 0.011879	11.42838 2.354210	0.1865 0.1249	9.074174 2.354210	0.2800 0.1249
LNG PRICE **IP [6]**	H0: r=0 H1: r≤1	0.064216 0.001145	13.30070 0.225743	0.1042 0.6347	13.07496* 0.225743	0.0764 0.6347
RUS PRICE **IP [7]**	H0: r=0 H1: r≤1	0.032281 0.001185	6.663850 0.232476	0.6170 0.6297	6.431373 0.232476	0.5585 0.6297
SI **IP [4]**	H0: r=0 H1: r≤1	0.043639 0.017410	10.88202 3.073579*	0.2188 0.0796	7.808438 3.073579*	0.3985 0.0796

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 231 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	7.319 9.053	0.396 0.248	7	No causal relation
WTI does not granger cause M2 M2 does not granger cause WTI	5.516 10.072	0.640 0.184	7	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	5.150 9.514**	0.161 0.023	3	M2→DUBAI
HH does not granger cause M2 M2 does not granger cause HH	11.685 3.768	0.111 0.806	7	No causal relation
BRENT does not granger cause SI	2.093	0.351	2	SI→BRENT

SI does not granger cause BRENT	7.978**	0.018		
WTI does not granger cause SI SI does not granger cause WTI	8.762 13.445*	0.270 0.062	7	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	5.593 10.507**	0.231 0.032	4	SI→DUBAI
LNG does not granger cause SI SI does not granger cause LNG	5.972 11.938***	0.113 0.007	3	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	9.453 13.925*	0.221 0.052	7	SI→RUSSIA
HH does not granger cause IP IP does not granger cause HH	4.019 15.563**	0.674 0.016	6	IP→HH
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	19.063*** 21.528***	0.008 0.003	7	RUSSIA↔IP
SI does not granger cause IP IP does not granger cause SI	20.415*** 7.213	0.000 0.125	4	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 232 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	0.349 0.572	0.554 0.449	1	No causal relation
NGC does not granger cause GDP GDP does not granger cause NGC	16.104*** 6.920	0.002 0.140	4	NGC→GDP
OILC does not granger cause GDP GDP does not granger cause OILC	3.811* 3.887**	0.050 0.048	1	OILC↔GDP
LNG does not granger cause M2 M2 does not granger cause LNG	4.951 6.175	0.175 0.103	3	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	8.907 9.662	0.259 0.208	7	No causal relation
HH does not granger cause SI SI does not granger cause HH	0.021 0.306	0.884 0.579	1	No causal relation
BRENT does not granger cause IP IP does not granger cause BRENT	21.468*** 4.073	0.000 0.538	5	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	22.419*** 2.910	0.004 0.713	5	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	31.401*** 18.956**	0.000 0.015	8	DUBAI↔IP
LNG does not granger cause IP IP does not granger cause LNG	15.544** 15.052**	0.016 0.019	6	LNG↔IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

JAPAN

UNIT ROOT TEST RESULTS

Table 233 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.813 [0] (0.368)	-0.268 [1] (0.997)	-5.516 [0]*** (0.000)	-5.933 [0]*** (0.000)
LN(GDP)	-3.878 [0]*** (0.005)	-0.556 [0] (0.975)	-3.833 [0]*** (0.006)	-5.175 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(EC)	-1.778 [3] (0.384)	-0.060 [2] (0.995)	-5.639 [3]*** (0.000)	-5.964 [2]*** (0.000)
LN(GDP)	-3.624 [2]** (0.001)	-0.600 [1] (0.972)	-3.868 [3]*** (0.005)	-5.175 [0]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.610 [5]**	0.164 [4]**	0.414 [3]*	0.148 [2]**
LN(GDP)	0.666 [5]**	0.190 [5]**	0.574 [4]**	0.077 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 234 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-4.720 [0]*** (0.000)	-5.518 [5]*** (0.000)	-2.469 [6] (0.131)	-1.264 [6] (0.880)
LN(GDP)	-3.358 [0]** (0.018)	-0.753 [0] (0.962)	-4.730 [0]*** (0.000)	-5.639 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-6.155 [13]*** (0.000)	-2.633 [13] (0.268)	-3.689 [3]*** (0.007)	-4.938 [7]*** (0.001)
LN(GDP)	-3.199 [1]** (0.026)	-0.802 [1] (0.957)	-4.682 [2]*** (0.000)	-5.618 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.765 [5]***	0.199 [5]**	0.596 [4]**	0.148 [3]**
LN(GDP)	0.787 [5]***	0.211 [5]**	0.639 [3]**	0.067 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 235 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-2.024 [0] (0.275)	-2.171 [0] (0.492)	-5.265 [0]*** (0.000)	-5.322 [0]*** (0.000)
LN(GDP)	-3.358 [0]** (0.018)	-0.753 [0] (0.962)	-4.730 [0]*** (0.000)	-5.639 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-2.400 [3] (0.147)	-2.398 [2] (0.375)	-5.208 [4]*** (0.000)	-5.263 [4]*** (0.000)
LN(GDP)	-3.199 [1]** (0.026)	-0.802 [1] (0.957)	-4.682 [2]*** (0.000)	-5.618 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.101 [5]	0.101 [5]	0.254 [1]	0.095 [0]
LN(GDP)	0.787 [5]***	0.211 [5]**	0.639 [3]**	0.067 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 236 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-1.153 [12] (0.997)	-1.073 [12] (0.929)	-1.493 [11] (0.534)	-1.899 [11] (0.650)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.644 [6] (0.999)	-1.270 [2] (0.891)	-14.480 [4]*** (0.000)	-14.746 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]

LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.708 [10]***	0.351 [10]***	0.297 [4]	0.077 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 237 NG Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-1.153 [12] (0.997)	-1.073 [12] (0.929)	-1.493 [11] (0.534)	-1.899 [11] (0.650)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-1.644 [6] (0.999)	-1.270 [2] (0.891)	-14.480 [4]*** (0.000)	-14.746 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.708 [10]***	0.351 [10]***	0.297 [4]	0.077 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 238 Oil Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-2.179 [1] (0.214)	-1.983 [1] (0.605)	-10.569 [0]*** (0.000)	-10.772 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-2.097 [6] (0.245)	-1.852 [5] (0.674)	-10.742 [5]*** (0.000)	-10.870 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.134 [10]	0.106 [10]	0.271 [6]	0.092 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 239 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-2.179 [1] (0.214)	-1.983 [1] (0.605)	-10.569 [0]*** (0.000)	-10.772 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-2.097 [6] (0.245)	-1.852 [5] (0.674)	-10.742 [5]*** (0.000)	-10.870 [4]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.134 [10]	0.106 [10]	0.271 [6]	0.092 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 240 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-2.688 [1]* (0.077)	-2.700 [1] (0.237)	-11.731 [0]*** (0.000)	-11.742 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-2.791 [5]* (0.061)	-2.793 [5] (0.201)	-11.827 [2]*** (0.000)	-11.798 [2]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	0.194 [10]	0.176 [10]**	0.035 [4]	0.036 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 241 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)	ADF (First Difference)

	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-2.688 [1]* (0.077)	-2.700 [1] (0.237)	-11.731 [0]*** (0.000)	-11.742 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-2.791 [5]* (0.061)	-2.793 [5] (0.201)	-11.827 [2]*** (0.000)	-11.798 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	0.194 [10]	0.176 [10]**	0.035 [4]	0.036 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 242 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-2.179 [1] (0.214)	-1.983 [1] (0.605)	-10.569 [0]*** (0.000)	-10.772 [0]*** (0.000)
LN(IP)	-2.535 [1] (0.108)	-2.601 [1] (0.280)	-10.918 [0]*** (0.000)	-10.888 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-2.097 [6] (0.245)	-1.852 [5] (0.674)	-10.742 [5]*** (0.000)	-10.870 [4]*** (0.000)
LN(IP)	-2.586 [5]* (0.097)	-2.655 [5] (0.000)	-10.980 [2]*** (0.000)	-10.951 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.134 [10]	0.106 [10]	0.271 [6]	0.092 [5]
LN(IP)	0.238 [10]	0.155 [10]**	0.040 [4]	0.037 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 243 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC **GDP [3]**	H0: r=0 H1: r≤1	0.239229 0.088022	12.06358 3.040615*	0.1539 0.0812	9.022969 3.040615*	0.2842 0.0812
NGC **GDP [2]**	H0: r=0 H1: r≤1	0.516114 0.266405	42.46386*** 12.70174***	0.0000 0.0004	29.76212*** 12.70174***	0.0001 0.0004
OILC **GDP [1]**	H0: r=0 H1: r≤1	0.278929 0.035741	15.26335* 1.528588	0.0542 0.2163	13.73476* 1.528588	0.0605 0.2163
BRENT PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.028067 0.022076	8.939286 3.928902**	0.3710 0.0475	5.010384 3.928902**	0.7405 0.0475
WTI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.030437 0.024106	9.734700 4.294572**	0.3017 0.0382	5.440127 4.294572**	0.6856 0.0382
DUBAI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.026193 0.019714	8.175615 3.504231*	0.4468 0.0612	4.671384 3.504231*	0.7826 0.0612
HH PRICE **M2 [5]**	H0: r=0 H1: r≤1	0.065846 0.013085	14.14352* 2.291736	0.0791 0.1301	11.85178 2.291736	0.1163 0.1301
LNG PRICE	H0: r=0	0.051624	12.65078	0.1283	9.222783	0.2681

M2 [5]	H1: r≤1	0.019508	3.427995*	0.0641	3.427995*	0.0641
RUS PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.035254 0.020183	9.680130 3.507055*	0.3062 0.0611	6.173075 3.507055*	0.5911 0.0611
BRENT PRICE **SI [2]**	H0: r=0 H1: r≤1	0.032032 0.025222	10.28409 4.521573**	0.2595 0.0335	5.762516 4.521573**	0.6439 0.0335
WTI PRICE **SI [2]**	H0: r=0 H1: r≤1	0.032064 0.028816	10.94378 5.175442**	0.2150 0.0229	5.768340 5.175442**	0.6431 0.0229
DUBAI PRICE **SI [2]**	H0: r=0 H1: r≤1	0.032340 0.026794	10.62603 4.807169**	0.2356 0.0283	5.818857 4.807169**	0.6366 0.0283
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.062179 0.025192	15.87890** 4.516098**	0.0438 0.0336	11.36280 4.516098**	0.1369 0.0336
LNG PRICE **SI [3]**	H0: r=0 H1: r≤1	0.034680 0.010855	8.132881 1.920873	0.4513 0.1658	6.212008 1.920873	0.5861 0.1658
RUS PRICE **SI [4]**	H0: r=0 H1: r≤1	0.042381 0.007166	8.837158 1.258645	0.3807 0.2619	7.578513 1.258645	0.4232 0.2619
BRENT PRICE **IP [4]**	H0: r=0 H1: r≤1	0.055811 0.015227	14.48184 3.053470*	0.0706 0.0806	11.42837 3.053470*	0.1340 0.0806
WTI PRICE **IP [4]**	H0: r=0 H1: r≤1	0.054504 0.018216	14.81148 3.658349*	0.0632 0.0558	11.15313 3.658349*	0.1467 0.0558
DUBAI PRICE **IP [4]**	H0: r=0 H1: r≤1	0.055215 0.016217	14.55641* 3.253542*	0.0689 0.0713	11.30287 3.253542*	0.1397 0.0713
HH PRICE **IP [2]**	H0: r=0 H1: r≤1	0.074094 0.032276	22.06801*** 6.594424**	0.0044 0.0102	15.47359** 6.594424**	0.0320 0.0102
LNG PRICE **IP [3]**	H0: r=0 H1: r≤1	0.058539 0.007676	13.60572* 1.541192	0.0944 0.2144	12.06453 1.541192	0.1082 0.2144
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.042508 0.014713	11.59392 2.949723*	0.1775 0.0859	8.644201 2.949723*	0.3170 0.0859
SI **IP [2]**	H0: r=0 H1: r≤1	0.064727 0.034324	18.02633** 6.182142**	0.0203 0.0129	11.84419 6.182142**	0.1166 0.0129

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 244 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	6.424* 8.294**	0.092 0.040	3	EC↔GDP
BRENT does not granger cause M2 M2 does not granger cause BRENT	3.607 4.640	0.307 0.200	3	No causal relation
WTI does not granger cause M2 M2 does not granger cause WTI	4.153 4.563	0.245 0.206	3	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	3.121 4.736	0.373 0.192	3	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	9.573* 14.185**	0.088 0.014	5	LNG↔M2
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	6.033 18.358*	0.535 0.010	7	M2→RUSSIA
BRENT does not granger cause SI SI does not granger cause BRENT	0.645 5.954*	0.724 0.050	2	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	0.571 2.706	0.751 0.258	2	No causal relation
DUBAI does not granger cause SI SI does not granger cause DUBAI	0.690 5.607*	0.707 0.060	2	SI→DUBAI
LNG does not granger cause SI SI does not granger cause LNG	1.924 19.579***	0.588 0.000	3	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	3.306 5.792	0.507 0.215	4	No causal relation
BRENT does not granger cause IP IP does not granger cause BRENT	24.887*** 1.661	0.000 0.797	4	BRENT→IP

WTI does not granger cause IP IP does not granger cause WTI	31.068*** 1.936	0.000 0.747	4	WTI→IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	2.090 35.237***	0.719 0.000	4	IP→RUSSIA

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 245 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
NGC does not granger cause GDP GDP does not granger cause NGC	1.326 1.120	0.515 0.571	2	No causal relation
OILC does not granger cause GDP GDP does not granger cause OILC	0.348 0.014	0.554 0.904	1	No causal relation
HH does not granger cause M2 M2 does not granger cause HH	3.062 8.862	0.690 0.114	5	No causal relation
HH does not granger cause SI SI does not granger cause HH	0.019 1.358	0.990 0.507	2	No causal relation
DUBAI does not granger cause IP IP does not granger cause DUBAI	26.458*** 2.664	0.000 0.615	4	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	1.005 1.614	0.604 0.446	2	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	19.451*** 2.758	0.000 0.430	3	LNG→IP
SI does not granger cause IP IP does not granger cause SI	1.100 2.205	0.576 0.332	2	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

KOREA

UNIT ROOT TEST RESULTS

Table 246 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-2.562 [0] (0.110)	-0.689 [0] (0.966)	-5.187 [0]*** (0.000)	-5.902 [0]*** (0.000)
LN(GDP)	-2.761 [0]* (0.073)	-0.646 [0] (0.969)	-4.850 [0]*** (0.000)	-5.438 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-2.535 [2] (0.115)	-0.721 [2] (0.963)	-5.240 [3]*** (0.000)	-0.903 [2]*** (0.000)
LN(GDP)	-2.715 [2]* (0.081)	-0.701 [2] (0.965)	-4.850 [0]*** (0.000)	-5.428 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.710 [5]**	0.168 [5]**	0.454 [3]*	0.091 [2]
LN(GDP)	0.718 [5]**	0.182 [5]**	0.541 [2]**	0.072 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 247 NG Consumption and GDP (1986-2013) –Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-5.822 [0]*** (0.000)	-13.848 [0]*** (0.000)	-31.810 [0]*** (0.000)	-31.620 [0]*** (0.000)
LN(GDP)	-3.506 [0]** (0.015)	-2.330 [0] (0.404)	-4.657 [0]*** (0.001)	-5.848 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-5.081 [2]*** (0.000)	-9.180 [3]*** (0.000)	-27.790 [2]*** (0.000)	-31.620 [0]*** (0.000)
LN(GDP)	-11.125 [26]*** (0.000)	-2.742 [10] (0.228)	-4.659 [2]*** (0.001)	-8.458 [12]*** (0.000)

	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.662 [4]**	0.198 [3]**	0.422 [0]*	0.117 [1]
LN(GDP)	0.670 [4]**	0.180 [4]**	0.730 [0]**	0.273 [16]***

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 248 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-2.067 [2] (0.258)	-1.660 [2] (0.750)	-1.987 [1] (0.291)	-2.550 [1]*** (0.303)
LN(GDP)	-3.261 [0]** (0.023)	-0.993 [0] (0.000)	-5.138 [0]*** (0.000)	-6.241 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(OIL)	-2.361 [4] (0.158)	-0.731 [4] (0.964)	-4.054 [3]*** (0.002)	-4.796 [3]*** (0.002)
LN(GDP)	-3.324 [2]** (0.019)	-0.020 [3] (0.995)	-5.138 [2]*** (0.995)	-6.265 [4]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(OIL)	0.789 [5]***	0.172 [5]**	0.405 [4]*	0.076 [4]
LN(GDP)	0.833 [5]***	0.209 [5]**	0.663 [3]**	0.087 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 249 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-1.105 [0] (0.713)	-0.417 [0] (0.986)	-12.030 [0]*** (0.000)	-12.085 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-0.877 [8] (0.793)	-0.980 [8] (0.943)	-12.745 [8]*** (0.000)	-12.640 [7]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.739 [10]***	0.192 [10]**	0.210 [8]	0.151 [8]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 250 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3]	-3.430 [2]**	-3.724 [0]***	-3.720 [2]**

	(0.346)	(0.050)	(0.004)	(0.0234)
LN(M2)	-1.105 [0] (0.713)	-0.417 [0] (0.986)	-12.030 [0]*** (0.000)	-12.085 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-0.877 [8] (0.793)	-0.980 [8] (0.943)	-12.745 [8]*** (0.000)	-12.640 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.739 [10]***	0.192 [10]**	0.210 [8]	0.151 [8]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 251 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.087 [1] (0.720)	-3.154 [1]* (0.097)	-9.497 [0]*** (0.000)	-9.471 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-0.915 [5] (0.781)	-3.063 [5] (0.118)	-9.497 [0]*** (0.000)	-9.471 [0]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	1.530 [10]***	0.188 [10]**	0.093 [4]	0.092 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 252 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.087 [1] (0.720)	-3.154 [1]* (0.097)	-9.497 [0]*** (0.000)	-9.471 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)

LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-0.915 [5] (0.781)	-3.063 [5] (0.118)	-9.497 [0]*** (0.000)	-9.471 [0]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	1.530 [10]***	0.188 [10]**	0.093 [4]	0.092 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 253 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-2.019 [0] (0.278)	-2.360 [0] (0.399)	-13.549 [0]*** (0.000)	-13.669 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-2.017 [5] (0.279)	-2.482 [3] (0.336)	-13.554 [4]*** (0.000)	-13.656 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.739 [11]***	0.253 [10]***	0.215 [3]	0.028 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 254 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-2.019 [0] (0.278)	-2.360 [0] (0.399)	-13.549 [0]*** (0.000)	-13.669 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-2.017 [5] (0.279)	-2.482 [3] (0.336)	-13.554 [4]*** (0.000)	-13.656 [6]*** (0.000)

	KPSS (Level)		KPSS (First Difference)	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.739 [11]***	0.253 [10]***	0.215 [3]	0.028 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 255 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC **GDP [1]**	H0: r=0 H1: r≤1	0.183591 0.036468	8.399653 1.300250	0.4237 0.2542	7.099403 1.300250	0.4775 0.2542
OILC **GDP [3]**	H0: r=0 H1: r≤1	0.357867 0.116511	22.67350*** 4.955077**	0.0035 0.0260	17.71842** 4.955077**	0.0137 0.0260
BRENT PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.037383 0.008926	8.330679 1.586950	0.4307 0.2078	6.743729 1.586950	0.5199 0.2078
WTI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.053828 0.007727	11.10359 1.365292	0.2052 0.2426	9.738297 1.365292	0.2297 0.2426
DUBAI PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.045123 0.009194	9.807459 1.634896	0.2958 0.2010	8.172563 1.634896	0.3614 0.2010
HH PRICE **M2 [1]**	H0: r=0 H1: r≤1	0.052495 0.009592	11.31388 1.715560	0.1929 0.1903	9.598319 1.715560	0.2397 0.1903
LNG PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.061331 0.003761	11.80267 0.663129	0.1666 0.4155	11.13954 0.663129	0.1474 0.4155
RUS PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.080025 0.004697	15.15609* 0.809863	0.0562 0.3682	14.34623** 0.809863	0.0485 0.3682
BRENT PRICE **SI [3]**	H0: r=0 H1: r≤1	0.121209 0.008277	24.20348*** 1.462843	0.0019 0.2265	22.74063*** 1.462843	0.0018 0.2265
WTI PRICE **SI [3]**	H0: r=0 H1: r≤1	0.116211 0.007904	23.13914*** 1.396703	0.0029 0.2373	21.74243*** 1.396703	0.0028 0.2373
DUBAI PRICE **SI [7]**	H0: r=0 H1: r≤1	0.108951 0.010386	21.63693*** 1.795779	0.0052 0.1802	19.84115*** 1.795779	0.0059 0.1802
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.042638 0.004909	8.583444 0.870955	0.4053 0.3507	7.712489 0.870955	0.4087 0.3507
LNG PRICE **SI [5]**	H0: r=0 H1: r≤1	0.049608 0.003967	9.544988 0.691717	0.3174 0.4056	8.853270 0.691717	0.2986 0.4056
RUS PRICE **SI [4]**	H0: r=0 H1: r≤1	0.177625 0.005845	35.24850*** 1.025812	0.0000 0.3111	34.22269*** 1.025812	0.0000 0.3111
BRENT PRICE **IP [2]**	H0: r=0 H1: r≤1	0.075281 0.017999	19.38211** 3.650671*	0.0123 0.0560	15.73143** 3.650671*	0.0291 0.0560
WTI PRICE **IP [2]**	H0: r=0 H1: r≤1	0.081932 0.017695	20.77081*** 3.588497*	0.0073 0.0582	17.18232** 3.588497*	0.0168 0.0582
DUBAI PRICE **IP [2]**	H0: r=0 H1: r≤1	0.079224 0.018868	20.41888*** 3.828709*	0.0083 0.0504	16.59017** 3.828709*	0.0211 0.0504
HH PRICE **IP [1]**	H0: r=0 H1: r≤1	0.048814 0.009464	12.02995 1.920737	0.1555 0.1658	10.10921 1.920737	0.2049 0.1658
LNG PRICE **IP [2]**	H0: r=0 H1: r≤1	0.069835 0.030845	20.84849*** 6.297398**	0.0071 0.0121	14.55109** 6.297398**	0.0450 0.0121
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.085663 0.036408	25.20203*** .380345***	0.0013 0.0066	17.82168** 7.380345***	0.0131 0.0066
SI **IP [2]**	H0: r=0 H1: r≤1	0.086970 0.006097	17.18695** 1.082423	0.0276 0.2982	16.10453** 1.082423	0.0253 0.2982

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 256 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation

EC does not granger cause GDP GDP does not granger cause EC	2.111 3.919**	0.146 0.047	1	GDP→EC
BRENT does not granger cause M2 M2 does not granger cause BRENT	4.874* 2.425	0.087 0.297	2	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	5.900 5.119	0.116 0.163	3	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	5.278* 2.855	0.071 0.239	2	DUBAI→M2
HH does not granger cause M2 M2 does not granger cause HH	1.962 1.954	0.161 0.162	1	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	2.761 9.185**	0.429 0.026	3	M2→LNG
HH does not granger cause SI SI does not granger cause HH	0.091 0.349	0.955 0.839	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	13.013** 30.526***	0.023 0.000	5	LNG↔SI
HH does not granger cause IP IP does not granger cause HH	1.331 0.095	0.248 0.756	1	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 257 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
OILC does not granger cause GDP GDP does not granger cause OILC	2.015 5.991	0.569 0.112	3	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	9.012 20.815***	0.251 0.004	7	M2→RUSSIA
BRENT does not granger cause SI SI does not granger cause BRENT	3.315 4.285	0.345 0.232	3	No causal relation
WTI does not granger cause SI SI does not granger cause WTI	3.154 0.888	0.368 0.828	3	No causal relation
DUBAI does not granger cause SI SI does not granger cause DUBAI	18.045** 15.167**	0.011 0.033	7	DUBAI↔SI
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	8.150* 9.447*	0.086 0.050	4	RUSSIA↔SI
BRENT does not granger cause IP IP does not granger cause BRENT	16.450*** 0.501	0.000 0.778	2	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	14.659*** 1.226	0.000 0.541	2	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	19.345*** 0.222	0.000 0.894	2	DUBAI→IP
LNG does not granger cause IP IP does not granger cause LNG	7.371** 5.082*	0.025 0.078	2	LNG↔IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	7.422 23.032***	0.115 0.000	4	IP→RUSSIA
SI does not granger cause IP IP does not granger cause SI	13.908*** 0.802	0.001 0.669	2	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

LUXEMBOURG

UNIT ROOT TEST RESULTS

Table 258 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-2.688 [1]* (0.086)	-2.624 [1] (0.272)	-4.283 [0]*** (0.001)	-4.285 [0]*** (0.009)
LN(GDP)	-1.194 [0] (0.666)	-0.342 [0] (0.986)	-4.213 [0]*** (0.002)	-4.325 [0]*** (0.008)
	PP (Level)		**PP (First Difference)**	

LN(EC)	-2.101 [1] (0.245)	-2.010 [1] (0.575)	-4.283 [0]*** (0.001)	-4.267 [1]*** (0.009)
LN(GDP)	-1.061 [3] (0.720)	-1.032 [3] (0.926)	-4.244 [2]*** (0.002)	-4.342 [2]*** (0.007)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.285 [4]	0.107 [4]	0.094 [2]	0.064 [1]
LN(GDP)	0.703 [5]**	0.136 [4]*	0.195 [3]	0.121 [3]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 259 Oil Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-1.025 [1] (0.743)	-2.142 [1] (0.518)	-17.577 [0]*** (0.000)	-17.528 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.128 [14] (0.704)	-2.453 [5] (0.350)	-18.220 [12]*** (0.000)	-18.161 [12]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.506 [10]***	1.166 [10]**	0.072 [18]	0.064 [18]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 260 NG Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-1.025 [1] (0.743)	-2.142 [1] (0.518)	-17.577 [0]*** (0.000)	-17.528 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-1.128 [14] (0.704)	-2.453 [5] (0.350)	-18.220 [12]*** (0.000)	-18.161 [12]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]

LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.506 [10]***	1.166 [10]**	0.072 [18]	0.064 [18]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 261 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-2.144 [1] (0.227)	-2.268 [1] (0.448)	-9.383 [0]*** (0.000)	-9.382 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-2.008 [7] (0.283)	-2.041 [6] (0.574)	-9.402 [4]*** (0.000)	-9.394 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.194 [10]	0.142 [10]*	0.069 [6]	0.067 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 262 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-2.144 [1] (0.227)	-2.268 [1] (0.448)	-9.383 [0]*** (0.000)	-9.382 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-2.008 [7] (0.283)	-2.041 [6] (0.574)	-9.402 [4]*** (0.000)	-9.394 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.194 [10]	0.142 [10]*	0.069 [6]	0.067 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 263 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-2.123 [1] (0.235)	-2.098 [1] (0.542)	-18.423 [0]*** (0.000)	-18.379 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-2.493 [5] (0.118)	-2.468 [5] (0.343)	-18.491 [4]*** (0.000)	-18.455 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	0.360 [11]*	0.351 [11]***	0.078 [1]	0.058 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 264 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-2.123 [1] (0.235)	-2.098 [1] (0.542)	-18.423 [0]*** (0.000)	-18.379 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-2.493 [5] (0.118)	-2.468 [5] (0.343)	-18.491 [4]*** (0.000)	-18.455 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	0.360 [11]*	0.351 [11]***	0.078 [1]	0.058 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 265 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-2.144 [1] (0.227)	-2.268 [1] (0.448)	-9.383 [0]*** (0.000)	-9.382 [0]*** (0.000)
LN(IP)	-2.153 [1] (0.224)	-2.317 [1] (0.422)	-16.411 [0]*** (0.000)	-16.367 [0]*** (0.000)

	PP (Level)		PP (First Difference)	
LN(SI)	-2.008 [7] (0.283)	-2.041 [6] (0.574)	-9.402 [4]*** (0.000)	-9.394 [4]*** (0.000)
LN(IP)	-2.338 [4] (0.161)	-2.456 [4] (0.349)	-16.512 [3]*** (0.000)	-16.700 [0]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.194 [10]	0.142 [10]*	0.069 [6]	0.067 [6]
LN(IP)	0.447 [10]*	0.285 [10]***	0.075 [1]	0.072 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 266 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [1]	H0: r=0 H1: r≤1	0.271416 0.096572	14.63736* 3.554547*	0.0670 0.0594	11.08281 3.554547*	0.1501 0.0594
BRENT PRICE M2 [2]	H0: r=0 H1: r≤1	0.058018 0.014307	13.12983 2.550657	0.1101 0.1102	10.57917 2.550657	0.1766 0.1102
WTI PRICE M2 [2]	H0: r=0 H1: r≤1	0.065659 0.013925	14.50268* 2.481967	0.0701 0.1152	12.02071 2.481967	0.1099 0.1152
DUBAI PRICE M2 [2]	H0: r=0 H1: r≤1	0.052830 0.013865	12.07836 2.471353	0.1532 0.1159	9.607009 2.471353	0.2390 0.1159
HH PRICE M2 [2]	H0: r=0 H1: r≤1	0.047697 0.007144	9.919469 1.269094	0.2870 0.2599	8.650375 1.269094	0.3164 0.2599
LNG PRICE M2 [2]	H0: r=0 H1: r≤1	0.051900 0.004082	10.15723 0.723996	0.2688 0.3948	9.433239 0.723996	0.2519 0.3948
RUS PRICE M2 [5]	H0: r=0 H1: r≤1	0.081864 0.003791	15.52231** 0.660950	0.0495 0.4162	14.86136** 0.660950	0.0402 0.4162
BRENT PRICE SI [6]	H0: r=0 H1: r≤1	0.039356 0.012933	9.198165 2.252057	0.3474 0.1334	6.946108 2.252057	0.4955 0.1334
WTI PRICE SI [6]	H0: r=0 H1: r≤1	0.040266 0.015586	9.827846 2.717668*	0.2942 0.0992	7.110178 2.717668*	0.4762 0.0992
DUBAI PRICE SI [6]	H0: r=0 H1: r≤1	0.040671 0.011670	9.214002 2.030861	0.3460 0.1541	7.183140 2.030861	0.4677 0.1541
HH PRICE SI [2]	H0: r=0 H1: r≤1	0.053827 0.022575	13.83493* 4.041586**	0.0876 0.0444	9.793339 4.041586**	0.2259 0.0444
LNG PRICE SI [4]	H0: r=0 H1: r≤1	0.026859 0.008589	6.274309 1.509650	0.6631 0.2192	4.764659 1.509650	0.7712 0.2192
RUS PRICE SI [7]	H0: r=0 H1: r≤1	0.042514 0.012167	9.577955 2.105597	0.3146 0.1468	7.472358 2.105597	0.4349 0.1468
BRENT PRICE IP [2]	H0: r=0 H1: r≤1	0.030131 0.014744	9.135079 2.985627*	0.3530 0.0840	6.149451 2.985627*	0.5941 0.0840
WTI PRICE IP [3]	H0: r=0 H1: r≤1	0.034025 0.013518	9.645608 2.722043*	0.3090 0.0990	6.923565 2.722043*	0.4982 0.0990
DUBAI PRICE IP [2]	H0: r=0 H1: r≤1	0.031054 0.014733	9.324118 2.983383*	0.3363 0.0841	6.340736 2.983383*	0.5699 0.0841
HH PRICE IP [2]	H0: r=0 H1: r≤1	0.099549 0.023548	25.86646*** 4.789784**	0.0010 0.0286	21.07667*** 4.789784**	0.0036 0.0286
LNG PRICE IP [2]	H0: r=0 H1: r≤1	0.027764 0.007569	7.186491 1.527089	0.5561 0.2165	5.659402 1.527089	0.6572 0.2165
RUS PRICE IP [7]	H0: r=0 H1: r≤1	0.031229 0.009868	8.162314 1.943749	0.4482 0.1633	6.218565 1.943749	0.5853 0.1633
SI IP [2]	H0: r=0 H1: r≤1	0.031659 0.022490	9.720512 4.026205**	0.3029 0.0448	5.694307 4.026205**	0.6527 0.0448

**Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level.
MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. ***, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 267 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	11.188*** 0.465	0.003 0.792	2	BRENT→M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	10.918*** 0.339	0.004 0.843	2	DUBAI→M2
HH does not granger cause M2 M2 does not granger cause HH	0.699 5.495*	0.704 0.064	2	M2→HH
LNG does not granger cause M2 M2 does not granger cause LNG	6.518** 2.296	0.038 0.317	2	LNG→M2
BRENT does not granger cause SI SI does not granger cause BRENT	9.998 34.389***	0.124 0.000	6	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	8.859 29.970***	0.181 0.000	6	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	11.081 37.284***	0.085 0.000	6	SI→DUBAI
LNG does not granger cause SI SI does not granger cause LNG	4.840 25.959***	0.304 0.000	4	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	5.030 19.801***	0.656 0.006	7	SI→RUSSIA
BRENT does not granger cause IP IP does not granger cause BRENT	26.618*** 0.428	0.000 0.807	2	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	16.637*** 3.754	0.000 0.289	3	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	21.071*** 0.311	0.000 0.855	2	DUBAI→IP
LNG does not granger cause IP IP does not granger cause LNG	1.925 3.297	0.381 0.192	2	No causal relation
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	11.155 32.086***	0.132 0.000	7	IP→RUSSIA
SI does not granger cause IP IP does not granger cause SI	8.256** 0.932	0.016 0.627	2	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 268 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	1.695 0.654	0.192 0.418	1	No causal relation
WTI does not granger cause M2 M2 does not granger cause WTI	0.838 0.675	0.657 0.713	2	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	5.644 5.079	0.342 0.406	5	No causal relation
HH does not granger cause SI SI does not granger cause HH	2.231 0.386	0.327 0.824	2	No causal relation
HH does not granger cause IP IP does not granger cause HH	2.242 0.544	0.326 0.761	2	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

MEXICO

UNIT ROOT TEST RESULTS

Table 269 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-3.949 [0]*** (0.004)	-3.421 [0]* (0.064)	-4.325 [0]*** (0.001)	-4.548 [0]*** (0.004)
LN(GDP)	-1.543 [0] (0.500)	-2.507 [0] (0.323)	-4.769 [0]*** (0.000)	-4.723 [0]*** (0.003)
	PP (Level)		**PP (First Difference)**	

LN(EC)	-3.854 [1]*** (0.005)	-3.421 [0]* (0.064)	-4.368 [3]*** (0.001)	-4.625 [3]*** (0.003)
LN(GDP)	-1.565 [2] (0.489)	-2.668 [1] (0.254)	-4.714 [3]*** (0.000)	-4.662 [3]*** (0.003)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.616 [4]**	0.125 [4]*	0.286 [3]	0.127 [3]*
LN(GDP)	0.693 [5]**	0.067 [3]	0.078 [2]	0.065 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 270 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(NG)	-0.910 [0] (0.775)	-2.553 [3] (0.302)	-4.495 [0]*** (0.000)	-4.475 [0]*** (0.004)
LN(GDP)	-1.909 [0] (0.325)	-3.237 [1]* (0.091)	-5.151 [0]*** (0.000)	-5.237 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-0.876 [3] (0.786)	-2.015 [3] (0.576)	-4.456 [2]*** (0.000)	-4.437 [2]*** (0.005)
LN(GDP)	-1.884 [3] (0.336)	-2.568 [2] (0.295)	-5.102 [3]*** (0.000)	-5.162 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.812 [5]***	0.088 [5]	0.098 [3]	0.084 [3]
LN(GDP)	0.785 [5]***	0.105 [4]	0.155 [1]	0.073 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 271 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(OIL)	-5.994 [0]*** (0.000)	-2.125 [0] (0.517)	-4.443 [0]*** (0.000)	-7.289 [0]*** (0.000)
LN(GDP)	-1.909 [0] (0.325)	-3.237 [1]* (0.091)	-5.151 [0]*** (0.000)	-5.237 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-12.783 [12]*** (0.000)	-4.121 [14]** (0.011)	-4.559 [3]*** (0.000)	-7.289 [0]*** (0.000)
LN(GDP)	-1.884 [3] (0.336)	-2.568 [2] (0.295)	-5.102 [3]*** (0.000)	-5.162 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.747 [5]***	0.210 [5]**	0.766 [4]***	0.130 [3]*
LN(GDP)	0.785 [5]***	0.105 [4]	0.155 [1]	0.073 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 272 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-1.721 [0] (0.418)	-2.483 [0] (0.335)	-13.156 [0]*** (0.000)	-13.296 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)

LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-2.312 [10] (0.169)	-2.359 [6] (0.399)	-13.350 [8]*** (0.000)	-14.010 [10]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.740 [10]***	0.385 [10]***	0.349 [7]*	0.037 [10]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 273 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-1.721 [0] (0.418)	-2.483 [0] (0.335)	-13.156 [0]*** (0.000)	-13.296 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-2.312 [10] (0.169)	-2.359 [6] (0.399)	-13.350 [8]*** (0.000)	-14.010 [10]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.740 [10]***	0.385 [10]***	0.349 [7]*	0.037 [10]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 274 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-0.697 [1] (0.843)	-1.668 [1] (0.761)	-10.990 [0]*** (0.000)	-10.961 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-0.757 [6]	-1.644 [6]	-11.069 [5]***	-11.040 [5]***

	(0.828)	(0.771)	(0.000)	(0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	1.613 [10]***	0.247 [10]***	0.125 [6]	0.111 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 275 NG Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-0.697 [1] (0.843)	-1.668 [1] (0.761)	-10.990 [0]*** (0.000)	-10.961 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-0.757 [6] (0.828)	-1.644 [6] (0.771)	-11.069 [5]*** (0.000)	-11.040 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	1.613 [10]***	0.247 [10]***	0.125 [6]	0.111 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 276 Oil Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-1.018 [1] (0.746)	-2.026 [1] (0.583)	-17.358 [0]*** (0.000)	-17.321 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-1.421 [8] (0.571)	-2.798 [8] (0.199)	-17.000 [8]*** (0.000)	-16.969 [8]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.631 [11]***	0.112 [11]	0.076 [8]	0.047 [8]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 277 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-1.018 [1] (0.746)	-2.026 [1] (0.583)	-17.358 [0]*** (0.000)	-17.321 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-1.421 [8] (0.571)	-2.798 [8] (0.199)	-17.000 [8]*** (0.000)	-16.969 [8]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.631 [11]***	0.112 [11]	0.076 [8]	0.047 [8]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 278 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-0.697 [1] (0.843)	-1.668 [1] (0.761)	-10.990 [0]*** (0.000)	-10.961 [0]*** (0.000)
LN(IP)	-0.509 [1] (0.868)	-1.806 [1] (0.697)	-16.157 [0]*** (0.000)	-16.114 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-0.757 [6] (0.828)	-1.644 [6] (0.771)	-11.069 [5]*** (0.000)	-11.040 [5]*** (0.000)
LN(IP)	-0.860 [8] (0.798)	-2.325 [8] (0.417)	-15.868 [8]*** (0.000)	-15.831 [8]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	1.613 [10]***	0.247 [10]***	0.125 [6]	0.111 [6]
LN(IP)	1.471 [10]***	0.113 [10]	0.056 [7]	0.056 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 279 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
NGC GDP [3]	H0: r=0 H1: r≤1	0.341071 0.009203	17.05539** 0.369821	0.0289 0.5431	16.68557** 0.369821	0.0203 0.5431
BRENT PRICE M2 [3]	H0: r=0 H1: r≤1	0.072231 0.035244	19.51010** 6.314971**	0.0117 0.0120	13.19513* 6.314971**	0.0733 0.0120
WTI PRICE M2 [4]	H0: r=0 H1: r≤1	0.081301 0.033244	20.75610*** 5.916591**	0.0073 0.0150	14.83951** 5.916591**	0.0405 0.0150
DUBAI PRICE M2 [3]	H0: r=0 H1: r≤1	0.072231 0.035244	19.51010** 6.314971**	0.0117 0.0120	13.19513* 6.314971**	0.0733 0.0120

HH PRICE M2 [1]	H0: r=0 H1: r≤1	0.048865 0.017748	12.10512 3.187507*	0.1520 0.0742	8.917609 3.187507*	0.2931 0.0742
LNG PRICE M2 [3]	H0: r=0 H1: r≤1	0.093140 0.015590	19.97247*** 2.765539*	0.0099 0.0963	17.20693** 2.765539*	0.0166 0.0963
RUS PRICE M2 [5]	H0: r=0 H1: r≤1	0.066275 0.034701	18.07711** 6.145293**	0.0200 0.0132	11.93182 6.145293**	0.1132 0.0132
BRENT PRICE SI [2]	H0: r=0 H1: r≤1	0.075889 0.000650	14.08449* 0.115137	0.0806 0.7344	13.96936* 0.115137	0.0556 0.7344
WTI PRICE SI [2]	H0: r=0 H1: r≤1	0.090786 0.000822	16.99146** 0.145523	0.0296 0.7028	16.84594** 0.145523	0.0191 0.7028
DUBAI PRICE SI [2]	H0: r=0 H1: r≤1	0.084424 0.000510	15.70204** 0.090277	0.0465 0.7638	15.61176** 0.090277	0.0304 0.7638
HH PRICE SI [2]	H0: r=0 H1: r≤1	0.044939 0.002154	8.520199 0.381689	0.4116 0.5367	8.138510 0.381689	0.3648 0.5367
LNG PRICE SI [3]	H0: r=0 H1: r≤1	0.061022 0.005804	12.10600 1.024468	0.1519 0.3115	11.08153 1.024468	0.1502 0.3115
RUS PRICE SI [4]	H0: r=0 H1: r≤1	0.161952 0.009189	32.53441*** 1.615515	0.0001 0.2037	30.91889*** 1.615515	0.0001 0.2037
BRENT PRICE IP [2]	H0: r=0 H1: r≤1	0.044021 0.009287	10.92416 1.875350	0.2162 0.1709	9.048813 1.875350	0.2821 0.1709
WTI PRICE IP [2]	H0: r=0 H1: r≤1	0.051136 0.006249	11.81055 1.260023	0.1662 0.2616	10.55053 1.260023	0.1782 0.2616
DUBAI PRICE IP [2]	H0: r=0 H1: r≤1	0.049657 0.009404	12.13668 1.899224	0.1505 0.1682	10.23745 1.899224	0.1968 0.1682
HH PRICE IP [5]	H0: r=0 H1: r≤1	0.039119 0.004162	8.727027 0.825830	0.3912 0.3635	7.901197 0.825830	0.3888 0.3635
LNG PRICE IP [3]	H0: r=0 H1: r≤1	0.047516 0.004629	10.66445 0.927966	0.2330 0.3354	9.736487 0.927966	0.2298 0.3354
RUS PRICE IP [3]	H0: r=0 H1: r≤1	0.096638 0.003667	21.06112*** 0.734841	0.0065 0.3913	20.32628*** 0.734841	0.0049 0.3913
SI IP [5]	H0: r=0 H1: r≤1	0.033984 0.006122	7.084652 1.068589	0.5678 0.3013	6.016062 1.068589	0.6111 0.3013

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 280 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
HH does not granger cause M2 M2 does not granger cause HH	0.097 1.897	0.755 0.168	1	No causal relation
HH does not granger cause SI SI does not granger cause HH	0.150 0.680	0.927 0.711	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	3.885 23.275***	0.274 0.000	3	SI→LNG
BRENT does not granger cause IP IP does not granger cause BRENT	9.240*** 1.265	0.009 0.531	2	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	10.345*** 2.531	0.005 0.282	2	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	8.631** 1.736	0.013 0.419	2	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	6.521 7.418	0.258 0.191	5	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	20.443*** 9.733**	0.000 0.021	3	LNG→IP
SI does not granger cause IP IP does not granger cause SI	22.070*** 5.511	0.000 0.356	5	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 281 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
NGC does not granger cause GDP	7.446*	0.058	3	NGC→GDP

GDP does not granger cause NGC	0.840	0.839		
BRENT does not granger cause M2 M2 does not granger cause BRENT	44.283*** 4.198	0.000 0.240	3	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	35.821*** 7.091	0.000 0.131	4	WTI→M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	43.987*** 3.081	0.000 0.379	3	DUBAI→M2
LNG does not granger cause M2 M2 does not granger cause LNG	21.383*** 1.756	0.000 0.624	3	LNG→M2
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	7.038 23.343***	0.217 0.000	5	M2→RUSSIA
BRENT does not granger cause SI SI does not granger cause BRENT	0.252 1.059	0.881 0.588	2	No causal relation
WTI does not granger cause SI SI does not granger cause WTI	0.247 0.628	0.883 0.730	2	No causal relation
DUBAI does not granger cause SI SI does not granger cause DUBAI	0.134 1.508	0.935 0.470	2	No causal relation
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	9.994** 8.170*	0.040 0.085	4	RUSSIA↔SI
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	6.530* 0.786	0.088 0.852	3	RUSSIA→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

NETHERLANDS

UNIT ROOT TEST RESULTS

Table 282 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.950 [1] (0.306)	-2.589 [0] (0.286)	-6.294 [0]*** (0.000)	-6.243 [0]*** (0.000)
LN(GDP)	-0.333 [2] (0.909)	-3.334 [1]* (0.077)	-3.580 [2]** (0.011)	-3.534 [2]* (0.051)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-2.260 [1] (0.189)	-2.589 [0] (0.286)	-6.506 [6]*** (0.000)	-6.557 [7]*** (0.000)
LN(GDP)	-0.542 [2] (0.870)	-1.793 [1] (0.686)	-3.130 [8]** (0.033)	-3.052 [8]*** (0.133)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.472 [4]**	0.105 [3]	0.055 [3]	0.056 [3]
LN(GDP)	0.714 [5]**	0.110 [4]	0.090 [2]	0.089 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 283 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-7.880 [0]*** (0.000)	-7.091 [0]*** (0.000)	-4.968 [2]*** (0.000)	-5.263 [0]*** (0.000)
LN(GDP)	-1.204 [1] (0.663)	-1.921 [1] (0.625)	-3.779 [0]*** (0.006)	-3.885 [0]** (0.021)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-7.608 [1]*** (0.000)	-6.987 [4]*** (0.000)	-6.146 [15]*** (0.000)	-5.903 [11]*** (0.000)
LN(GDP)	-1.436 [2] (0.555)	-1.301 [2] (0.874)	-3.701 [3]*** (0.007)	-3.866 [2]** (0.022)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.667 [4]**	0.141 [3]*	0.414 [2]*	0.126 [2]*
LN(GDP)	0.830 [5]***	0.100 [4]	0.205 [2]	0.115 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 284 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-1.561 [1] (0.492)	-2.197 [2] (0.478)	-3.222 [2]** (0.025)	-3.208 [2]* (0.097)
LN(GDP)	-1.204 [1] (0.663)	-1.921 [1] (0.625)	-3.779 [0]*** (0.006)	-3.885 [0]** (0.021)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-1.421 [2] (0.563)	-1.868 [2] (0.653)	-5.396 [1]*** (0.000)	-5.304 [0]*** (0.000)
LN(GDP)	-1.436 [2] (0.555)	-1.301 [2] (0.874)	-3.701 [3]*** (0.007)	-3.866 [2]** (0.022)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.503 [5]**	0.144 [5]*	0.094 [1]	0.096 [1]
LN(GDP)	0.830 [5]***	0.100 [4]	0.205 [2]	0.115 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 285 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-2.819 [0]* (0.057)	-0.361 [0] (0.988)	-14.037 [0]*** (0.000)	-14.646 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-2.979 [4]** (0.038)	-0.124 [5] (0.994)	-14.022 [2]*** (0.000)	-14.740 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.658 [10]***	0.398 [10]***	0.893 [1]***	0.073 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 286 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-2.819 [0]* (0.057)	-0.361 [0] (0.988)	-14.037 [0]*** (0.000)	-14.646 [0]*** (0.000)

	PP (Level)		PP (First Difference)	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-2.979 [4]** (0.038)	-0.124 [5] (0.994)	-14.022 [2]*** (0.000)	-14.740 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.658 [10]***	0.398 [10]***	0.893 [1]***	0.073 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 287 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-2.394 [1] (0.144)	-2.078 [1] (0.553)	-10.320 [0]*** (0.000)	-10.396 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-2.320 [6] (0.166)	-2.033 [6] (0.578)	-10.334 [3]*** (0.000)	-10.345 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.497 [10]**	0.117 [10]	0.157 [6]	0.055 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 288 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-2.394 [1] (0.144)	-2.078 [1] (0.553)	-10.320 [0]*** (0.000)	-10.396 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9]	-2.142 [9]	-12.469 [8]***	-12.462 [8]***

	(0.545)	(0.518)	(0.000)	(0.000)
LN(SI)	-2.320 [6] (0.166)	-2.033 [6] (0.578)	-10.334 [3]*** (0.000)	-10.345 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.497 [10]**	0.117 [10]	0.157 [6]	0.055 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 289 Oil Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-2.363 [2] (0.153)	-4.760 [0]*** (0.000)	-13.282 [1]*** (0.000)	-13.293 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-2.565 [5] (0.101)	-4.638 [7]*** (0.001)	-21.125 [4]*** (0.000)	-21.474 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.389 [11]***	0.267 [10]***	0.060 [3]	0.016 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 290 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-2.363 [2] (0.153)	-4.760 [0]*** (0.000)	-13.282 [1]*** (0.000)	-13.293 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-2.565 [5] (0.101)	-4.638 [7]*** (0.001)	-21.125 [4]*** (0.000)	-21.474 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]

LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.389 [11]***	0.267 [10]***	0.060 [3]	0.016 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 291 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-2.394 [1] (0.144)	-2.078 [1] (0.553)	-10.320 [0]*** (0.000)	-10.396 [0]*** (0.000)
LN(IP)	-3.044 [1]** (0.032)	-5.308 [0]*** (0.000)	-12.939 [1]*** (0.000)	-12.915 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-2.320 [6] (0.166)	-2.033 [6] (0.578)	-10.334 [3]*** (0.000)	-10.345 [2]*** (0.000)
LN(IP)	-3.474 [5]*** (0.009)	-5.364 [6]*** (0.000)	-19.032 [6]*** (0.000)	-19.021 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.497 [10]**	0.117 [10]	0.157 [6]	0.055 [5]
LN(IP)	1.250 [10]***	0.166 [9]**	0.064 [7]	0.024 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 292 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [2]	H0: r=0 H1: r≤1	0.260301 0.001866	10.31491 0.063492	0.2573 0.8010	10.25142 0.063492	0.1959 0.8010
OILC GDP [2]	H0: r=0 H1: r≤1	0.169822 0.066315	10.44401 2.813264*	0.2481 0.0935	7.630743 2.813264*	0.4175 0.0935
BRENT PRICE M2 [2]	H0: r=0 H1: r≤1	0.068685 0.042959	20.36687*** 7.771925***	0.0085 0.0053	12.59495* 7.771925***	0.0903 0.0053
WTI PRICE M2 [3]	H0: r=0 H1: r≤1	0.076265 0.044752	22.02028*** 7.058109***	0.0045 0.0045	13.96218* 7.058109***	0.0557 0.0045
DUBAI PRICE M2 [2]	H0: r=0 H1: r≤1	0.079280 0.042836	22.36934*** 7.749182***	0.0039 0.0054	14.62016** 7.749182***	0.0439 0.0054
HH PRICE M2 [1]	H0: r=0 H1: r≤1	0.052637 0.043467	17.53522** 7.910325***	0.0243 0.0049	9.624896 7.910325***	0.2378 0.0049
LNG PRICE M2 [2]	H0: r=0 H1: r≤1	0.048401 0.040713	16.13820** 7.357007***	0.0400 0.0067	8.781191 7.357007***	0.3048 0.0067
RUS PRICE M2 [4]	H0: r=0 H1: r≤1	0.092784 0.042655	24.66893*** 7.628438***	0.0016 0.0057	17.04049** 7.628438***	0.0177 0.0057
BRENT PRICE SI [6]	H0: r=0 H1: r≤1	0.046344 0.022299	12.11068 3.901369**	0.1517 0.0482	8.209315 3.901369**	0.3578 0.0482
WTI PRICE SI [7]	H0: r=0 H1: r≤1	0.049648 0.022099	12.60244 3.843624**	0.1302 0.0499	8.758817 3.843624**	0.3068 0.0499
DUBAI PRICE SI [7]	H0: r=0 H1: r≤1	0.048757 0.020101	12.09013 3.492572*	0.1527 0.0616	8.597556 3.492572*	0.3212 0.0616
HH PRICE SI [2]	H0: r=0 H1: r≤1	0.049621 0.037057	15.69204** 6.683752***	0.0467 0.0097	9.008292 6.683752***	0.2855 0.0097
LNG PRICE SI [4]	H0: r=0 H1: r≤1	0.038561 0.016224	9.744158 2.862518*	0.3009 0.0907	6.881640 2.862518*	0.5032 0.0907
RUS PRICE SI [7]	H0: r=0 H1: r≤1	0.046673 0.019327	11.57788 3.356765*	0.1783 0.0669	8.221116 3.356765*	0.3567 0.0669
BRENT PRICE IP [2]	H0: r=0 H1: r≤1	0.094227 0.021088	24.17631*** 4.283979**	0.0019 0.0385	19.89233*** 4.283979**	0.0058 0.0385
WTI PRICE IP [3]	H0: r=0 H1: r≤1	0.081908 0.022938	21.73271*** 4.641083**	0.0050 0.0312	17.09163** 4.641083**	0.0174 0.0312
DUBAI PRICE IP [2]	H0: r=0 H1: r≤1	0.088480 0.023295	23.35884*** 4.737792**	0.0027 0.0295	18.62105*** 4.737792**	0.0096 0.0295
HH PRICE	H0: r=0	0.039958	13.72187*	0.0909	8.196347	0.3591

IP [2]	H1: r≤1	0.027116	5.525524**	0.0187	5.525524**	0.0187
LNG PRICE **IP [3]**	H0: r=0 H1: r≤1	0.039807 0.014583	11.06235 2.938065*	0.2077 0.0865	8.124285 2.938065*	0.3662 0.0865
RUS PRICE **IP [5]**	H0: r=0 H1: r≤1	0.088099 0.018786	22.01531*** 3.755026**	0.0045 0.0526	18.26029** 3.755026*	0.0111 0.0526

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 293 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	2.220 6.383**	0.329 0.041	2	GDP→EC
OILC does not granger cause GDP GDP does not granger cause OILC	5.599* 2.165	0.060 0.338	2	OILC→GDP
BRENT does not granger cause SI SI does not granger cause BRENT	8.931 27.867***	0.177 0.000	6	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	8.061 22.100***	0.327 0.002	7	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	7.086 23.821***	0.419 0.001	7	SI→DUBAI
LNG does not granger cause SI SI does not granger cause LNG	2.273 27.623***	0.685 0.000	4	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	4.538 21.906***	0.716 0.002	7	SI→RUSSIA
LNG does not granger cause IP IP does not granger cause LNG	6.001 6.205	0.111 0.102	3	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 294 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	2.177 1.397	0.336 0.497	2	No causal relation
WTI does not granger cause M2 M2 does not granger cause WTI	2.250 5.609	0.522 0.132	3	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	2.153 1.145	0.340 0.564	2	No causal relation
HH does not granger cause M2 M2 does not granger cause HH	3.195* 0.755	0.073 0.384	1	HH→M2
LNG does not granger cause M2 M2 does not granger cause LNG	2.043 0.673	0.360 0.714	2	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	3.660 1.330	0.453 0.856	4	No causal relation
HH does not granger cause SI SI does not granger cause HH	1.481 0.815	0.476 0.665	2	No causal relation
BRENT does not granger cause IP IP does not granger cause BRENT	2.181 1.732	0.335 0.420	2	No causal relation
WTI does not granger cause IP IP does not granger cause WTI	4.873 2.466	0.181 0.481	3	No causal relation
DUBAI does not granger cause IP IP does not granger cause DUBAI	2.328 2.706	0.312 0.258	2	No causal relation
HH does not granger cause IP IP does not granger cause HH	0.560 0.961	0.755 0.618	2	No causal relation
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	5.437 8.509	0.364 0.130	5	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

NEW ZEALAND

UNIT ROOT TEST RESULTS

Table 295 EC and GDP (1977-2012) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.100 [0] (0.704)	-0.919 [0] (0.942)	-4.912 [0]*** (0.000)	-5.016 [0]*** (0.001)
LN(GDP)	-0.437 [0] (0.891)	-1.658 [0] (0.748)	-4.926 [0]*** (0.000)	-4.853 [0]*** (0.002)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-1.115 [1] (0.698)	-1.125 [2] (0.909)	-4.882 [2]*** (0.000)	-5.006 [6]*** (0.001)
LN(GDP)	-0.465 [1] (0.886)	-1.806 [1] (0.679)	-4.958 [2]*** (0.000)	-4.887 [2]*** (0.002)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.577 [5]**	0.167 [5]**	0.181 [2]	0.130 [0]*
LN(GDP)	0.685 [5]**	0.106 [4]	0.080 [1]	0.080 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 296 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-1.615 [0] (0.464)	-1.165 [0] (0.902)	-4.001 [0]*** (0.003)	-4.101 [0]** (0.014)
LN(GDP)	-0.393 [0] (0.899)	-1.687 [0] (0.736)	-5.004 [0]*** (0.000)	-4.929 [0]*** (0.001)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-1.659 [1] (0.442)	-1.359 [1] (0.855)	-3.906 [4]*** (0.005)	-3.848 [9]** (0.025)
LN(GDP)	-0.422 [1] (0.894)	-1.838 [1] (0.665)	-5.035 [2]*** (0.000)	-4.963 [2]*** (0.001)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.423 [5]*	0.186 [4]**	0.193 [1]	0.064 [2]
LN(GDP)	0.705 [5]**	0.102 [4]	0.077 [1]	0.077 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 297 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-0.077 [0] (0.944)	-2.497 [0] (0.327)	-5.892 [0]*** (0.000)	-5.818 [0]*** (0.000)
LN(GDP)	-0.393 [0] (0.899)	-1.687 [0] (0.736)	-5.004 [0]*** (0.000)	-4.929 [0]*** (0.001)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-0.199 [3] (0.929)	-2.547 [3] (0.305)	-5.890 [2]*** (0.000)	-5.823 [2]*** (0.000)
LN(GDP)	-0.422 [1] (0.894)	-1.838 [1] (0.665)	-5.035 [2]*** (0.000)	-4.963 [2]*** (0.001)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.649 [5]**	0.109 [4]	0.224 [3]	0.188 [3]**
LN(GDP)	0.705 [5]**	0.102 [4]	0.077 [1]	0.077 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 298 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-0.397 [0] (0.982)	-2.380 [0] (0.388)	-12.137 [1]*** (0.000)	-12.146 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-0.766 [4] (0.993)	-1.940 [3] (0.628)	-15.604 [2]*** (0.000)	-15.610 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.688 [10]***	0.139 [10]*	0.159 [4]	0.074 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 299 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.397 [0] (0.982)	-2.380 [0] (0.388)	-12.137 [1]*** (0.000)	-12.146 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-0.766 [4] (0.993)	-1.940 [3] (0.628)	-15.604 [2]*** (0.000)	-15.610 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.688 [10]***	0.139 [10]*	0.159 [4]	0.074 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 300 Oil Prices and SI (2001-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.712 [1] (0.423)	-1.888 [1] (0.656)	-9.269 [0]*** (0.000)	-9.318 [0]*** (0.000)
LN(WTI)	-1.888 [1] (0.338)	-2.169 [1] (0.502)	-8.739 [0]*** (0.000)	-8.779 [0]*** (0.000)

LN(DUBAI)	-1.723 [1] (0.417)	-1.946 [1] (0.625)	-8.154 [0]*** (0.000)	-8.214 [0]*** (0.000)
LN(SI)	-1.471 [1] (0.545)	-1.494 [1] (0.827)	-9.783 [0]*** (0.000)	-9.756 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.736 [4] (0.410)	-1.824 [4] (0.688)	-9.302 [2]*** (0.000)	-9.349 [2]*** (0.000)
LN(WTI)	-1.785 [4] (0.386)	-2.099 [4] (0.541)	-8.803 [2]*** (0.000)	-8.843 [2]*** (0.000)
LN(DUBAI)	-1.755 [4] (0.401)	-1.788 [4] (0.706)	-8.221 [2]*** (0.000)	-8.281 [2]*** (0.000)
LN(SI)	-1.495 [6] (0.533)	-1.515 [6] (0.820)	-9.726 [4]*** (0.000)	-9.698 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.387 [10]***	0.241 [9]***	0.158 [3]	0.054 [3]
LN(WTI)	1.333 [10]***	0.274 [9]***	0.121 [4]	0.047 [4]
LN(DUBAI)	1.422 [10]***	0.252 [9]***	0.163 [4]	0.052 [4]
LN(SI)	0.173 [10]**	0.178 [10]**	0.135 [6]	0.136 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 301 NG Prices and SI (2001-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.324 [0] (0.165)	-2.337 [0] (0.411)	-12.404 [0]*** (0.000)	-12.357 [0]*** (0.000)
LN(LNG)	-0.818 [0] (0.811)	-3.643 [2]** (0.029)	-10.794 [0]*** (0.000)	-10.761 [0]*** (0.000)
LN(RUS)	-1.794 [3] (0.382)	-3.327 [3]** (0.065)	-3.613 [2]*** (0.006)	-3.605 [2]** (0.034)
LN(SI)	-1.471 [1] (0.545)	-1.494 [1] (0.827)	-9.783 [0]*** (0.000)	-9.756 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.688 [6]* (0.078)	-2.719 [6] (0.230)	-12.407 [3]*** (0.000)	-12.361 [3]*** (0.000)
LN(LNG)	-1.042 [4] (0.737)	-3.187 [5]* (0.090)	-10.922 [3]*** (0.000)	-10.891 [3]*** (0.000)
LN(RUS)	-1.251 [9] (0.651)	-2.147 [9] (0.515)	-11.925 [8]*** (0.000)	-11.899 [8]*** (0.000)
LN(SI)	-1.495 [6] (0.533)	-1.515 [6] (0.820)	-9.726 [4]*** (0.000)	-9.698 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.378 [10]*	0.247 [10]***	0.051 [4]	0.054 [4]
LN(LNG)	1.459 [10]***	0.061 [9]	0.038 [4]	0.038 [4]
LN(RUS)	1.262 [10]***	0.215 [10]**	0.074 [9]	0.068[9]
LN(SI)	0.173 [10]**	0.178 [10]**	0.135 [6]	0.136 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 302 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-2.386 [2] (0.146)	-2.460 [2] (0.347)	-6.496 [1]*** (0.000)	-6.519 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	

LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-1.928 [7] (0.318)	-1.968 [7] (0.614)	-9.504 [3]*** (0.000)	-9.446 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	0.876 [11]***	0.366 [11]***	0.101 [7]	0.049 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 303 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-2.386 [2] (0.146)	-2.460 [2] (0.347)	-6.496 [1]*** (0.000)	-6.519 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-1.928 [7] (0.318)	-1.968 [7] (0.614)	-9.504 [3]*** (0.000)	-9.446 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	0.876 [11]***	0.366 [11]***	0.101 [7]	0.049 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 304 SI and IP (2001-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-1.471 [1] (0.545)	-1.494 [1] (0.827)	-9.783 [0]*** (0.000)	-9.756 [0]*** (0.000)
LN(IP)	-3.350 [2]** (0.014)	-3.258 [2]* (0.077)	-5.878 [1]*** (0.000)	-5.914 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.495 [6] (0.533)	-1.515 [6] (0.820)	-9.726 [4]*** (0.000)	-9.698 [4]*** (0.000)
LN(IP)	-2.540 [6] (0.107)	-2.458 [6] (0.348)	-8.512 [3]*** (0.000)	-8.524 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.173 [10]**	0.178 [10]**	0.135 [6]	0.136 [6]
LN(IP)	0.260 [10]	0.241 [10]***	0.107 [6]	0.062 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 305 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC **GDP [3]**	H0: r=0 H1: r≤1	0.254250 0.073909	11.84472 2.457044	0.1645 0.1170	9.387674 2.457044	0.2553 0.1170
NGC **GDP [1]**	H0: r=0 H1: r≤1	0.123729 0.014516	5.134573 0.511779	0.7944 0.4744	4.622794 0.511779	0.7885 0.4744
OILC **GDP [2]**	H0: r=0 H1: r≤1	0.248176 0.003024	9.801576 0.102973	0.2963 0.7483	9.698603 0.102973	0.2325 0.7483
BRENT PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.030604 0.000964	5.608196 0.168850	0.7413 0.6811	5.439346 0.168850	0.6857 0.6811
WTI PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.034623 9.41E-05	6.182870 0.016476	0.6739 0.8977	6.166394 0.016476	0.5920 0.8977
DUBAI PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.027551 0.000695	5.010844 0.121682	0.8077 0.7272	4.889162 0.121682	0.7558 0.7272
HH PRICE **M2 [6]**	H0: r=0 H1: r≤1	0.056080 0.002821	10.47323 0.488789	0.2461 0.4845	9.984444 0.488789	0.2130 0.4845
LNG PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.105682 0.001721	19.96133*** 0.303222	0.0099 0.5819	19.65811*** 0.303222	0.0064 0.5819
RUS PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.043749 0.002773	8.314651 0.485984	0.4324 0.4857	7.828667 0.485984	0.3964 0.4857
BRENT PRICE **SI [2]**	H0: r=0 H1: r≤1	0.023632 0.006180	4.969060 1.022905	0.8121 0.3118	3.946155 1.022905	0.8650 0.3118
WTI PRICE **SI [3]**	H0: r=0 H1: r≤1	0.026732 0.011056	6.266996 1.823321	0.6640 0.1769	4.443675 1.823321	0.8098 0.17690
DUBAI PRICE **SI [2]**	H0: r=0 H1: r≤1	0.024130 0.006352	5.081607 1.051343	0.8001 0.3052	4.030264 1.051343	0.8561 0.3052
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.074542 0.010933	14.59588* 1.813900	0.0680 0.1780	12.78198* 1.813900	0.0846 0.1780
LNG PRICE **SI [3]**	H0: r=0 H1: r≤1	0.012071 0.008341	3.365435 1.373695	0.9479 0.2412	1.991740 1.373695	0.9909 0.2412
RUS PRICE **SI [4]**	H0: r=0 H1: r≤1	0.040041 0.006000	7.641813 0.980887	0.5045 0.3220	6.660926 0.980887	0.5300 0.3220
BRENT PRICE **IP [3]**	H0: r=0 H1: r≤1	0.028670 0.019586	9.773919 3.956154**	0.2985 0.0467	5.817765 3.956154**	0.6367 0.0467
WTI PRICE **IP [4]**	H0: r=0 H1: r≤1	0.026744 0.024131	10.25551 4.861058**	0.2616 0.0275	5.394454 4.861058**	0.6914 0.0275
DUBAI PRICE **IP [3]**	H0: r=0 H1: r≤1	0.028476 0.019372	9.690275 3.912491**	0.3053 0.0479	5.777784 3.912491**	0.6419 0.0479
HH PRICE **IP [3]**	H0: r=0 H1: r≤1	0.049558 0.025096	15.24888** 5.083235**	0.0544 0.0242	10.16564 5.083235**	0.2013 0.0242
LNG PRICE **IP [3]**	H0: r=0 H1: r≤1	0.027026 0.006718	6.827743 1.348184	0.5978 0.2456	5.479559 1.348184	0.6805 0.2456
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.032351 0.017670	10.09220 3.547812*	0.2737 0.0596	6.544384 3.547812*	0.5444 0.0596
SI **IP [3]**	H0: r=0 H1: r≤1	0.071328 0.012183	14.14623* 2.010238	0.0790 0.1562	12.13599 2.010238	0.1056 0.1562

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 306 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	5.647 5.098	0.130 0.164	3	No causal relation
NGC does not granger cause GDP GDP does not granger cause NGC	0.004 0.003	0.949 0.954	1	No causal relation
OILC does not granger cause GDP	7.972**	0.018	2	OILC→GDP

GDP does not granger cause OILC	2.907	0.233		
BRENT does not granger cause M2 M2 does not granger cause BRENT	16.889*** 8.591*	0.002 0.072	4	BRENT↔M2
WTI does not granger cause M2 M2 does not granger cause WTI	13.026** 8.232*	0.011 0.083	4	WTI↔M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	13.971*** 8.221*	0.007 0.083	4	DUBAI↔M2
HH does not granger cause M2 M2 does not granger cause HH	10.282 15.256**	0.113 0.018	6	M2→HH
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	6.239 6.571	0.182 0.160	4	No causal relation
BRENT does not granger cause SI SI does not granger cause BRENT	0.927 4.575	0.628 0.101	2	No causal relation
WTI does not granger cause SI SI does not granger cause WTI	2.185 3.410	0.534 0.332	3	No causal relation
DUBAI does not granger cause SI SI does not granger cause DUBAI	0.737 3.967	0.691 0.137	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	1.043 19.649***	0.790 0.000	3	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	6.243 9.334*	0.181 0.053	4	SI→RUSSIA
BRENT does not granger cause IP IP does not granger cause BRENT	5.946 4.340	0.114 0.226	3	No causal relation
WTI does not granger cause IP IP does not granger cause WTI	9.657** 10.563**	0.046 0.031	4	WTI↔IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	7.887** 2.198	0.048 0.532	3	DUBAI→IP
LNG does not granger cause IP IP does not granger cause LNG	3.287 6.838*	0.348 0.077	3	IP→LNG
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	4.598 21.350***	0.331 0.000	4	IP→RUSSIA

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 307 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
LNG does not granger cause M2 M2 does not granger cause LNG	12.669*** 8.103**	0.005 0.043	3	LNG↔M2
HH does not granger cause SI SI does not granger cause HH	0.068 0.013	0.966 0.993	2	No causal relation
HH does not granger cause IP IP does not granger cause HH	0.557 6.980*	0.906 0.072	3	IP→HH
SI does not granger cause IP IP does not granger cause SI	2.373 1.658	0.498 0.646	3	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

NORWAY

UNIT ROOT TEST RESULTS

Table 308 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-3.352 [8]** (0.021)	-4.021 [0]** (0.016)	-7.279 [0]*** (0.000)	-4.119 [7]*** (0.000)
LN(GDP)	-1.638 [1]	-1.005 [1]	-2.739 [0]*	-3.155 [0]

	(0.452)	(0.930)	(0.077)	(0.109)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-2.943 [9]* (0.050)	-3.827 [8]** (0.026)	-7.767 [17]*** (0.000)	-17.223 [29]*** (0.000)
LN(GDP)	-2.948 [1]** (0.049)	-2.592 [5] (0.104)	-2.592 [5] (0.104)	2.880 [6] (0.180)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.726 [5]**	0.282 [0]***	0.458 [12]*	0.284 [21]***
LN(GDP)	0.713 [5]**	0.164 [4]**	0.480 [3]**	0.161 [0]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 309 NG Consumption and GDP (1977-2013) -Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(NG)	-5.315 [0]*** (0.000)	-3.073 [0]*** (0.000)	-7.287 [0]*** (0.000)	-8.798 [0]*** (0.000)
LN(GDP)	-1.869 [1] (0.342)	-0.834 [1] (0.952)	-2.590 [0] (0.104)	-3.161 [0]*** (0.108)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-5.432 [2]*** (0.000)	-2.968 [3] (0.154)	-7.019 [3]*** (0.000)	-10.154 [4]*** (0.000)
LN(GDP)	-2.705 [1]* (0.083)	-0.104 [2] (0.992)	-2.398 [5] (0.149)	-2.769 [8] (0.217)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.682 [5]**	0.225 [4]***	0.677 [4]**	0.077 [1]
LN(GDP)	0.703 [5]**	0.173 [4]**	0.473 [3]**	0.160 [0]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 310 Oil Consumption and GDP (1970-2013)-Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(OIL)	-1.921 [0] (0.319)	-3.796 [0]** (0.026)	-7.331 [0]*** (0.000)	-7.249 [0]*** (0.000)
LN(GDP)	-2.814 [6]* (0.065)	-0.364 [2] (0.998)	-2.675 [0]* (0.086)	-4.457 [1]*** (0.005)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-1.840 [2] (0.356)	-3.835 [3]** (0.024)	-10.193 [7]*** (0.000)	-10.080 [7]*** (0.000)
LN(GDP)	-3.966 [1]*** (0.003)	-0.085 [1] (0.993)	-2.460 [6] (0.132)	-3.126 [8] (0.113)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.782 [5]***	0.072 [0]	0.126 [7]	0.122 [7]*
LN(GDP)	0.820 [5]***	0.189 [5]**	0.618 [4]**	0.084 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 311 Oil Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-0.743 [13] (0.831)	-2.441 [13] (0.356)	-1.831 [12] (0.364)	-1.854 [12] (0.673)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3]	-2.034 [4]	-10.408 [1]***	-10.432 [1]***

	(0.450)	(0.578)	(0.000)	(0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.579 [63] (0.490)	-1.755 [22] (0.722)	-14.986 [35]*** (0.000)	-15.711 [51]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.727 [10]***	0.273 [10]***	0.187 [42]	0.159 [69]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 312 NG Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.743 [13] (0.831)	-2.441 [13] (0.356)	-1.831 [12] (0.364)	-1.854 [12] (0.673)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-1.579 [63] (0.490)	-1.755 [22] (0.722)	-14.986 [35]*** (0.000)	-15.711 [51]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.727 [10]***	0.273 [10]***	0.187 [42]	0.159 [69]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 313 Oil Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.115 [1] (0.709)	-2.348 [1] (0.405)	-8.789 [0]*** (0.000)	-8.767 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)

LN(SI)	-0.948 [5] (0.770)	-2.178 [6] (0.498)	-8.809 [1]*** (0.000)	-8.787 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	1.297 [10]***	0.117 [10]	0.070 [5]	0.066 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 314 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.115 [1] (0.709)	-2.348 [1] (0.405)	-8.789 [0]*** (0.000)	-8.767 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-0.948 [5] (0.770)	-2.178 [6] (0.498)	-8.809 [1]*** (0.000)	-8.787 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	1.297 [10]***	0.117 [10]	0.070 [5]	0.066 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 315 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-1.144 [3] (0.698)	-4.542 [1]*** (0.001)	-12.652 [2]*** (0.000)	-12.620 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-1.912 [8] (0.326)	-6.207 [6]*** (0.000)	-38.920 [54]*** (0.000)	-40.468 [55]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]

LN(IP)	1.587 [11]***	0.321 [10]***	0.143 [62]	0.138 [62]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 316 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-1.144 [3] (0.698)	-4.542 [1]*** (0.001)	-12.652 [2]*** (0.000)	-12.620 [2]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-1.912 [8] (0.326)	-6.207 [6]*** (0.000)	-38.920 [54]*** (0.000)	-40.468 [55]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.587 [11]***	0.321 [10]***	0.143 [62]	0.138 [62]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 317 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-1.115 [1] (0.709)	-2.348 [1] (0.405)	-8.789 [0]*** (0.000)	-8.767 [0]*** (0.000)
LN(IP)	-1.109 [3] (0.711)	-7.032 [0]*** (0.000)	-12.012 [2]*** (0.000)	-11.976 [2]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(SI)	-0.948 [5] (0.770)	-2.178 [6] (0.498)	-8.809 [1]*** (0.000)	-8.787 [1]*** (0.000)
LN(IP)	-1.792 [8] (0.383)	-7.313 [6]*** (0.000)	-39.212 [56]*** (0.000)	-39.061 [56]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(SI)	1.297 [10]***	0.117 [10]	0.070 [5]	0.066 [5]
LN(IP)	1.606 [10]***	0.221 [9]***	0.144 [52]	0.141 [52]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 318 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
OILC GDP [2]	H0: r=0 H1: r≤1	0.280399 0.206631	22.98153*** 0.490119***	0.0031 0.0021	13.49141* 0.490119***	0.0660 0.0021
BRENT PRICE M2 [8]	H0: r=0 H1: r≤1	0.058501 0.005291	11.21530 0.907110	0.1986 0.3409	10.30819 0.907110	0.1925 0.3409
WTI PRICE M2 [8]	H0: r=0 H1: r≤1	0.072889 0.005393	13.86617* 0.924620	0.0867 0.3363	12.94155* 0.924620	0.0800 0.3363
DUBAI PRICE M2 [8]	H0: r=0 H1: r≤1	0.059240 0.005265	11.34520 0.902698	0.1911 0.3421	10.44250 0.902698	0.1845 0.3421

HH PRICE M2 [8]	H0: r=0 H1: r≤1	0.066386 0.004922	12.59013 0.843814	0.1307 0.3583	11.74632 0.843814	0.1205 0.3583
LNG PRICE M2 [8]	H0: r=0 H1: r≤1	0.046592 0.002788	8.636161 0.477412	0.4001 0.4896	8.158749 0.477412	0.3628 0.4896
RUS PRICE M2 [8]	H0: r=0 H1: r≤1	0.068706 0.003689	12.80385 0.632029	0.1222 0.4266	12.17182 0.632029	0.1043 0.4266
BRENT PRICE SI [6]	H0: r=0 H1: r≤1	0.042668 0.009726	9.234499 1.690894	0.3441 0.1935	7.543606 1.690894	0.4270 0.1935
WTI PRICE SI [6]	H0: r=0 H1: r≤1	0.047858 0.009662	10.16372 1.679600	0.2684 0.1950	8.484120 1.679600	0.3316 0.1950
DUBAI PRICE SI [6]	H0: r=0 H1: r≤1	0.041168 0.009251	8.880618 1.607875	0.3765 0.2048	7.272742 1.607875	0.4574 0.2048
HH PRICE SI [2]	H0: r=0 H1: r≤1	0.042947 0.004691	8.601867 0.832217	0.4035 0.3616	7.769650 0.832217	0.4026 0.3616
LNG PRICE SI [3]	H0: r=0 H1: r≤1	0.026846 0.006193	5.882700 1.093270	0.7093 0.2957	4.789430 1.093270	0.7682 0.2957
RUS PRICE SI [4]	H0: r=0 H1: r≤1	0.112277 0.004632	21.65414*** 0.812494	0.0052 0.3674	20.84164*** 0.812494	0.0040 0.3674
BRENT PRICE IP [5]	H0: r=0 H1: r≤1	0.039667 0.006180	9.241575 1.227511	0.3435 0.2679	8.014065 1.227511	0.3773 0.2679
WTI PRICE IP [5]	H0: r=0 H1: r≤1	0.039409 0.006144	9.181056 1.220183	0.3489 0.2693	7.960873 1.220183	7.960873 1.220183
DUBAI PRICE IP [3]	H0: r=0 H1: r≤1	0.036195 0.011210	9.627917 2.254569	0.3105 0.1332	7.373347 2.254569	0.4460 0.1332
HH PRICE IP [5]	H0: r=0 H1: r≤1	0.040638 0.003092	8.827630 0.613259	0.3816 0.4336	8.214372 0.613259	0.3573 0.4336
LNG PRICE IP [6]	H0: r=0 H1: r≤1	0.062285 0.001297	12.92476 0.255741	0.1176 0.61310	12.66902* 0.255741	0.0880 0.6131
RUS PRICE IP [4]	H0: r=0 H1: r≤1	0.048485 0.003816	10.65105 0.760807	0.2339 0.3831	9.890240 0.760807	0.2192 0.3831
SI IP [4]	H0: r=0 H1: r≤1	0.035190 0.004202	7.006099 0.736841	0.5769 0.3907	6.269258 0.736841	0.5789 0.3907

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 319 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	6.711 13.519*	0.568 0.095	8	M2→BRENT
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	7.865 14.889*	0.446 0.061	8	M2→DUBAI
HH does not granger cause M2 M2 does not granger cause HH	8.594 9.089	0.377 0.334	8	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	6.189 12.065	0.626 0.148	8	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	3.601 21.387***	0.891 0.006	8	M2→RUSSIA
BRENT does not granger cause SI SI does not granger cause BRENT	10.476 33.112***	0.106 0.000	6	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	11.038* 31.146***	0.087 0.000	6	WTI↔SI
DUBAI does not granger cause SI SI does not granger cause DUBAI	11.195* 28.533***	0.082 0.000	6	DUBAI↔SI
HH does not granger cause SI SI does not granger cause HH	0.092 1.340	0.954 0.511	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	2.923 55.381***	0.403 0.000	3	SI→LNG
BRENT does not granger cause IP IP does not granger cause BRENT	3.284 8.151	0.656 0.148	5	No causal relation

WTI does not granger cause IP IP does not granger cause WTI	2.905 6.931	0.714 0.225	5	No causal relation
DUBAI does not granger cause IP IP does not granger cause DUBAI	4.259 1.542	0.234 0.672	3	No causal relation
HH does not granger cause IP IP does not granger cause HH	2.287 1.378	0.808 0.926	5	No causal relation
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	4.732 5.867	0.315 0.209	4	No causal relation
SI does not granger cause IP IP does not granger cause SI	1.160 3.963	0.884 0.411	4	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 320 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
OILC does not granger cause GDP GDP does not granger cause OILC	4.699* 0.050	0.095 0.974	2	OILC→GDP
WTI does not granger cause M2 M2 does not granger cause WTI	5.001 9.665	0.757 0.289	8	No causal relation
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	4.165 9.937**	0.384 0.041	4	SI→RUSSIA
LNG does not granger cause IP IP does not granger cause LNG	8.199 20.288***	0.223 0.002	6	IP→LNG

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

POLAND

UNIT ROOT TEST RESULTS

Table 321 EC and GDP (1990-2012) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-2.218 [0] (0.205)	-2.034 [0] (0.551)	-4.645 [0]*** (0.001)	-4.579 [0]*** (0.008)
LN(GDP)	-0.451 [0] (0.980)	-3.543 [3]* (0.063)	-6.413 [0]*** (0.000)	-6.111 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(EC)	-2.218 [0] (0.205)	-2.034 [0] (0.551)	-4.644 [1]*** (0.001)	-4.570 [2]*** (0.008)
LN(GDP)	-0.342 [1] (0.975)	-3.962 [2]** (0.026)	-6.413 [0]*** (0.000)	-6.078 [2]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.0192 [3]	0.148 [3]**	0.155 [2]	0.084 [3]
LN(GDP)	0.670 [3]**	0.060 [2]	0.150 [1]	0.109 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 322 NG Consumption and GDP (1990-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-0.184 [1] (0.965)	-5.011 [0]*** (0.002)	-5.482 [0]*** (0.000)	-5.404 [0]*** (0.001)
LN(GDP)	-2.390 [1] (0.155)	-3.049 [3] (0.144)	-3.943 [5]*** (0.008)	-4.223 [5]** (0.020)
	PP (Level)		PP (First Difference)	
LN(NG)	-0.456 [1] (0.981)	-5.011 [0]*** (0.002)	-5.809 [2]*** (0.000)	-5.634 [2]*** (0.000)
LN(GDP)	-0.104 [2] (0.959)	-3.656 [2]** (0.046)	-5.801 [1]*** (0.000)	-6.248 [2]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.683 [3]**	0.160 [0]**	0.197 [0]	0.080 [0]
LN(GDP)	0.693 [3]**	0.070 [2]	0.136 [1]	0.113 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 323 Oil Consumption and GDP (1990-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-0.834 [0] (0.789)	-2.312 [2] (0.410)	3.290 [0]** (0.027)	-3.232 [0] (0.103)
LN(GDP)	-2.390 [1] (0.155)	-3.049 [3] (0.144)	-3.943 [5]*** (0.008)	-4.223 [5]** (0.020)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-0.933 [2] (0.758)	-2.247 [2] (0.443)	-3.290 [0]** (0.027)	-3.232 [0] (0.103)
LN(GDP)	-0.104 [2] (0.959)	-3.656 [2]** (0.046)	-5.801 [1]*** (0.000)	-6.248 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.0632 [3]**	0.085 [2]	0.102 [2]	0.103 [1]
LN(GDP)	0.693 [3]**	0.070 [2]	0.136 [1]	0.113 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 324 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-00.100 [1] (0.946)	-0.997 [1] (0.940)	-17.525 [0]*** (0.000)	-17.473 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-0.148 [5] (0.941)	-1.311 [6] (0.881)	-16.924 [6]*** (0.000)	-16.883 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.737 [10]***	0.210 [10]**	0.186 [5]	0.185 [5]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 325 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-00.100 [1] (0.946)	-0.997 [1] (0.940)	-17.525 [0]*** (0.000)	-17.473 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	

LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-0.148 [5] (0.941)	-1.311 [6] (0.881)	-16.924 [6]*** (0.000)	-16.883 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.737 [10]***	0.210 [10]**	0.186 [5]	0.185 [5]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 326 Oil Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-0.890 [1] (0.789)	-1.909 [1] (0.645)	-10.024 [0]*** (0.000)	-9.999 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.059 [7] (0.731)	-1.926 [7] (0.636)	-10.301 [6]*** (0.000)	-10.277 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	1.260 [10]***	0.206 [10]**	0.080 [7]	0.081 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 327 NG Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-0.890 [1] (0.789)	-1.909 [1] (0.645)	-10.024 [0]*** (0.000)	-9.999 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)

LN(SI)	-1.059 [7] (0.731)	-1.926 [7] (0.636)	-10.301 [6]*** (0.000)	-10.277 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	1.260 [10]***	0.206 [10]**	0.080 [7]	0.081 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 328 Oil Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-00.456 [1] (0.895)	-1.904 [1] (0.648)	-19.666 [0]*** (0.000)	-19.618 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-00.460 [10] (0.894)	-2.307 [2] (0.427)	-19.705 [1]*** (0.000)	-19.657 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.768 [11]***	0.196 [11]**	0.068 [10]	0.067 [10]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 329 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-00.456 [1] (0.895)	-1.904 [1] (0.648)	-19.666 [0]*** (0.000)	-19.618 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-00.460 [10] (0.894)	-2.307 [2] (0.427)	-19.705 [1]*** (0.000)	-19.657 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]

LN(IP)	1.768 [11]***	0.196 [11]**	0.068 [10]	0.067 [10]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 330 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-0.890 [1] (0.789)	-1.909 [1] (0.645)	-10.024 [0]*** (0.000)	-9.999 [0]*** (0.000)
LN(IP)	-0.702 [3] (0.842)	-1.973 [3] (0.611)	-6.573 [2]*** (0.000)	-6.553 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.059 [7] (0.731)	-1.926 [7] (0.636)	-10.301 [6]*** (0.000)	-10.277 [6]*** (0.000)
LN(IP)	-1.098 [6] (0.716)	-2.149 [0] (0.514)	-17.908 [1]*** (0.000)	-17.887 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	1.260 [10]***	0.206 [10]**	0.080 [7]	0.081 [7]
LN(IP)	1.682 [10]***	0.241 [10]***	0.111 [6]	0.051 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 331 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [1]	H0: r=0 H1: r≤1	0.391325 0.106092	12.78107 2.355200	0.1231 0.1249	10.42587 2.355200	0.1854 0.1249
NGC GDP [3]	H0: r=0 H1: r≤1	0.651028 0.079507	22.71220*** 1.656912	0.0034 0.1980	21.05529*** 1.656912	0.0036 0.1980
OILC GDP [2]	H0: r=0 H1: r≤1	0.457466 0.017232	13.20664 0.365032	0.1074 0.5457	12.84161* 0.365032	0.0829 0.5457
BRENT PRICE M2 [4]	H0: r=0 H1: r≤1	0.137629 0.004522	26.70536*** 0.793141	0.0007 0.3732	25.91221*** 0.793141	0.0005 0.3732
WTI PRICE M2 [4]	H0: r=0 H1: r≤1	0.161098 0.004375	31.50814*** 0.767352	0.0001 0.3810	30.74079*** 0.767352	0.0001 0.3810
DUBAI PRICE M2 [4]	H0: r=0 H1: r≤1	0.134591 0.004245	26.04129*** 0.744509	0.0009 0.3882	25.29678*** 0.744509	0.0006 0.3882
HH PRICE M2 [2]	H0: r=0 H1: r≤1	0.122019 0.002842	23.53678*** 0.503718	0.0025 0.4779	23.03306*** 0.503718	0.0016 0.4779
LNG PRICE M2 [3]	H0: r=0 H1: r≤1	0.085504 0.000145	15.75664** 0.025456	0.0457 0.8732	15.73119** 0.025456	0.0291 0.8732
RUS PRICE M2 [4]	H0: r=0 H1: r≤1	0.141704 9.30E-05	26.75742*** 0.016276	0.0007 0.8983	26.74114*** 0.016276	0.0003 0.8983
BRENT PRICE SI [2]	H0: r=0 H1: r≤1	0.051635 0.003822	10.06157 0.677862	0.2760 0.4103	9.383712 0.677862	0.2556 0.4103
WTI PRICE SI [2]	H0: r=0 H1: r≤1	0.072187 0.003734	13.92389* 0.662206	0.0851 0.4158	13.26169* 0.662206	0.0715 0.4158
DUBAI PRICE SI [2]	H0: r=0 H1: r≤1	0.048745 0.004132	9.578138 0.732958	0.3146 0.3919	8.845180 0.732958	0.2993 0.3919
HH PRICE SI [2]	H0: r=0 H1: r≤1	0.041347 0.003468	8.088921 0.614847	0.4560 0.4330	7.474073 0.614847	0.4347 0.4330
LNG PRICE SI [2]	H0: r=0 H1: r≤1	0.034076 0.005324	7.081557 0.944883	0.5682 0.3310	6.136674 0.944883	0.5957 0.3310
RUS PRICE SI [4]	H0: r=0 H1: r≤1	0.139172 0.005815	27.24619*** 1.020534	0.0006 0.3124	26.22566*** 1.020534	0.0004 0.3124
BRENT PRICE IP [4]	H0: r=0 H1: r≤1	0.056653 0.000740	11.75327 0.147341	0.1691 0.7011	11.60593 0.147341	0.1263 0.7011
WTI PRICE IP [4]	H0: r=0 H1: r≤1	0.061882 0.000918	12.89492 0.182789	0.1187 0.6690	12.71213* 0.182789	0.0867 0.6690
DUBAI PRICE IP [2]	H0: r=0 H1: r≤1	0.072918 0.000759	15.37098* 0.152600	0.0522 0.6961	15.21838** 0.152600	0.0352 0.6961

HH PRICE **IP [5]**	H0: r=0 H1: r≤1	0.038592 0.002159	8.220515 0.427923	0.4421 0.5130	7.792592 0.427923	0.4002 0.5130
LNG PRICE **IP [5]**	H0: r=0 H1: r≤1	0.061324 0.001225	12.77309 0.242758	0.1234 0.6222	12.53033* 0.242758	0.0923 0.6222
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.109684 0.001502	23.41857*** 0.299047	0.0026 0.5845	23.11952*** 0.299047	0.0016 0.5845
SI **IP [5]**	H0: r=0 H1: r≤1	0.063328 0.003004	11.90693 0.523545	0.1615 0.4693	11.38338 0.523545	0.1360 0.4693

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 332 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	0.414 0.010**	0.519 0.010	1	GDP→EC
BRENT does not granger cause SI SI does not granger cause BRENT	0.108 9.480***	0.947 0.008	2	SI→BRENT
DUBAI does not granger cause SI SI does not granger cause DUBAI	0.013 9.401***	0.993 0.009	2	SI→DUBAI
HH does not granger cause SI SI does not granger cause HH	0.488 0.331	0.783 0.847	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	0.283 19.441***	0.867 0.000	2	SI→LNG
BRENT does not granger cause IP IP does not granger cause BRENT	4.760 17.708***	0.312 0.001	4	IP→BRENT
HH does not granger cause IP IP does not granger cause HH	3.576 8.502	0.611 0.130	5	No causal relation
SI does not granger cause IP IP does not granger cause SI	12.304** 17.552***	0.030 0.003	5	SI↔IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 333 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
NGC does not granger cause GDP GDP does not granger cause NGC	14.360*** 12.225***	0.002 0.006	3	NGC↔GDP
OILC does not granger cause GDP GDP does not granger cause OILC	19.794*** 0.692	0.000 0.707	2	OILC→GDP
BRENT does not granger cause M2 M2 does not granger cause BRENT	15.166*** 4.341	0.004 0.361	4	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	19.052*** 5.568	0.000 0.233	4	WTI→M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	16.607*** 3.231	0.002 0.519	4	DUBAI→M2
HH does not granger cause M2 M2 does not granger cause HH	8.920** 2.306	0.011 0.315	2	HH→M2
LNG does not granger cause M2 M2 does not granger cause LNG	2.658 2.766	0.447 0.429	3	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	6.846 2.175	0.144 0.703	4	No causal relation
WTI does not granger cause SI SI does not granger cause WTI	1.127 0.222	0.569 0.894	2	No causal relation
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	9.267* 2.249	0.054 0.689	4	RUSSIA→SI
WTI does not granger cause IP IP does not granger cause WTI	7.000 5.160	0.135 0.271	4	No causal relation

DUBAI does not granger cause IP IP does not granger cause DUBAI	4.645* 1.534	0.098 0.464	2	DUBAI→IP
LNG does not granger cause IP IP does not granger cause LNG	3.874 6.371	0.567 0.271	5	No causal relation
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	1.801 32.010***	0.772 0.000	4	IP→RUSSIA

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

PORTUGAL

UNIT ROOT TEST RESULTS

Table 334 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.961 [0] (0.301)	-0.216 [0] (0.997)	-5.341 [0]*** (0.000)	-6.011 [0]*** (0.000)
LN(GDP)	-1.558 [1] (0.492)	-1.194 [1] (0.896)	-2.790 [0]* (0.070)	-3.294 [4]* (0.085)
	PP (Level)		PP (First Difference)	
LN(EC)	-1.908 [3] (0.325)	-0.378 [3] (0.998)	-5.462 [4]*** (0.000)	-6.012 [3]*** (0.000)
LN(GDP)	-1.826 [3] (0.361)	-0.663 [2] (0.968)	-2.825 [2]* (0.065)	-3.160 [2] (0.108)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.673 [5]**	0.183 [4]**	0.394 [4]*	0.148 [3]**
LN(GDP)	0.703 [5]**	0.162 [4]**	0.295 [3]	0.079 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 335 NG Consumption and GDP (1997-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-15.235 [0]*** (0.000)	-13.501 [0]*** (0.000)	-0.222 [3]*** (0.961)	-1.874 [3]*** (0.606)
LN(GDP)	-3.808 [0]** (0.012)	-1.629 [0] (0.734)	-02.749 [0]* (0.089)	-3.789 [0]** (0.047)
	PP (Level)		PP (First Difference)	
LN(NG)	-13.141 [1]*** (0.000)	-13.065 [1]*** (0.000)	-20.888 [14]*** (0.000)	-18.405 [10]*** (0.000)
LN(GDP)	-3.808 [0]** (0.012)	-1.615 [2] (0.740)	-2.707 [5]* (0.095)	-4.288 [5]** (0.020)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.512 [2]**	0.171 [1]**	0.459 [1]*	0.183 [0]**
LN(GDP)	0.411 [2]*	0.168 [2]**	0.496 [2]**	0106 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 336 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-3.166 [0]** (0.029)	-0.0690 [0] (0.967)	-2.061 [2] (0.260)	-2.658 [2] (0.258)
LN(GDP)	-1.642 [1] (0.452)	-0.679 [4] (0.999)	-3.977 [0]*** (0.003)	-1.152 [7]*** (0.904)
	PP (Level)		PP (First Difference)	
LN(OIL)	-3.024 [5]** (0.040)	-0.570 [5] (0.975)	-6.490 [5]*** (0.000)	-7.707 [4]*** (0.000)
LN(GDP)	-2.345 [1] (0.163)	-0.974 [1] (0.937)	-3.864 [2]*** (0.004)	-4.104 [3]** (0.012)
	KPSS (Level)		KPSS (First Difference)	

LN(OIL)	0.704 [5]**	0.183 [5]**	0.575 [5]**	0.090 [4]
LN(GDP)	0.816 [5]***	0.174 [4]**	0.421 [1]*	0.109 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 337 Oil Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-2.358 [0] (0.155)	-0.813 [0] (0.961)	-13.554 [0]*** (0.000)	-13.890 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-2.372 [4] (0.151)	-0.785 [4] (0.964)	-13.562 [5]*** (0.000)	-13.896 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.480 [10]***	0.345 [10]***	0.557 [5]**	0.092 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 338 NG Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-2.358 [0] (0.155)	-0.813 [0] (0.961)	-13.554 [0]*** (0.000)	-13.890 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-2.372 [4] (0.151)	-0.785 [4] (0.964)	-13.562 [5]*** (0.000)	-13.896 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.480 [10]***	0.345 [10]***	0.557 [5]**	0.092 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 339 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-2.152 [1] (0.224)	-2.210 [1] (0.480)	-10.003 [0]*** (0.000)	-9.981 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.868 [7] (0.346)	-2.066 [7] (0.560)	-10.263 [5]*** (0.000)	-10.240 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.449 [10]*	0.157 [10]**	0.081 [7]	0.081 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 340 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-2.152 [1] (0.224)	-2.210 [1] (0.480)	-10.003 [0]*** (0.000)	-9.981 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.868 [7] (0.346)	-2.066 [7] (0.560)	-10.263 [5]*** (0.000)	-10.240 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.449 [10]*	0.157 [10]**	0.081 [7]	0.081 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 341 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)

LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-1.028 [2] (0.742)	-2.659 [2] (0.254)	-19.022 [1]*** (0.000)	-19.046 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-3.312 [7]** (0.015)	-6.876 [9]*** (0.000)	-39.612 [8]*** (0.000)	-39.068 [9]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.210 [11]***	0.349 [11]***	0.246 [23]	0.067 [24]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 342 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-1.028 [2] (0.742)	-2.659 [2] (0.254)	-19.022 [1]*** (0.000)	-19.046 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-3.312 [7]** (0.015)	-6.876 [9]*** (0.000)	-39.612 [8]*** (0.000)	-39.068 [9]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.210 [11]***	0.349 [11]***	0.246 [23]	0.067 [24]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 343 SI and IP (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-2.152 [1] (0.224)	-2.210 [1] (0.480)	-10.003 [0]*** (0.000)	-9.981 [0]*** (0.000)
LN(IP)	-0.947 [2] (0.771)	-3.004 [2] (0.133)	-17.817 [1]*** (0.000)	-17.809 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.868 [7] (0.346)	-2.066 [7] (0.560)	-10.263 [5]*** (0.000)	-10.240 [5]*** (0.000)

LN(IP)	-3.022 [6]** (0.034)	-7.793 [8]*** (0.000)	-37.425 [10]*** (0.000)	-38.021 [10]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.449 [10]*	0.157 [10]**	0.081 [7]	0.081 [7]
LN(IP)	1.387 [10]***	0.273 [10]***	0.129 [30]	0.095 [31]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 344 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [2]	H0: r=0 H1: r≤1	0.247783 0.073907	12.29136 2.610533	0.1435 0.1062	9.680825 2.610533	0.2337 0.1062
OILC GDP [4]	H0: r=0 H1: r≤1	0.266731 0.120255	17.09629** 4.996812**	0.0285 0.0254	12.09948 4.996812**	0.1070 0.0254
BRENT PRICE M2 [2]	H0: r=0 H1: r≤1	0.058219 0.028298	15.69780** 5.080915**	0.0466 0.0242	10.61689 5.080915**	0.1745 0.0242
WTI PRICE M2 [2]	H0: r=0 H1: r≤1	0.081956 0.026844	19.95159*** 4.816396**	0.0099 0.0282	15.13520** 4.816396**	0.0363 0.0282
DUBAI PRICE M2 [2]	H0: r=0 H1: r≤1	0.063706 0.028612	16.78945** 5.138234**	0.0318 0.0234	11.65121 5.138234**	0.1244 0.0234
HH PRICE M2 [1]	H0: r=0 H1: r≤1	0.089732 0.034416	22.96889*** 6.234012**	0.0031 0.0125	16.73488** 6.234012**	0.0199 0.0125
LNG PRICE M2 [3]	H0: r=0 H1: r≤1	0.036201 0.023877	10.74298 4.253330**	0.2278 0.0392	6.489648 4.253330**	0.5512 0.0392
RUS PRICE M2 [5]	H0: r=0 H1: r≤1	0.084284 0.018790	18.62109** 3.300529*	0.0163 0.0693	15.32056** 3.300529*	0.0339 0.0693
BRENT PRICE SI [2]	H0: r=0 H1: r≤1	0.035279 0.015049	9.041038 2.683886	0.3616 0.1014	6.357151 2.683886	0.5678 0.1014
WTI PRICE SI [7]	H0: r=0 H1: r≤1	0.029450 0.019899	8.598580 3.457139*	0.4038 0.0630	5.141441 3.457139*	0.7239 0.0630
DUBAI PRICE SI [2]	H0: r=0 H1: r≤1	0.034873 0.015453	9.039299 2.756497*	0.3618 0.0969	6.282802 2.756497*	0.5772 0.0969
HH PRICE SI [2]	H0: r=0 H1: r≤1	0.084144 0.016983	18.58935** 3.031791*	0.0165 0.0816	15.55756** 3.031791*	0.0311 0.0816
LNG PRICE SI [3]	H0: r=0 H1: r≤1	0.027460 0.005956	5.952015 1.051380	0.7012 0.3052	4.900634 1.051380	0.7543 0.3052
RUS PRICE SI [4]	H0: r=0 H1: r≤1	0.029803 0.013575	7.686705 2.391951	0.4995 0.1220	5.294753 2.391951	0.7043 0.1220
BRENT PRICE IP [4]	H0: r=0 H1: r≤1	0.038659 0.007134	9.270656 1.424807	0.3410 0.2326	7.845850 1.424807	0.3946 0.2326
WTI PRICE IP [4]	H0: r=0 H1: r≤1	0.041094 0.006604	9.669089 1.318611	0.3071 0.2508	8.350478 1.318611	0.3442 0.2508
DUBAI PRICE IP [4]	H0: r=0 H1: r≤1	0.039387 0.007604	9.515509 1.519057	0.3198 0.2178	7.996452 1.519057	0.3791 0.2178
HH PRICE IP [6]	H0: r=0 H1: r≤1	0.044769 0.002743	9.564293 0.541193	0.3157 0.4619	9.023100 0.541193	0.2842 0.4619
LNG PRICE IP [4]	H0: r=0 H1: r≤1	0.059999 0.000637	12.43971 0.126742	0.1370 0.7218	12.31297* 0.126742	0.0994 0.7218
RUS PRICE IP [5]	H0: r=0 H1: r≤1	0.037158 0.001006	7.696619 0.199249	0.4984 0.6553	7.497370 0.199249	0.4321 0.6553
SI IP [4]	H0: r=0 H1: r≤1	0.054903 0.001636	10.16835 0.286549	0.2680 0.5924	9.881798 0.286549	0.2198 0.5924

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level.
MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 345 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation

EC does not granger cause GDP GDP does not granger cause EC	4.114 7.376**	0.127 0.025	2	GDP→EC
LNG does not granger cause M2 M2 does not granger cause LNG	1.206 5.700	0.751 0.127	3	No causal relation
BRENT does not granger cause SI SI does not granger cause BRENT	0.936 8.351**	0.626 0.015	2	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	9.084 20.752***	0.246 0.004	7	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	1.091 9.596***	0.579 0.008	2	SI→DUBAI
LNG does not granger cause SI SI does not granger cause LNG	2.291 11.432***	0.514 0.009	3	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	3.294 6.270	0.509 0.179	4	No causal relation
BRENT does not granger cause IP IP does not granger cause BRENT	10.376** 2.563	0.034 0.633	4	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	8.890* 4.134	0.063 0.388	4	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	10.410** 2.007	0.034 0.734	4	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	13.762** 11.413*	0.032 0.076	6	HH↔IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	11.416** 9.582*	0.043 0.088	5	RUSSIA↔IP
SI does not granger cause IP IP does not granger cause SI	9.825** 2.363	0.043 0.669	4	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 346 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
OILC does not granger cause GDP GDP does not granger cause OILC	11.277** 11.483**	0.023 0.021	4	OIL↔GDP
BRENT does not granger cause M2 M2 does not granger cause BRENT	3.238 2.626	0.198 0.268	2	No causal relation
WTI does not granger cause M2 M2 does not granger cause WTI	3.497 3.433	0.174 0.179	2	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	6.493** 1.906	0.038 0.385	2	DUBAI→M2
HH does not granger cause M2 M2 does not granger cause HH	0.147 0.117	0.700 0.732	1	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	4.585 8.772	0.468 0.118	5	No causal relation
HH does not granger cause SI SI does not granger cause HH	0.542 1.658	0.762 0.436	2	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	10.175** 3.428	0.037 0.488	4	LNG→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

SLOVAKIA

UNIT ROOT TEST RESULTS

Table 347 EC and GDP (1992-2012) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.929 [0] (0.313)	-1.987 [0] (0.572)	-6.325 [0]*** (0.000)	-6.428 [0]*** (0.000)
LN(GDP)	-0.689 [0] (0.827)	-2.340 [1] (0.394)	-3.216 [0]** (0.034)	-3.206 [0]*** (0.112)
	PP (Level)		PP (First Difference)	
LN(EC)	-1.788 [1]	-1.843 [1]	-6.401 [1]***	-7.024 [3]***

	(0.375)	(0.645)	(0.000)	(0.000)
LN(GDP)	-0.689 [0] (0.827)	-1.872 [1] (0.631)	-3.215 [2]** (0.034)	-3.198 [2] (0.114)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.198 [2]	0.156 [2]**	0.197 [2]	0.134 [3]*
LN(GDP)	0.626 [3]**	0.070 [2]	0.111 [0]	0.100 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 348 NG Consumption and GDP (1992-2013) -Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(NG)	-1.649 [0] (0.441)	-2.659 [2] (0.261)	-1.762 [2]*** (0.385)	-5.112 [1]*** (0.003)
LN(GDP)	-0.925 [0] (0.759)	-2.174 [1] (0.476)	-3.210 [0]** (0.034)	-3.289 [0]* (0.096)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-1.649 [0] (0.441)	-1.705 [3] (0.712)	-5.383 [0]*** (0.000)	-6.390 [6]*** (0.000)
LN(GDP)	-0.925 [0] (0.759)	-1.663 [1] (0.731)	-3.251 [1]** (0.031)	-3.282 [2]* (0.097)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.205 [3]**	0.162 [3]**	0.194 [3]	0.186 [10]**
LN(GDP)	0.649 [3]**	0.072 [2]	0.149 [0]	0.109 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 349 Oil Consumption and GDP (1992-2013)-Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(OIL)	-3.619 [0]** (0.014)	-5.199 [0]*** (0.002)	-7.993 [0]*** (0.000)	-7.691 [0]*** (0.000)
LN(GDP)	-0.925 [0] (0.759)	-2.174 [1] (0.476)	-3.210 [0]** (0.034)	-3.289 [0]* (0.096)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-3.712 [2]** (0.011)	-5.199 [0]*** (0.002)	-10.818 [6]*** (0.000)	-10.266 [6]*** (0.000)
LN(GDP)	-0.925 [0] (0.759)	-1.663 [1] (0.731)	-3.251 [1]** (0.031)	-3.282 [2]* (0.097)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.364 [2]*	0.107 [1]	0.167 [4]	0.153 [5]
LN(GDP)	0.649 [3]**	0.072 [2]	0.149 [0]	0.109 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 350 Oil Prices and M2 (2006-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-2.847 [2]* (0.052)	-2.907 [2] (0.164)	-5.876 [0]*** (0.000)	-5.958 [0]*** (0.000)
LN(WTI)	-3.707 [2]*** (0.005)	-3.818 [2]** (0.019)	-4.074 [1]*** (0.001)	-4.123 [1]*** (0.008)
LN(DUBAI)	-3.101 [2]** (0.029)	-3.263 [2]* (0.078)	-4.553 [2]*** (0.000)	-4.606 [2]*** (0.001)
LN(M2)	-1.989 [0] (0.291)	-2.739 [0] (0.223)	-11.057 [0]*** (0.000)	-11.193 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-2.323 [5] (0.166)	-2.274 [5] (0.443)	-5.962 [3]*** (0.000)	-6.047 [3]*** (0.000)
LN(WTI)	-2.691 [5]* (0.078)	-2.701 [5] (0.238)	-6.428 [3]*** (0.000)	-6.478 [33]*** (0.000)

LN(DUBAI)	-2.348 [5] (0.158)	-2.293 [5] (0.433)	-5.445 [2]*** (0.000)	-5.533 [2]*** (0.000)
LN(M2)	-2.060 [4] (0.261)	-2.725 [4] (0.228)	-11.032 [5]*** (0.000)	-11.171 [44]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	0.667 [8]**	0.071 [8]	0.110 [5]	0.057 [5]
LN(WTI)	0.498 [8]**	0.048 [7]	0.082 [5]	0.045 [5]
LN(DUBAI)	0.733 [8]**	0.070 [8]	0.120 [4]	0.055 [4]
LN(M2)	1.122 [9]***	0.193 [8]**	0.263 [5]	0.108 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 351 NG Prices and M2 (2006-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-1.954 [0] (0.306)	-2.296 [0] (0.432)	-9.568 [0]*** (0.000)	-9.516 [0]*** (0.000)
LN(LNG)	-1.386 [1] (0.586)	-2.944 [2] (0.153)	-7.291 [0]*** (0.000)	-7.254 [0]*** (0.000)
LN(RUS)	-3.401 [3]** (0.013)	-3.690 [3]** (0.027)	-3.243 [2]** (0.020)	-3.223 [2]* (0.085)
LN(M2)	-1.989 [0] (0.291)	-2.739 [0] (0.223)	-11.057 [0]*** (0.000)	-11.193 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.067 [3] (0.258)	-2.572 [4] (0.293)	-9.568 [0]*** (0.000)	-9.516 [0]*** (0.000)
LN(LNG)	-1.518 [5] (0.520)	-2.332 [5] (0.412)	-7.477 [4]*** (0.000)	-7.443 [4]*** (0.000)
LN(RUS)	-2.437 [7] (0.134)	-2.508 [7] (0.323)	-8.756 [7]*** (0.000)	-8.735 [7]*** (0.000)
LN(M2)	-2.060 [4] (0.261)	-2.725 [4] (0.228)	-11.032 [5]*** (0.000)	-11.171 [44]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.824 [8]***	0.135 [8]*	0.059 [1]	0.041 [1]
LN(LNG)	0.910 [9]***	0.104 [8]	0.052 [2]	0.050 [5]
LN(RUS)	0.290 [8]	0.058 [8]	0.050 [7]	0.041 [7]
LN(M2)	1.122 [9]***	0.193 [8]**	0.263 [5]	0.108 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 352 Oil Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-2.219 [1] (0.200)	-1.454 [1] (0.841)	-9.345 [0]*** (0.000)	-9.700 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.998 [8] (0.287)	-1.297 [7] (0.885)	-9.716 [6]*** (0.000)	-9.941 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]

LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.615 [10]**	0.401 [10]***	0.500 [8]***	0.118 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 353 NG Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-2.219 [1] (0.200)	-1.454 [1] (0.841)	-9.345 [0]*** (0.000)	-9.700 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.998 [8] (0.287)	-1.297 [7] (0.885)	-9.716 [6]*** (0.000)	-9.941 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.615 [10]**	0.401 [10]***	0.500 [8]***	0.118 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 354 Oil Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-0.235 [2] (0.930)	-2.413 [2] (0.371)	-15.348 [1]*** (0.000)	-15.317 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-0.445 [11] (0.897)	-4.101 [5]*** (0.007)	-23.815 [4]*** (0.000)	-23.761 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.741 [11]***	0.146 [10]**	0.078 [14]	0.075 [14]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 355 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-0.235 [2] (0.930)	-2.413 [2] (0.371)	-15.348 [1]*** (0.000)	-15.317 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-0.445 [11] (0.897)	-4.101 [5]*** (0.007)	-23.815 [4]*** (0.000)	-23.761 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.741 [11]***	0.146 [10]**	0.078 [14]	0.075 [14]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 356 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-2.219 [1] (0.200)	-1.454 [1] (0.841)	-9.345 [0]*** (0.000)	-9.700 [0]*** (0.000)
LN(IP)	-0.911 [2] (0.782)	-1.893 [2] (0.653)	-14.257 [1]*** (0.000)	-14.231 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.998 [8] (0.287)	-1.297 [7] (0.885)	-9.716 [6]*** (0.000)	-9.941 [6]*** (0.000)
LN(IP)	-1.159 [11] (0.691)	-3.808 [5]** (0.018)	-22.455 [4]*** (0.000)	-22.420 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.615 [10]**	0.401 [10]***	0.500 [8]***	0.118 [7]
LN(IP)	1.657 [10]***	0.201 [10]**	0.083 [15]	0.044 [15]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 357 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC	H0: r=0	0.651652	22.80313***	0.0033	17.92741**	0.0126
GDP [3]	H1: r≤1	0.249344	4.875724**	0.0272	4.875724**	0.0272
NGC	H0: r=0	0.675526	22.52909***	0.0037	21.38543***	0.0032
GDP [2]	H1: r≤1	0.058417	1.143659	0.2849	1.143659	0.2849
BRENT PRICE	H0: r=0	0.121390	18.74807**	0.0156	13.32969*	0.0698
M2 [4]	H1: r≤1	0.051246	5.418384**	0.0199	5.418384**	0.0199
WTI PRICE	H0: r=0	0.110792	20.79537***	0.0072	12.21209	0.1029
M2 [3]	H1: r≤1	0.079218	8.583280***	0.0034	8.583280***	0.0034
DUBAI PRICE	H0: r=0	0.110600	17.50565**	0.0246	12.07244	0.1080
M2 [4]	H1: r≤1	0.051382	5.433205**	0.0198	5.433205**	0.0198
HH PRICE	H0: r=0	0.058944	10.30362	0.2581	6.439728	0.5574
M2 [1]	H1: r≤1	0.035795	3.863893**	0.0493	3.863893**	0.0493

LNG PRICE	H0: r=0	0.163715	21.93477***	0.0047	18.59377***	0.0097
M2 [3]	H1: r≤1	0.031615	3.341006*	0.0676	3.341006*	0.0676
RUS PRICE	H0: r=0	0.107406	19.45766**	0.0120	11.36236	0.1370
M2 [7]	H1: r≤1	0.077763	8.095300***	0.0044	8.095300***	0.0044
BRENT PRICE	H0: r=0	0.045913	11.80516	0.1665	8.318994	0.3472
SI [2]	H1: r≤1	0.019503	3.486163*	0.0619	3.486163*	0.0619
WTI PRICE	H0: r=0	0.048702	12.89279	0.1188	8.837302	0.2999
SI [2]	H1: r≤1	0.022652	4.055491**	0.0440	4.055491**	0.0440
DUBAI PRICE	H0: r=0	0.050507	12.76885	0.1236	9.173387	0.2720
SI [2]	H1: r≤1	0.020108	3.595463*	0.0579	3.595463*	0.0579
HH PRICE	H0: r=0	0.067986	17.20124**	0.0274	12.46221*	0.0945
SI [2]	H1: r≤1	0.026419	4.739026**	0.0295	4.739026**	0.0295
LNG PRICE	H0: r=0	0.038639	8.113091	0.4534	6.974695	0.4922
SI [2]	H1: r≤1	0.006411	1.138396	0.2860	1.138396	0.2860
RUS PRICE	H0: r=0	0.037432	9.873304	0.2906	6.523701	0.5469
SI [8]	H1: r≤1	0.019398	3.349603*	0.0672	3.349603*	0.0672
BRENT PRICE	H0: r=0	0.049122	10.60516	0.2370	10.02361	0.2104
IP [4]	H1: r≤1	0.002918	0.581552	0.4457	0.581552	0.4457
WTI PRICE	H0: r=0	0.061112	13.02113	0.1140	12.54880*	0.0917
IP [4]	H1: r≤1	0.002371	0.472325	0.4919	0.472325	0.4919
DUBAI PRICE	H0: r=0	0.054995	12.05116	0.1545	11.25643	0.1418
IP [4]	H1: r≤1	0.003986	0.794731	0.3727	0.794731	0.3727
HH PRICE	H0: r=0	0.048316	10.11614	0.2719	9.854974	0.2216
IP [4]	H1: r≤1	0.001312	0.261168	0.6093	0.261168	0.6093
LNG PRICE	H0: r=0	0.046359	10.41074	0.2505	9.351189	0.2581
IP [6]	H1: r≤1	0.005364	1.059553	0.3033	1.059553	0.3033
RUS PRICE	H0: r=0	0.084890	18.29742**	0.0184	17.56481**	0.0145
IP [5]	H1: r≤1	0.003693	0.732611	0.3920	0.732611	0.3920
SI	H0: r=0	0.038627	8.272639	0.4367	6.893677	0.5018
IP [4]	H1: r≤1	0.007849	1.378961	0.2403	1.378961	0.2403

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 358 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
HH does not granger cause M2	0.004	0.945	1	No causal relation
M2 does not granger cause HH	1.652	0.198		
BRENT does not granger cause SI	3.719	0.155	2	No causal relation
SI does not granger cause BRENT	1.680	0.431		
WTI does not granger cause SI	6.688**	0.035	2	WTI→SI
SI does not granger cause WTI	2.128	0.345		
DUBAI does not granger cause SI	4.036	0.132	2	No causal relation
SI does not granger cause DUBAI	1.958	0.375		
LNG does not granger cause SI	2.447	0.294	2	No causal relation
SI does not granger cause LNG	3.864	0.144		
RUSSIA does not granger cause SI	13.500*	0.095	8	RUSSIA↔SI
SI does not granger cause RUSSIA	18.331**	0.018		
BRENT does not granger cause IP	32.111***	0.000	4	BRENT↔IP
IP does not granger cause BRENT	8.000*	0.091		
DUBAI does not granger cause IP	31.512***	0.000	4	DUBAI↔IP
IP does not granger cause DUBAI	9.212*	0.056		
HH does not granger cause IP	0.572	0.966	4	No causal relation
IP does not granger cause HH	2.597	0.627		
LNG does not granger cause IP	32.294***	0.000	6	LNG↔IP
IP does not granger cause LNG	12.489*	0.051		
SI does not granger cause IP	1.443	0.836	4	No causal relation
IP does not granger cause SI	3.449	0.485		

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 359 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	14.138*** 17.377***	0.000 0.002	3	EC↔GDP
NGC does not granger cause GDP GDP does not granger cause NGC	2.199 2.023	0.333 0.363	2	No causal relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	26.811*** 5.238	0.000 0.263	4	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	21.008*** 3.155	0.000 0.368	3	WTI→M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	28.918*** 5.974	0.000 0.201	4	DUBAI→M2
LNG does not granger cause M2 M2 does not granger cause LNG	30.750*** 2.172	0.000 0.537	3	LNG→M2
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	19.961*** 29.725***	0.005 0.000	7	RUSSIA↔M2
HH does not granger cause SI SI does not granger cause HH	1.673 4.786*	0.433 0.091	2	SI→HH
WTI does not granger cause IP IP does not granger cause WTI	25.632*** 9.039*	0.000 0.060	4	WTI↔IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	5.051 17.983***	0.409 0.003	5	IP→RUSSIA

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

SLOVENIA

UNIT ROOT TEST RESULTS

Table 360 EC and GDP (1995-2012) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-2.294 [0] (0.184)	-1.805 [0] (0.657)	-5.047 [0]*** (0.001)	-5.477 [0]*** (0.002)
LN(GDP)	-2.323 [0] (0.176)	-0.058 [0] (0.993)	-2.480 [0] (0.137)	-3.405 [0]* (0.086)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-2.294 [0] (0.184)	-1.697 [1] (0.707)	-5.047 [0]*** (0.001)	-5.948 [4]*** (0.001)
LN(GDP)	-2.323 [0] (0.176)	-0.166 [2] (0.995)	-2.466 [1] (0.141)	-3.352 [4]* (0.093)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.449 [3]*	0.151 [2]**	0.338 [2]	0.190 [7]
LN(GDP)	0.520 [3]**	0.154 [2]**	0.442 [1]*	0.114 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 361 Oil Prices and M2 (2005-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-2.694 [1]* (0.078)	-2.573 [1] (0.293)	-6.528 [0]*** (0.000)	-6.646 [0]*** (0.000)
LN(WTI)	-3.348 [2]** (0.014)	-3.691 [2]** (0.026)	-6.875 [0]*** (0.000)	-6.963 [0]*** (0.000)
LN(DUBAI)	-2.778 [1]* (0.064)	-3.066 [2] (0.119)	-5.885 [0]*** (0.000)	-6.033 [0]*** (0.000)
LN(M2)	-3.221 [1]** (0.021)	-1.546 [1] (0.808)	-12.546 [0]*** (0.000)	-13.214 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-2.592 [5]* (0.097)	-2.458 [5] (0.348)	-6.570 [3]*** (0.000)	-6.698 [3]*** (0.000)
LN(WTI)	-2.907 [5]**	-2.874 [5]	-7.002 [3]***	-7.095 [3]***

	(0.047)	(0.174)	(0.000)	(0.000)
LN(DUBAI)	-2.695 [5]* (0.077)	-2.516 [5] (0.319)	-5.931 [2]*** (0.000)	-6.098 [2]*** (0.000)
LN(M2)	-3.234 [10]** (0.020)	-1.449 [9] (0.841)	-12.497 [2]*** (0.000)	-13.248 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	0.837 [9]***	0.068 [8]	0.155 [5]	0.050 [5]
LN(WTI)	0.741 [8]***	0.053 [8]	0.120 [5]	0.040 [5]
LN(DUBAI)	0.905 [9]***	0.077 [8]	0.182 [5]	0.048 [5]
LN(M2)	1.154 [9]***	0.314 [9]***	0.735 [2]**	0.082 [9]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 362 NG Prices and M2 (2005-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-1.654 [0] (0.451)	-2.667 [0] (0.252)	-10.397 [0]*** (0.000)	-10.354 [0]*** (0.000)
LN(LNG)	-1.598 [1] (0.480)	-2.955 [2] (0.149)	-7.956 [0]*** (0.000)	-7.934 [0]*** (0.000)
LN(RUS)	-3.3460 [3]** (0.015)	-3.804 [3]** (0.019)	-3.303 [2]** (0.016)	-3.312 [2]* (0.069)
LN(M2)	-3.221 [1]** (0.021)	-1.546 [1] (0.808)	-12.546 [0]*** (0.000)	-13.214 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-1.806 [3] (0.376)	-2.986 [4] (0.140)	-10.415 [2]*** (0.000)	-10.373 [2]*** (0.000)
LN(LNG)	-1.685 [5] (0.436)	-2.505 [5] (0.325)	-8.113 [4]*** (0.000)	-8.094 [4]*** (0.000)
LN(RUS)	-2.650 [7]* (0.085)	-2.633 [7] (0.266)	-9.517 [7]*** (0.000)	-9.554 [7]*** (0.000)
LN(M2)	-3.234 [10]** (0.020)	-1.449 [9] (0.841)	-12.497 [2]*** (0.000)	-13.248 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.905 [9]***	0.121 [8]*	0.046 [2]	0.046 [2]
LN(LNG)	1.051 [9]***	0.099 [8]	0.057 [5]	0.047 [5]
LN(RUS)	0.551 [9]**	0.087 [9]	0.107 [7]	0.045 [7]
LN(M2)	1.154 [9]***	0.314 [9]***	0.735 [2]**	0.082 [9]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 363 Oil Prices and SI (2004-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-2.761 [1]* (0.066)	-2.453 [1] (0.350)	-7.567 [0] (0.000)	-7.759 [0]*** (0.000)
LN(WTI)	-3.201 [2]** (0.022)	-3.487 [2]** (0.044)	-7.610 [0]*** (0.000)	-7.748 [0]*** (0.000)
LN(DUBAI)	-2.700 [1]* (0.076)	-2.892 [2] (0.168)	-6.621 [0]*** (0.000)	-6.829 [0]*** (0.000)
LN(SI)	-1.303 [1] (0.626)	-2.158 [3] (0.508)	-6.419 [0]*** (0.000)	-6.446 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-2.612 [4]* (0.093)	-2.327 [4] (0.416)	-7.567 [0]*** (0.000)	-7.707 [1]*** (0.000)
LN(WTI)	-2.832 [4]* (0.056)	-2.740 [4] (0.222)	-7.507 [1]*** (0.000)	-7.658 [1]*** (0.000)
LN(DUBAI)	-2.520 [4] (0.112)	-2.194 [4] (0.488)	-6.621 [0]*** (0.000)	-6.718 [1]*** (0.000)
LN(SI)	-1.372 [7] (0.593)	-1.951 [7] (0.621)	-6.495 [4]*** (0.000)	-6.533 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	

LN(BRENT)	1.032 [9]***	0.113 [8]	0.214 [4]	0.046 [4]
LN(WTI)	0.934 [9]***	0.113 [8]	0.168 [4]	0.037 [4]
LN(DUBAI)	1.075 [9]***	0.141 [8]*	0.219 [5]	0.043 [4]
LN(SI)	0.578 [9]**	0.198 [9]**	0.179 [7]	0.125 [7]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 364 NG Prices and SI (2004-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-1.753 [0] (0.401)	-2.649 [0] (0.259)	-11.021 [0]*** (0.000)	-10.985 [0]*** (0.000)
LN(LNG)	-1.630 [1] (0.464)	-2.655 [1] (0.257)	-8.479 [0]*** (0.000)	-8.465 [0]*** (0.000)
LN(RUS)	-3.153 [3]** (0.025)	-3.538 [3]** (0.039)	-3.325 [2]** (0.015)	-3.435 [2]* (0.051)
LN(SI)	-1.303 [1] (0.626)	-2.158 [3] (0.508)	-6.419 [0]*** (0.000)	-6.446 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-1.894 [3] (0.334)	-2.909 [4] (0.162)	-11.020 [1]*** (0.000)	-10.985 [1]*** (0.000)
LN(LNG)	-1.617 [5] (0.471)	-2.620 [5] (0.272)	-8.515 [2]*** (0.000)	-8.501 [2]*** (0.000)
LN(RUS)	-2.547 [8] (0.106)	-2.344 [8] (0.406)	-10.279 [7]*** (0.000)	-10.362 [7]*** (0.000)
LN(SI)	-1.372 [7] (0.593)	-1.951 [7] (0.621)	-6.495 [4]*** (0.000)	-6.533 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.917 [9]***	0.111 [9]	0.047 [1]	0.043 [1]
LN(LNG)	1.194 [9]***	0.082 [9]	0.055 [4]	0.043 [4]
LN(RUS)	0.818 [9]***	0.174 [9]**	0.178 [8]	0.046 [8]
LN(SI)	0.578 [9]**	0.198 [9]**	0.179 [7]	0.125 [7]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 365 Oil Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-1.657 [1] (0.451)	-1.707 [1] (0.744)	-19.093 [0]*** (0.000)	-19.081 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-1.827 [6] (0.366)	-2.134 [6] (0.523)	-18.773 [6]*** (0.000)	-18.786 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.175 [11]***	0.293 [11]***	0.105 [5]	0.044 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. ***, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.

Table 366 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-1.657 [1] (0.451)	-1.707 [1] (0.744)	-19.093 [0]*** (0.000)	-19.081 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-1.827 [6] (0.366)	-2.134 [6] (0.523)	-18.773 [6]*** (0.000)	-18.786 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.175 [11]***	0.293 [11]***	0.105 [5]	0.044 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. ***, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.

Table 367 SI and IP (2004-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-1.303 [1] (0.626)	-2.158 [3] (0.508)	-6.419 [0]*** (0.000)	-6.446 [0]*** (0.000)
LN(IP)	-2.131 [1] (0.232)	-2.106 [1] (0.536)	-14.761 [0]*** (0.000)	-14.734 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.372 [7] (0.593)	-1.951 [7] (0.621)	-6.495 [4]*** (0.000)	-6.533 [4]*** (0.000)
LN(IP)	-2.550 [6] (0.106)	-2.512 [6] (0.321)	-14.541 [6]*** (0.000)	-14.531 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.578 [9]**	0.198 [9]**	0.179 [7]	0.125 [7]*
LN(IP)	0.126 [9]	0.130 [9]*	0.094 [5]	0.065 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. ***, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.

Table 368 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [1]	H0: r=0 H1: r≤1	0.545497 0.226475	16.72555** 4.108749**	0.0325 0.0427	12.61680* 4.108749	0.0896 0.0427
BRENT PRICE M2 [2]	H0: r=0 H1: r≤1	0.103911 0.070627	21.40649*** 8.569730***	0.0057 0.0034	12.83676* 8.569730***	0.0830 0.0034
WTI PRICE M2 [3]	H0: r=0 H1: r≤1	0.120431 0.096618	26.67228*** 11.78674***	0.0007 0.0006	14.88555** 11.78674***	0.0398 0.0006
DUBAI PRICE M2 [2]	H0: r=0 H1: r≤1	0.105576 0.084051	23.32627*** 10.27202***	0.0027 0.0013	13.05425* 10.27202***	0.0770 0.0013

HH PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.141207 0.079651	27.52186*** 9.711230***	0.0005 0.0018	17.81063** 9.711230***	0.0132 0.0018
LNG PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.092026 0.044608	16.63423** 5.339097**	0.0336 0.0208	11.29514 5.339097**	0.1400 0.0208
RUS PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.133488 0.077544	25.75942*** 9.282259***	0.0010 0.0023	16.47716** 9.282259***	0.0220 0.0023
BRENT PRICE **SI [8]**	H0: r=0 H1: r≤1	0.079214 0.021952	12.88109 2.730233*	0.1192 0.0985	10.15086 2.730233*	0.2022 0.0985
WTI PRICE **SI [4]**	H0: r=0 H1: r≤1	0.083944 0.018078	13.45208* 2.316960	0.0992 0.1280	11.13512 2.316960	0.1476 0.1280
DUBAI PRICE **SI [4]**	H0: r=0 H1: r≤1	0.062367 0.017842	10.46481 2.286416	0.2467 0.1305	8.178397 2.286416	0.3608 0.1305
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.068203 0.013256	10.83412 1.721479	0.2219 0.1895	9.112646 1.721479	0.2769 0.1895
LNG PRICE **SI [4]**	H0: r=0 H1: r≤1	0.052883 0.009832	8.155090 1.254906	0.4490 0.2626	6.900184 1.254906	0.5010 0.2626
RUS PRICE **SI [6]**	H0: r=0 H1: r≤1	0.071369 0.010863	10.62089 1.365365	0.2359 0.2426	9.255523 1.365365	0.2655 0.2426
BRENT PRICE **IP [2]**	H0: r=0 H1: r≤1	0.024694 0.018888	8.858644 3.832794*	0.3786 0.0503	5.025850 3.832794*	0.7386 0.0503
WTI PRICE **IP [2]**	H0: r=0 H1: r≤1	0.031611 0.018853	10.28216 3.825704*	0.2596 0.0505	6.456453 3.825704*	0.5553 0.0505
DUBAI PRICE **IP [2]**	H0: r=0 H1: r≤1	0.025108 0.018469	8.857989 3.746930*	0.3787 0.0529	5.111059 3.746930*	0.7277 0.0529
HH PRICE **IP [5]**	H0: r=0 H1: r≤1	0.046322 0.018244	13.03672 3.645700*	0.1135 0.0562	9.391021 3.645700*	0.2550 0.0562
LNG PRICE **IP [4]**	H0: r=0 H1: r≤1	0.016905 0.007181	4.827026 1.434263	0.8269 0.2311	3.392763 1.434263	0.9172 0.2311
RUS PRICE **IP [8]**	H0: r=0 H1: r≤1	0.037175 0.013524	10.04254 2.655185	0.2775 0.1032	7.387359 2.655185	0.4444 0.1032
SI **IP [4]**	H0: r=0 H1: r≤1	0.053941 0.016228	9.120016 2.077883	0.3544 0.1494	7.042133 2.077883	0.4842 0.1494

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 369 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	**Chi-sq**	**Prob.**	**df**	**Causal Relation**
BRENT does not granger cause SI SI does not granger cause BRENT	31.264*** 4.052	0.000 0.852	8	BRENT→SI
DUBAI does not granger cause SI SI does not granger cause DUBAI	12.455** 1.138	0.014 0.888	4	DUBAI→SI
HH does not granger cause SI SI does not granger cause HH	1.955 4.752*	0.376 0.092	2	SI→HH
LNG does not granger cause SI SI does not granger cause LNG	11.612** 12.198**	0.020 0.015	4	LNG↔SI
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	23.300*** 20.729***	0.000 0.002	6	RUSSIA↔SI
BRENT does not granger cause IP IP does not granger cause BRENT	15.836*** 0.280	0.000 0.869	2	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	13.935*** 0.383	0.000 0.825	2	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	17.938*** 1.680	0.000 0.431	2	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	7.118 10.946*	0.212 0.052	5	IP→HH
LNG does not granger cause IP IP does not granger cause LNG	12.501** 5.570	0.014 0.233	4	LNG→IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	5.491 59.002***	0.704 0.000	8	IP→RUSSIA
SI does not granger cause IP IP does not granger cause SI	14.696*** 7.884*	0.005 0.095	4	SI↔IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 370 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	6.880*** 1.617	0.008 0.203	1	EC→GDP
BRENT does not granger cause M2 M2 does not granger cause BRENT	2.235 2.195	0.327 0.333	2	No causal relation
WTI does not granger cause M2 M2 does not granger cause WTI	1.348 3.661	0.717 0.300	3	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	3.490 2.628	0.174 0.268	2	No causal relation
HH does not granger cause M2 M2 does not granger cause HH	1.547 0.840	0.4161 0.656	2	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	2.868 2.102	0.238 0.349	2	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	5.710 4.154	0.221 0.385	4	No causal relation
WTI does not granger cause SI SI does not granger cause WTI	4.243 3.312	0.374 0.507	4	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

SPAIN

UNIT ROOT TEST RESULTS

Table 371 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.255 [1] (0.638)	-0.537 [0] (0.999)	-4.322 [0]*** (0.001)	-4.535 [0]*** (0.004)
LN(GDP)	-1.012 [1] (0.737)	-2.322 [1] (0.411)	-2.383 [0] (0.153)	-2.410 [0] (0.368)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-1.543 [4] (0.500)	-0.152 [3] (0.991)	-4.503 [4]*** (0.001)	-4.694 [4]*** (0.003)
LN(GDP)	-0.815 [3] (0.802)	-1.437 [3] (0.832)	-2.417 [1]*** (0.144)	-2.441 [1]*** (0.353)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.658 [5]**	0.130 [4]*	0.284 [4]	0.138 [4]*
LN(GDP)	0.696 [5]**	0.096 [4]	0.166 [3]	0.145 [3]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 372 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-4.543 [0]*** (0.000)	-9.025 [0]*** (0.000)	-8.218 [0]*** (0.000)	-7.762 [0]*** (0.000)
LN(GDP)	-1.633 [1] (0.456)	-2.058 [1] (0.552)	-2.670 [0]* (0.087)	-2.963 [0] (0.154)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-3.650 [3]*** (0.008)	-6.891 [4]*** (0.000)	-10.422 [3]*** (0.000)	-9.665 [3]*** (0.000)
LN(GDP)	-1.921 [4] (0.319)	-1.190 [4] (0.899)	-2.691 [1]* (0.083)	-2.963 [0] (0.154)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.848 [5]***	0.093 [2]	0.395 [2]*	0.120 [2]*
LN(GDP)	0.820 [5]***	0.099 [4]	0.274 [4]	0.101 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 373 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-1.280 [3] (0.629)	-1.925 [3] (0.622)	-2.109 [2] (0.242)	-2.125 [2]*** (0.516)
LN(GDP)	-1.633 [1] (0.456)	-2.058 [1] (0.552)	-2.670 [0]* (0.087)	-2.963 [0] (0.154)
	PP (Level)		PP (First Difference)	
LN(OIL)	-2.597 [5] (0.101)	-1.858 [5] (0.658)	-4.670 [4]*** (0.000)	-5.361 [5]*** (0.000)
LN(GDP)	-1.921 [4] (0.319)	-1.190 [4] (0.899)	-2.691 [1]* (0.083)	-2.963 [0] (0.154)
	KPSS (Level)		KPSS (First Difference)	
LN(OIL)	0.732 [5]**	0.076 [4]**	0.308 [5]	0.107 [5]
LN(GDP)	0.820 [5]***	0.099 [4]	0.274 [4]	0.101 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 374 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-1.847 [13] (0.356)	-1.943 [12] (0.627)	-1.369 [12] (0.596)	-1.958 [12] (0.619)
	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-3.469 [5]*** (0.009)	-0.666 [2] (0.999)	-14.049 [7]*** (0.000)	-14.786 [4]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.603 [10]***	0.370 [10]***	1.077 [7]***	0.256 [3]***

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 375 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-1.847 [13] (0.356)	-1.943 [12] (0.627)	-1.369 [12] (0.596)	-1.958 [12] (0.619)

	PP (Level)		PP (First Difference)	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-3.469 [5]*** (0.009)	-0.666 [2] (0.999)	-14.049 [7]*** (0.000)	-14.786 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.603 [10]***	0.370 [10]***	1.077 [7]***	0.256 [3]***

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 376 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-2.090 [1] (0.248)	-2.214 [1] (0.478)	-10.414 [0]*** (0.000)	-10.419 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.876 [5] (0.342)	-1.952 [5] (0.622)	-10.367 [2]*** (0.000)	-10.370 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.226 [10]	0.178 [10]**	0.101 [4]	0.095 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 377 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-2.090 [1] (0.248)	-2.214 [1] (0.478)	-10.414 [0]*** (0.000)	-10.419 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9]	-2.142 [9]	-12.469 [8]***	-12.462 [8]***

	(0.545)	(0.518)	(0.000)	(0.000)
LN(SI)	-1.876 [5] (0.342)	-1.952 [5] (0.622)	-10.367 [2]*** (0.000)	-10.370 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.226 [10]	0.178 [10]**	0.101 [4]	0.095 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 378 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-0.404 [3] (0.905)	-1.775 [3] (0.713)	-6.353 [2]*** (0.000)	-6.503 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-0.263 [5] (0.926)	-1.839 [5] (0.682)	-16.918 [7]*** (0.000)	-17.042 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.042 [11]***	0.364 [11]***	0.412 [5]*	0.103 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 379 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-0.404 [3] (0.905)	-1.775 [3] (0.713)	-6.353 [2]*** (0.000)	-6.503 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-0.263 [5] (0.926)	-1.839 [5] (0.682)	-16.918 [7]*** (0.000)	-17.042 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]

LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.042 [11]***	0.364 [11]***	0.412 [5]*	0.103 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 380 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-2.090 [1] (0.248)	-2.214 [1] (0.478)	-10.414 [0]*** (0.000)	-10.419 [0]*** (0.000)
LN(IP)	-0.457 [3] (0.895)	-1.668 [3] (0.761)	-6.019 [2]*** (0.000)	-6.053 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.876 [5] (0.342)	-1.952 [5] (0.622)	-10.367 [2]*** (0.000)	-10.370 [2]*** (0.000)
LN(IP)	-0.271 [5] (0.925)	-1.683 [5] (0.754)	-15.595 [7]*** (0.000)	-15.603 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.226 [10]	0.178 [10]**	0.101 [4]	0.095 [4]
LN(IP)	1.232 [10]***	0.315 [10]***	0.240 [5]	0.113 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 381 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [2]	H0: r=0 H1: r≤1	0.174849 0.041262	7.967071 1.432661	0.4689 0.2313	6.534410 1.432661	0.5456 0.2313
OILC GDP [4]	H0: r=0 H1: r≤1	0.116946 0.024173	5.804732 0.954328	0.7185 0.3286	4.850405 0.954328	0.7606 0.3286
BRENT PRICE M2 [7]	H0: r=0 H1: r≤1	0.084450 0.024505	19.44290** 4.267379**	0.0120 0.0388	15.17552** 4.267379**	0.0358 0.0388
WTI PRICE M2 [7]	H0: r=0 H1: r≤1	0.100448 0.022996	22.20909*** 4.001418**	0.0042 0.0455	18.20767** 4.001418**	0.0113 0.0455
DUBAI PRICE M2 [7]	H0: r=0 H1: r≤1	0.081249 0.023313	18.63254** 4.057307**	0.0163 0.0440	14.57524** 4.057307**	0.0447 0.0440
HH PRICE M2 [7]	H0: r=0 H1: r≤1	0.113317 0.019578	24.08679*** 3.400821*	0.0020 0.0652	20.68597*** 3.400821*	0.0042 0.0652
LNG PRICE M2 [7]	H0: r=0 H1: r≤1	0.046031 0.021845	11.90432 3.798967*	0.1616 0.0513	8.105356 3.798967*	0.3681 0.0513
RUS PRICE M2 [7]	H0: r=0 H1: r≤1	0.071723 0.021225	16.49102** 3.689979*	0.0353 0.0547	12.80104* 3.689979*	0.0840 0.0547
BRENT PRICE SI [2]	H0: r=0 H1: r≤1	0.030277 0.013780	7.897843 2.456042	0.4764 0.1171	5.441801 2.456042	0.6853 0.1171
WTI PRICE SI [2]	H0: r=0 H1: r≤1	0.032358 0.017050	8.865986 3.043848*	0.3779 0.0810	5.822138 3.043848*	0.6362 0.0810
DUBAI PRICE SI [2]	H0: r=0 H1: r≤1	0.029932 0.014441	7.953646 2.574739	0.4704 0.1086	5.378908 2.574739	0.6934 0.1086
HH PRICE SI [2]	H0: r=0 H1: r≤1	0.059856 0.019057	14.33059* 3.405664*	0.0743 0.0650	10.92492 3.405664*	0.1580 0.0650
LNG PRICE SI [3]	H0: r=0 H1: r≤1	0.023522 0.006803	5.390882 1.201498	0.7660 0.2730	4.189383 1.201498	0.8389 0.2730
RUS PRICE SI [4]	H0: r=0 H1: r≤1	0.051948 0.006929	10.55243 1.216842	0.2406 0.2700	9.335586 1.216842	0.2593 0.2700
BRENT PRICE IP [4]	H0: r=0 H1: r≤1	0.049712 0.005385	11.22163 1.074582	0.1982 0.2999	10.14705 1.074582	0.2025 0.2999
WTI PRICE IP [4]	H0: r=0 H1: r≤1	0.051173 0.004873	11.42535 0.972150	0.1867 0.3241	10.45320 0.972150	0.1838 0.3241
DUBAI PRICE IP [4]	H0: r=0 H1: r≤1	0.049659 0.005866	11.30660 1.170681	0.1933 0.2793	10.13592 1.170681	0.2032 0.2793
HH PRICE IP [4]	H0: r=0 H1: r≤1	0.056675 0.001282	11.86589 0.255367	0.1635 0.6133	11.61052 0.255367	0.1261 0.6133

LNG PRICE **IP [8]**	H0: r=0 H1: r≤1	0.042991 6.38E-05	8.581294 0.012451	0.4055 0.9109	8.568843 0.012451	0.3238 0.9109
RUS PRICE **IP [7]**	H0: r=0 H1: r≤1	0.026968 0.000582	5.472433 0.114044	0.7568 0.7356	5.358388 0.114044	0.6961 0.7356
SI **IP [4]**	H0: r=0 H1: r≤1	0.033515 0.000448	6.044184 0.078470	0.6903 0.7794	5.965715 0.078470	0.6176 0.7794

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 382 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	1.156** 7.808	0.020 0.560	2	EC→GDP
OILC does not granger cause GDP GDP does not granger cause OILC	0.609 5.119	0.962 0.275	4	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	2.754 14.421**	0.906 0.044	7	M2→LNG
BRENT does not granger cause SI SI does not granger cause BRENT	0.435 9.348***	0.804 0.009	2	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	0.901 5.270*	0.637 0.071	2	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	0.514 11.779***	0.773 0.002	2	SI→DUBAI
LNG does not granger cause SI SI does not granger cause LNG	0.199 11.143**	0.977 0.011	3	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	8.700* 9.568**	0.069 0.048	4	RUSSIA↔SI
BRENT does not granger cause IP IP does not granger cause BRENT	20.325*** 0.131	0.000 0.997	4	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	21.408*** 1.719	0.000 0.787	4	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	24.403*** 0.211	0.000 0.994	4	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	8.286* 8.255*	0.081 0.082	4	HH↔IP
LNG does not granger cause IP IP does not granger cause LNG	31.113*** 16.916**	0.000 0.031	8	LNG↔IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	20.426*** 30.484***	0.004 0.000	7	RUSSIA↔IP
SI does not granger cause IP IP does not granger cause SI	12.055** 6.302	0.016 0.177	4	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 383 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	9.773 4.057	0.201 0.773	7	No causal relation
WTI does not granger cause M2 M2 does not granger cause WTI	14.075** 4.793	0.049 0.685	7	WTI→M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	10.325 2.802	0.170 0.902	7	No causal relation
HH does not granger cause M2 M2 does not granger cause HH	9.377 17.533**	0.226 0.014	7	M2→HH
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	6.772 4.009	0.453 0.778	7	No causal relation
HH does not granger cause SI SI does not granger cause HH	0.330 0.973	0.847 0.614	2	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively**

SWEDEN

UNIT ROOT TEST RESULTS

Table 384 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-2.934 [0]* (0.051)	-2.640 [0] (0.265)	-8.158 [0]*** (0.000)	-8.218 [0]*** (0.000)
LN(GDP)	-0.074 [0] (0.959)	-2.573 [1] (0.293)	-4.385 [0]*** (0.001)	-4.329 [0]*** (0.008)
	PP (Level)		PP (First Difference)	
LN(EC)	-2.953 [3]** (0.049)	-2.702 [3] (0.241)	-8.176 [1]*** (0.000)	-8.218 [0]*** (0.000)
LN(GDP)	-0.020 [1] (0.950)	-2.168 [1] (0.491)	-4.290 [4]*** (0.001)	-4.233 [4]** (0.010)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.360 [4]*	0.171 [4]**	0.229 [2]	0.022 [0]
LN(GDP)	0.700 [5]**	0.107 [4]	0.089 [1]	0.065 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 385 NG Consumption and GDP (1985-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-7.551 [0]*** (0.000)	-6.656 [0]*** (0.000)	-3.497 [1]** (0.016)	-3.550 [1]* (0.054)
LN(GDP)	-0.641 [0] (0.845)	-2.002 [1] (0.573)	-3.781 [0]*** (0.008)	-3.708 [0]** (0.039)
	PP (Level)		PP (First Difference)	
LN(NG)	-7.278 [3]*** (0.000)	-7.022 [2]*** (0.000)	-7.233 [26]*** (0.000)	-8.028 [26]*** (0.000)
LN(GDP)	-0.672 [1] (0.837)	-1.645 [2] (0.748)	-3.743 [2]*** (0.009)	-3.670 [2]** (0.042)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.548 [4]**	0.138 [3]*	0.411 [3]*	0.156 [3]**
LN(GDP)	0.655 [4]**	0.094 [4]	0.112 [1]	0.112 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 386 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-1.345 [0] (0.599)	-1.916 [0] (0.628)	7.187 [0]*** (0.000)	-7.114 [0]*** (0.000)
LN(GDP)	-0.575 [0] (0.865)	-2.604 [1] (0.280)	-4.806 [0]*** (0.000)	-4.764 [0]*** (0.002)
	PP (Level)		PP (First Difference)	
LN(OIL)	-1.345 [0] (0.599)	-1.874 [2] (0.650)	-7.184 [1]*** (0.000)	-7.112 [1]*** (0.000)
LN(GDP)	-0.575 [0] (0.865)	-2.119 [1] (0.520)	-4.737 [3]*** (0.000)	-4.695 [3]*** (0.002)
	KPSS (Level)		KPSS (First Difference)	
LN(OIL)	0.717 [5]**	0.167 [5]**	0.113 [1]	0.057 [0]
LN(GDP)	0.823 [5]***	0.087 [4]	0.083 [0]	0.083 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 387 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-1.505 [1] (0.528)	-2.729 [1] (0.226)	-10.352 [0]*** (0.000)	-10.557 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.433 [7] (0.565)	-2.239 [6] (0.464)	-10.522 [5]*** (0.000)	-10.602 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	0.587 [10]**	0.127 [10]*	0.220 [7]	0.076 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 388 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-1.505 [1] (0.528)	-2.729 [1] (0.226)	-10.352 [0]*** (0.000)	-10.557 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-1.433 [7] (0.565)	-2.239 [6] (0.464)	-10.522 [5]*** (0.000)	-10.602 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	0.587 [10]**	0.127 [10]*	0.220 [7]	0.076 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 389 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1]	-2.199 [1]	-10.385 [0]***	-10.449 [0]***

	(0.319)	(0.486)	(0.000)	(0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-2.273 [1] (0.181)	-2.120 [1] (0.531)	-15.172 [1]*** (0.000)	-15.354 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-2.617 [4]* (0.091)	-2.496 [4] (0.329)	-24.315 [4]*** (0.000)	-24.820 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	0.337 [11]	0.318 [11]***	0.183 [7]	0.036 [8]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 390 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-2.273 [1] (0.181)	-2.120 [1] (0.531)	-15.172 [1]*** (0.000)	-15.354 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-2.617 [4]* (0.091)	-2.496 [4] (0.329)	-24.315 [4]*** (0.000)	-24.820 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	0.337 [11]	0.318 [11]***	0.183 [7]	0.036 [8]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 391 Johansen Cointegration Test Results

Variables	**Hypothesis**	**Eigenvalue**	**Trace Statistic**	**Prob.**	**Max-Eigen Statistic**	**Prob.**
EC **GDP [1]**	H0: r=0 H1: r≤1	0.125504 0.005700	4.893830 0.200054	0.8200 0.6547	4.693776 0.200054	0.7799 0.6547
OILC **GDP [1]**	H0: r=0 H1: r≤1	0.061648 0.019865	3.515219 0.842731	0.9387 0.3586	2.672488 0.842731	0.9661 0.3586
BRENT PRICE **M2 [6]**	H0: r=0 H1: r≤1	0.071968 0.016857	15.86237** 2.941151*	0.0440 0.0863	12.92122* 2.941151*	0.0806 0.0863
WTI PRICE **M2 [6]**	H0: r=0 H1: r≤1	0.072829 0.018498	16.31193** 3.230084*	0.0376 0.0723	13.08185* 3.230084*	0.0762 0.0723

DUBAI PRICE M2 [6]	H0: r=0 H1: r≤1	0.074441 0.014987	15.99517** 2.612314	0.0420 0.1060	13.38286* 2.612314	0.0685 0.1060
HH PRICE M2 [2]	H0: r=0 H1: r≤1	0.040639 0.0145730	9.941798 2.598440	0.2852 0.1070	7.343358 2.598440	0.4494 0.1070
LNG PRICE M2 [4]	H0: r=0 H1: r≤1	0.073982 0.003883	14.13159* 0.680814	0.0794 0.4093	13.45078* 0.680814	0.0669 0.4093
RUS PRICE M2 [4]	H0: r=0 H1: r≤1	0.082107 0.004270	15.74187** 0.748827	0.0459 0.3868	14.99304** 0.748827	0.0383 0.3868
BRENT PRICE IP [4]	H0: r=0 H1: r≤1	0.033909 0.014367	9.744746 2.879810*	0.3009 0.0897	6.864936 2.879810*	0.5052 0.0897
WTI PRICE IP [4]	H0: r=0 H1: r≤1	0.035760 0.013825	10.01695 2.770450*	0.2794 0.0960	7.246500 2.770450*	0.4604 0.0960
DUBAI PRICE IP [4]	H0: r=0 H1: r≤1	0.034073 0.014480	9.801315 2.902627*	0.2963 0.0884	6.898688 2.902627*	0.5012 0.0884
HH PRICE IP [2]	H0: r=0 H1: r≤1	0.065447 0.019395	17.54168** 3.936681**	0.0243 0.0472	13.60500* 3.936681**	0.0634 0.0472
LNG PRICE IP [4]	H0: r=0 H1: r≤1	0.039247 0.002174	8.400486 0.433035	0.4236 0.5105	7.967451 0.433035	0.3820 0.5105
RUS PRICE IP [5]	H0: r=0 H1: r≤1	0.034076 0.006030	8.062354 1.197595	0.4588 0.2738	6.864759 1.197595	0.5053 0.2738

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 392 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	0.530 0.006	0.466 0.934	1	No causal relation
OILC does not granger cause GDP GDP does not granger cause OILC	0.378 1.812	0.538 0.178	1	No causal relation
HH does not granger cause M2 M2 does not granger cause HH	0.204 0.093	0.902 0.954	2	No causal relation
BRENT does not granger cause IP IP does not granger cause BRENT	22.556*** 2.225	0.000 0.694	4	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	19.360*** 1.557	0.000 0.816	4	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	24.505*** 1.241	0.000 0.871	4	DUBAI→IP
LNG does not granger cause IP IP does not granger cause LNG	18.568*** 4.134	0.001 0.388	4	LNG→IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	5.150 25.793***	0.397 0.000	5	IP→RUSSIA

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 393 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	20.100*** 15.278**	0.002 0.018	6	BRENT↔M2
WTI does not granger cause M2 M2 does not granger cause WTI	19.131*** 11.266*	0.003 0.080	6	WTI↔M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	22.489*** 16.955***	0.001 0.009	6	DUBAI↔M2
LNG does not granger cause M2 M2 does not granger cause LNG	12.906** 12.162**	0.011 0.016	4	LNG↔M2

RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	2.448 1.776	0.653 0.776	4	No causal relation
HH does not granger cause IP IP does not granger cause HH	1.039 2.482	0.594 0.289	2	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

SWITZERLAND

Table 394 EC and GDP (1980-2012) –Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.999 [0] (0.285)	-1.483 [0] (0.814)	-6.300 [0]*** (0.000)	-6.966 [0]*** (0.000)
LN(GDP)	-0.548 [0] (0.868)	-3.210 [1] (0.101)	-3.909 [0]*** (0.005)	-3.839 [0]** (0.027)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-1.828 [4] (0.360)	-0.912 [8] (0.942)	-6.328 [3]*** (0.000)	-16.990 [30]*** (0.000)
LN(GDP)	-0.567 [4] (0.864)	-2.421 [2] (0.362)	-3.735 [9]*** (0.008)	-3.607 [9]** (0.045)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.271 [4]	0.180 [4]**	0.368 [6]*	0.500 [31]***
LN(GDP)	0.737 [4]**	0.070 [3]	0.059 [4]	0.059 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 395 NG Consumption and GDP (1980-2013) –Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-3.081 [1]** (0.038)	-2.014 [0] (0.572)	-6.479 [0]*** (0.000)	-7.419 [0]*** (0.000)
LN(GDP)	-0.570 [0] (0.863)	-3.267 [1]* (0.089)	-3.999 [0]*** (0.004)	-3.933 [0]** (0.022)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-4.529 [11]*** (0.001)	-1.998 [4] (0.580)	-6.447 [2]*** (0.000)	-7.855 [4]*** (0.000)
LN(GDP)	-0.587 [4] (0.860)	-2.448 [2] (0.349)	-3.865 [9]*** (0.005)	-3.745 [9]** (0.033)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.648 [5]**	0.204 [4]**	0.495 [2]**	0.132 [7]*
LN(GDP)	0.659 [5]**	0.065 [3]	0.058 [4]	0.066 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 396 Oil Consumption and GDP (1980-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-3.692 [0]*** (0.008)	-3.848 [0]** (0.026)	-4.969 [2]*** (0.000)	-5.367 [2]*** (0.000)
LN(GDP)	-0.570 [0] (0.863)	-3.267 [1]* (0.089)	-3.999 [0]*** (0.004)	-3.933 [0]** (0.022)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-3.731 [2]*** (0.008)	-3.874 [1]** (0.024)	-16.029 [31]*** (0.000)	-18.627 [20]*** (0.000)
LN(GDP)	-0.587 [4] (0.860)	-2.448 [2] (0.349)	-3.865 [9]*** (0.005)	-3.745 [9]** (0.033)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.340 [3]	0.187 [3]**	0.500 [32]**	0.500 [32]***
LN(GDP)	0.659 [5]**	0.065 [3]	0.058 [4]	0.066 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 397 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-0.020 [1] (0.954)	-1.889 [1] (0.655)	-6.905 [0]*** (0.000)	-6.929 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-0.286 [8] (0.977)	-1.879 [8] (0.661)	-6.951 [4]*** (0.000)	-6.990 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.504 [10]***	0.254 [10]***	0.190 [8]	0.072 [8]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 398 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.020 [1] (0.954)	-1.889 [1] (0.655)	-6.905 [0]*** (0.000)	-6.929 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-0.286 [8] (0.977)	-1.879 [8] (0.661)	-6.951 [4]*** (0.000)	-6.990 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.504 [10]***	0.254 [10]***	0.190 [8]	0.072 [8]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 399 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	

	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1511 [1] (0.525)	-1.756 [1] (0.721)	-10.408 [0]*** (0.000)	-10.434 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.629 [6] (0.465)	-1.869 [6] (0.666)	-10.448 [3]*** (0.000)	-10.469 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.208 [10]	0.097 [10]	0.136 [6]	0.070 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 400 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1511 [1] (0.525)	-1.756 [1] (0.721)	-10.408 [0]*** (0.000)	-10.434 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.629 [6] (0.465)	-1.869 [6] (0.666)	-10.448 [3]*** (0.000)	-10.469 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.208 [10]	0.097 [10]	0.136 [6]	0.070 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 401 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1]	-2.203 [1]	-9.902 [0]***	-9.991 [0]***

	(0.302)	(0.484)	(0.000)	(0.000)
LN(IP)	-0.702 [1] (0.842)	-2.313 [1] (0.424)	-8.460 [0]*** (0.000)	-8.438 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-0.651 [6] (0.854)	-2.098 [6] (0.543)	-8.387 [0]*** (0.000)	-8.366 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.672 [11]***	0.120 [11]*	0.060 [6]	0.060 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 402 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-0.702 [1] (0.842)	-2.313 [1] (0.424)	-8.460 [0]*** (0.000)	-8.438 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** .(0.000)
LN(IP)	-0.651 [6] (0.854)	-2.098 [6] (0.543)	-8.387 [0]*** (0.000)	-8.366 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.672 [11]***	0.120 [11]*	0.060 [6]	0.060 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 403 SI and IP (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-1.511 [1] (0.525)	-1.756 [1] (0.721)	-10.408 [0]*** (0.000)	-10.434 [0]*** (0.000)
LN(IP)	-0.451 [1] (0.896)	-2.309 [1] (0.426)	-8.142 [0]*** (0.000)	-8.134 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.629 [6] (0.465)	-1.869 [6] (0.666)	-10.448 [3]*** (0.000)	-10.469 [3]*** (0.000)
LN(IP)	-0.434 [5] (0.899)	-2.001 [5] (0.596)	-8.246 [2]*** (0.000)	8.237 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.208 [10]	0.097 [10]	0.136 [6]	0.070 [5]

LN(IP)	1.575 [10]***	0.136 [10]*	0.097 [5]	0.087 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 404 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [2]	H0: r=0 H1: r≤1	0.510131 0.000100	21.41154*** 0.003002	0.0057 0.9547	21.40854*** 0.003002	0.0032 0.9547
NGC GDP [2]	H0: r=0 H1: r≤1	0.362530 0.074528	16.35870** 2.401008	0.0370 0.1213	13.95769* 2.401008	0.0558 0.1213
BRENT PRICE M2 [7]	H0: r=0 H1: r≤1	0.022431 0.015576	6.602291 2.700201	0.6243 0.1003	3.902090 2.700201	0.8695 0.1003
WTI PRICE M2 [4]	H0: r=0 H1: r≤1	0.024048 0.003661	4.901754 0.641843	0.8192 0.4230	4.259911 0.641843	0.8310 0.4230
DUBAI PRICE M2 [7]	H0: r=0 H1: r≤1	0.027491 0.014934	7.382715 2.588068	0.5336 0.1077	4.794647 2.588068	0.7675 0.1077
HH PRICE M2 [2]	H0: r=0 H1: r≤1	0.059448 4.77E-05	10.85655 0.008442	0.2205 0.9264	10.84811 0.008442	0.1620 0.9264
LNG PRICE M2 [2]	H0: r=0 H1: r≤1	0.079017 0.001384	14.81462* 0.245096	0.0631 0.6205	14.56952** 0.245096	0.0447 0.6205
RUS PRICE M2 [5]	H0: r=0 H1: r≤1	0.058472 0.000111	10.50290 0.019253	0.2440 0.8895	10.48365 0.019253	0.1821 0.8895
BRENT PRICE SI [2]	H0: r=0 H1: r≤1	0.023108 0.018438	7.432028 3.293984*	0.5280 0.0695	4.138044 3.293984*	0.8445 0.0695
WTI PRICE SI [2]	H0: r=0 H1: r≤1	0.027770 0.017645	8.135854 3.151042*	0.4510 0.0759	4.984812 3.151042*	0.7438 0.0759
DUBAI PRICE SI [2]	H0: r=0 H1: r≤1	0.024480 0.017794	7.564810 3.177986*	0.5130 0.0746	4.386824 3.177986*	0.8164 0.0746
HH PRICE SI [2]	H0: r=0 H1: r≤1	0.043140 0.012435	10.02016 2.214736	0.2792 0.1367	7.805423 2.214736	0.3988 0.1367
LNG PRICE SI [3]	H0: r=0 H1: r≤1	0.028241 0.008173	6.486270 1.444291	0.6380 0.2294	5.041978 1.444291	0.7365 0.2294
RUS PRICE SI [4]	H0: r=0 H1: r≤1	0.046243 0.007974	9.686593 1.401025	0.3056 0.2366	8.285568 1.401025	0.3504 0.2366
BRENT PRICE IP [2]	H0: r=0 H1: r≤1	0.041500 0.011830	10.91153 2.391974	0.2170 0.1220	8.519555 2.391974	0.3283 0.1220
WTI PRICE IP [4]	H0: r=0 H1: r≤1	0.042059 0.009121	10.37414 1.823384	0.2530 0.1769	8.550760 1.823384	0.3254 0.1769
DUBAI PRICE IP [4]	H0: r=0 H1: r≤1	0.042746 0.010887	10.87203 2.178434	0.2195 0.1400	8.693592 2.178434	0.3125 0.1400
HH PRICE IP [5]	H0: r=0 H1: r≤1	0.044429 0.001835	9.361993 0.363680	0.3330 0.5465	8.998312 0.363680	0.2863 0.5465
LNG PRICE IP [4]	H0: r=0 H1: r≤1	0.047910 0.003832	10.53402 0.763967	0.2419 0.3821	9.770055 0.763967	0.2275 0.3821
RUS PRICE IP [5]	H0: r=0 H1: r≤1	0.070286 0.005262	15.47458** 1.044687	0.0504 0.3067	14.42989** 1.044687	0.0471 0.3067
SI IP [4]	H0: r=0 H1: r≤1	0.036985 0.001444	6.848126 0.252939	0.5954 0.6150	6.595187 0.252939	0.5381 0.6150

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level.
MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 405 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	0.637 4.457	0.726 0.107	2	No causal relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	33.714*** 10.002	0.000 0.188	7	BRENT→M2

WTI does not granger cause M2 M2 does not granger cause WTI	15.751*** 13.599***	0.003 0.008	4	WTI↔M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	45.934*** 8.634	0.000 0.280	7	DUBAI→M2
HH does not granger cause M2 M2 does not granger cause HH	1.331 1.725	0.513 0.422	2	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	3.877 32.686***	0.567 0.000	5	M2→RUSSIA
BRENT does not granger cause SI SI does not granger cause BRENT	1.017 7.164**	0.601 0.027	2	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	0.895 4.818*	0.639 0.089	2	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	0.923 7.369**	0.630 0.025	2	SI→DUBAI
HH does not granger cause SI SI does not granger cause HH	0.156 2.041	0.924 0.360	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	6.244 11.061**	0.100 0.011	3	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	3.623 8.099*	0.459 0.088	4	SI→RUSSIA
BRENT does not granger cause IP IP does not granger cause BRENT	8.605** 0.601	0.013 0.740	2	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	7.234** 0.854	0.026 0.652	2	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	13.473*** 2.313	0.009 0.678	4	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	5.519 6.020	0.355 0.304	5	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	6.826 12.751**	0.145 0.012	4	IP→LNG
SI does not granger cause IP IP does not granger cause SI	18.737*** 7.712	0.000 0.102	4	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 406 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
NGC does not granger cause GDP GDP does not granger cause NGC	0.811 4.308	0.666 0.116	2	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	1.311 18.622***	0.519 0.000	2	M2→LNG
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	14.191** 6.562	0.014 0.255	5	RUSSIA→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

TURKEY

UNIT ROOT TEST RESULTS

Table 407 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-0.140[0] (0.937)	-2.829 [0] (0.196)	-6.036 [0]*** (0.000)	-6.007 [0]*** (0.000)
LN(GDP)	-0.231[0] (0.970)	-2.585 [0] (0.288)	-5.993 [0]*** (0.000)	-6.109 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(EC)	0.026[4] (0.955)	-2.923 [1] (0.164)	-6.064 [2]*** (0.000)	-6.045 [2]*** (0.000)
LN(GDP)	-0.496[4] (0.984)	-2.591 [3] (0.286)	-5.993 [2]*** (0.000)	-6.134 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	

LN(EC)	0.717 [5]**	0.055 [3]	0.070 [4]	0.064 [5]
LN(GDP)	0.711 [5]**	0.089 [3]	0.103 [3]	0.067 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 408 NG Consumption and GDP (1982-2013) -Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(NG)	-2.832[0]* (0.065)	-1.514 [0] (0.802)	-4.600 [0]*** (0.001)	-5.525 [0]*** (0.000)
LN(GDP)	-0.562[0] (0.865)	-3.099 [0] (0.123)	-6.158 [0]*** (0.000)	-6.048 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-2.954[2]* (0.050)	-1.504 [1] (0.806)	-4.751 [4]*** (0.000)	-5.532 [3]*** (0.000)
LN(GDP)	-0.403[5] (0.896)	-3.159 [2] (0.111)	-7.443 [6]*** (0.000)	-7.250 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.663 [4]**	0.169 [4]**	0.383 [3]*	0.068 [1]
LN(GDP)	0.749 [4]***	0.088 [1]	0.129 [6]	0.129 [6]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 409 Oil Consumption and GDP (1970-2013)-Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(OIL)	-3.672 [0]*** (0.008)	-3.012 [0] (0.140)	-5.616 [0]*** (0.000)	-6.133 [0]*** (0.000)
LN(GDP)	-0.130 [0] (0.939)	-2.717 [0] (0.234)	-6.523 [0]*** (0.000)	-6.462 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-3.672 [0]*** (0.008)	-3.006 [1] (0.142)	-5.616 [0]*** (0.000)	-6.131 [3]*** (0.000)
LN(GDP)	-0.081 [3] (0.945)	-2.717 [0] (0.234)	-6.533 [3]*** (0.000)	-6.538 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.816 [5]***	0.204 [4]**	0.517 [2]**	0.074 [1]
LN(GDP)	0.842 [5]***	0.109 [3]	0.053 [3]	0.047 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 410 Oil Prices and M2 (2006-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-2.847 [2]* (0.052)	-2.907 [2] (0.164)	-5.876 [0]*** (0.000)	-5.958 [0]*** (0.000)
LN(WTI)	-3.707 [2]*** (0.005)	-3.818 [2]** (0.019)	-4.074 [1]*** (0.001)	-4.123 [1]*** (0.008)
LN(DUBAI)	-3.101 [2]** (0.029)	-3.263 [2]* (0.078)	-4.553 [2]*** (0.000)	-4.606 [2]*** (0.001)
LN(M2)	-1.502 [0] (0.528)	-3.169 [0]* (0.096)	-10.087 [0]*** (0.000)	-10.159 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-2.323[5] (0.166)	-2.274 [5] (0.443)	-5.962 [3]*** (0.000)	-6.047 [3]*** (0.000)
LN(WTI)	-2.691[5]* (0.078)	-2.701 [5] (0.238)	-6.428 [3]*** (0.000)	-6.478 [33]*** (0.000)
LN(DUBAI)	-2.348[5] (0.158)	-2.293 [5] (0.433)	-5.445 [2]*** (0.000)	-5.533 [2]*** (0.000)
LN(M2)	-1.635 [5] (0.461)	-3.169 [0]* (0.096)	-10.144 [6]*** (0.000)	-10.243 [6]*** (0.000)

	KPSS (Level)		KPSS (First Difference)	
LN(BRENT)	0.667 [8]**	0.071 [8]	0.110 [5]	0.057 [5]
LN(WTI)	0.498 [8]**	0.048 [7]	0.082 [5]	0.045 [5]
LN(DUBAI)	0.733 [8]**	0.070 [8]	0.120 [4]	0.055 [4]
LN(M2)	1.184 [9]***	0.205 [8]**	0.207 [4]	0.068 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 411 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-1.954[0] (0.306)	-2.296 [0] (0.432)	-9.568 [0]*** (0.000)	-9.516 [0]*** (0.000)
LN(LNG)	-1.386[1] (0.586)	-2.944 [2] (0.153)	-7.291 [0]*** (0.000)	-7.254 [0]*** (0.000)
LN(RUS)	-3.401[3]** (0.013)	-3.690 [3]** (0.027)	-3.243 [2]** (0.020)	-3.223 [2]* (0.085)
LN(M2)	-1.502 [0] (0.528)	-3.169 [0]* (0.096)	-10.087 [0]*** (0.000)	-10.159 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.067[3] (0.258)	-2.572 [4] (0.293)	-9.568 [0]*** (0.000)	-9.516 [0]*** (0.000)
LN(LNG)	-1.518[5] (0.520)	-2.332 [5] (0.412)	-7.477 [4]*** (0.000)	-7.443 [4]*** (0.000)
LN(RUS)	-2.437[7] (0.134)	-2.508 [7] (0.323)	-8.756 [7]*** (0.000)	-8.735 [7]*** (0.000)
LN(M2)	-1.635 [5] (0.461)	-3.169 [0]* (0.096)	-10.144 [6]*** (0.000)	-10.243 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.824 [8]***	0.135 [8]*	0.059 [1]	0.041 [1]
LN(LNG)	0.910 [9]***	0.104 [8]	0.052 [2]	0.050 [5]
LN(RUS)	0.290 [8]	0.058 [8]	0.050 [7]	0.041 [7]
LN(M2)	1.184 [9]***	0.205 [8]**	0.207 [4]	0.068 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 412 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-0.700 [1] (0.842)	-2.640 [1] (0.262)	-11.620 [0]*** (0.000)	-11.593 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-0.539 [3] (0.879)	-2.757 [4] (0.215)	-11.640 [1]*** (0.000)	-11.613 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	1.540 [10]***	0.150 [10]**	0.102 [2]	0.093 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 413 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-0.700 [1] (0.842)	-2.640 [1] (0.262)	-11.620 [0]*** (0.000)	-11.593 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-0.539 [3] (0.879)	-2.757 [4] (0.215)	-11.640 [1]*** (0.000)	-11.613 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	1.540 [10]***	0.150 [10]**	0.102 [2]	0.093 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 414 Oil Prices and IP (2005-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-2.694 [1]* (0.078)	-2.573[1] (0.293)	-6.528[0]*** (0.000)	-6.646 [0]*** (0.000)
LN(WTI)	-3.348 [2]** (0.014)	-3.691 [2]** (0.026)	-6.875 [0]*** (0.000)	-6.963 [0]*** (0.000)
LN(DUBAI)	-2.778 [1]* (0.064)	-3.066 [2] (0.119)	-5.885 [0]*** (0.000)	-6.033 [0]*** (0.000)
LN(IP)	-0.802 [0] (0.814)	-1.885 [0] (0.655)	-6.504 [1]*** (0.000)	-6.486 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-2.592 [5]* (0.097)	-2.458 [5] (0.348)	-6.570 [3]*** (0.000)	-6.698 [3]*** (0.000)
LN(WTI)	-2.907[5]** (0.047)	-2.874 [5] (0.174)	-7.002 [3]*** (0.000)	-7.095 [3]*** (0.000)
LN(DUBAI)	-2.695 [5]* (0.077)	-2.516 [5] (0.319)	-5.931 [2]*** (0.000)	-6.098 [2]*** (0.000)
LN(IP)	-0.904 [4] (0.784)	-2.214 [5] (0.476)	-11.727 [4]*** (0.000)	-11.682 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	0.837 [9]***	0.068 [8]	0.155 [5]	0.050 [5]
LN(WTI)	0.741 [8]***	0.053 [8]	0.120 [5]	0.040 [5]
LN(DUBAI)	0.905 [9]***	0.077 [8]	0.182 [5]	0.048 [5]
LN(IP)	1.053 [9]***	0.108 [9]	0.060 [4]	0.057 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 415 NG Prices and IP (2005-2014)-Monthly

Variable	ADF (Level)	ADF (First Difference)

	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-1.654 [0] (0.451)	-2.667 [0] (0.252)	-10.397 [0]*** (0.000)	-10.354 [0]*** (0.000)
LN(LNG)	-1.598 [1] (0.480)	-2.955 [2] (0.149)	-7.956 [0]*** (0.000)	-7.934 [0]*** (0.000)
LN(RUS)	-3.3460 [3]** (0.015)	-3.804 [3]** (0.019)	-3.303 [2]** (0.016)	-3.312 [2]* (0.069)
LN(IP)	-0.802 [0] (0.814)	-1.885 [0] (0.655)	-6.504 [1]*** (0.000)	-6.486 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-1.806 [3] (0.376)	-2.986 [4] (0.140)	-10.415 [2]*** (0.000)	-10.373 [2]*** (0.000)
LN(LNG)	-1.685 [5] (0.436)	-2.505 [5] (0.325)	-8.113 [4]*** (0.000)	-8.094 [4]*** (0.000)
LN(RUS)	-2.650 [7]* (0.085)	-2.633 [7] (0.266)	-9.517 [7]*** (0.000)	-9.554 [7]*** (0.000)
LN(IP)	-0.904 [4] (0.784)	-2.214 [5] (0.476)	-11.727 [4]*** (0.000)	-11.682 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.905 [9]***	0.121 [8]*	0.046 [2]	0.046 [2]
LN(LNG)	1.051 [9]***	0.099 [8]	0.057 [5]	0.047 [5]
LN(RUS)	0.551 [9]**	0.087 [9]	0.107 [7]	0.045 [7]
LN(IP)	1.053 [9]***	0.108 [9]	0.060 [4]	0.057 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 416 SI and IP (2005-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-1.532 [1] (0.513)	-2.630 [1] (0.267)	-8.339 [0]*** (0.000)	-8.303 [0]*** (0.000)
LN(IP)	-0.802 [0] (0.814)	-1.885 [0] (0.655)	-6.504 [1]*** (0.000)	-6.486 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.619 [5] (0.469)	-2.629 [5] (0.268)	-8.343 [3]*** (0.000)	-8.306 [3]*** (0.000)
LN(IP)	-0.904 [4] (0.784)	-2.214 [5] (0.476)	-11.727 [4]*** (0.000)	-11.682 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	1.026 [9]***	0.063 [8]	0.046 [5]	0.043 [5]
LN(IP)	1.053 [9]***	0.108 [9]	0.060 [4]	0.057 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 417 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC **GDP [1]**	H0: r=0 H1: r≤1	0.247589 0.010504	10.32612 0.369589	0.2565 0.5432	9.956530 0.369589	0.2148 0.5432
NGC **GDP [2]**	H0: r=0 H1: r≤1	0.483363 0.002707	19.23066** 0.078608	0.0130 0.7792	19.15205*** 0.078608	0.0078 0.7792
OILC **GDP [1]**	H0: r=0 H1: r≤1	0.230367 0.000805	11.03117 0.033843	0.2096 0.8540	10.99733 0.033843	0.1544 0.8540
BRENT PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.089841 0.027951	12.86097 2.976653*	0.1200 0.0845	9.884317 2.976653*	0.2196 0.0845
WTI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.134612 0.025997	17.77548** 2.739465*	0.0223 0.0979	15.03601** 2.739465*	0.0377 0.09790
DUBAI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.075932 0.027127	11.07309 2.860198*	0.2071 0.0908	8.212890 2.860198*	0.3575 0.0908
HH PRICE	H0: r=0	0.070008	9.408272	0.3290	7.693434	0.4107

M2 [1]	H1: r≤1	0.016048	1.714837	0.1904	1.714837	0.1904
LNG PRICE	H0: r=0	0.084854	11.01315	0.2107	9.221807	0.2682
M2 [3]	H1: r≤1	0.017077	1.791342	0.1808	1.791342	0.1808
RUS PRICE	H0: r=0	0.124158	13.92820*	0.0849	13.65467*	0.0622
M2 [4]	H1: r≤1	0.002652	0.273529	0.6010	0.273529	0.6010
BRENT PRICE	H0: r=0	0.115218	21.97827***	0.0046	21.54479***	0.0030
SI [3]	H1: r≤1	0.002460	0.433476	0.5103	0.433476	0.5103
WTI PRICE	H0: r=0	0.109138	20.72776***	0.0074	20.33949***	0.0049
SI [3]	H1: r≤1	0.002204	0.388280	0.5332	0.388280	0.5332
DUBAI PRICE	H0: r=0	0.108653	20.70332***	0.0075	20.24371***	0.0050
SI [3]	H1: r≤1	0.002608	0.459613	0.4978	0.459613	0.4978
HH PRICE	H0: r=0	0.044924	8.591458	0.4045	8.181691	0.3605
SI [1]	H1: r≤1	0.002299	0.409767	0.5221	0.409767	0.5221
LNG PRICE	H0: r=0	0.070238	13.17610	0.1085	12.81751*	0.0836
SI [3]	H1: r≤1	0.002035	0.358585	0.5493	0.358585	0.5493
RUS PRICE	H0: r=0	0.158120	30.28627***	0.0002	30.12051***	0.0001
SI [4]	H1: r≤1	0.000947	0.165760	0.6839	0.165760	0.6839
BRENT PRICE	H0: r=0	0.109670	13.59550*	0.0947	13.59113*	0.0637
IP [2]	H1: r≤1	3.73E-05	0.004368	0.9465	0.004368	0.9465
WTI PRICE	H0: r=0	0.177117	22.63362***	0.0035	22.61312***	0.0019
IP [3]	H1: r≤1	0.000177	0.020500	0.8861	0.020500	0.8861
DUBAI PRICE	H0: r=0	0.114998	14.29622*	0.0752	14.29339**	0.0495
IP [2]	H1: r≤1	2.42E-05	0.002831	0.9550	0.002831	0.9550
HH PRICE	H0: r=0	0.097221	12.84964	0.1204	11.86422	0.1159
IP [3]	H1: r≤1	0.008459	0.985424	0.3209	0.985424	0.3209
LNG PRICE	H0: r=0	0.065290	10.05376	0.2766	7.832224	0.3960
IP [3]	H1: r≤1	0.018969	2.221536	0.1361	2.221536	0.1361
RUS PRICE	H0: r=0	0.163835	20.64443***	0.0076	20.04010***	0.0055
IP [7]	H1: r≤1	0.005381	0.604327	0.4369	0.604327	0.4369
SI	H0: r=0	0.116019	18.09620**	0.0198	14.42835**	0.0471
IP [2]	H1: r≤1	0.030863	3.667847*	0.0555	3.667847*	0.0555

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 418 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP	0.220	0.638	1	No causal relation
GDP does not granger cause EC	2.054	0.151		
OILC does not granger cause GDP	2.52E-05	0.996	1	No causal relation
GDP does not granger cause OILC	1.475	0.224		
BRENT does not granger cause M2	1.048	0.592	2	No causal relation
M2 does not granger cause BRENT	0.690	0.708		
DUBAI does not granger cause M2	4.186	0.242	3	M2→DUBAI
M2 does not granger cause DUBAI	7.073*	0.069		
HH does not granger cause M2	0.729	0.393	1	No causal relation
M2 does not granger cause HH	1.890	0.169		
LNG does not granger cause M2	1.214	0.749	3	M2→LNG
M2 does not granger cause LNG	11.013**	0.011		
HH does not granger cause SI	0.166	0.683	1	No causal relation
SI does not granger cause HH	0.110	0.739		
HH does not granger cause IP	6.030	0.110	3	No causal relation
IP does not granger cause HH	4.085	0.252		
LNG does not granger cause IP	6.944*	0.073	3	LNG↔IP
IP does not granger cause LNG	15.657***	0.001		

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 419 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
NGC does not granger cause GDP	1.510	0.470	2	No causal relation

GDP does not granger cause NGC	0.401	0.818		
WTI does not granger cause M2 M2 does not granger cause WTI	3.802 1.004	0.283 0.800	3	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	2.580 6.022	0.630 0.197	4	No causal relation
BRENT does not granger cause SI SI does not granger cause BRENT	3.479 3.917	0.323 0.270	3	No causal relation
WTI does not granger cause SI SI does not granger cause WTI	4.562 0.676	0.206 0.878	3	No causal relation
DUBAI does not granger cause SI SI does not granger cause DUBAI	3.418 4.294	0.331 0.231	3	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	2.275 3.916	0.517 0.270	3	No causal relation
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	8.807* 5.133	0.066 0.273	4	RUSSIA→SI
BRENT does not granger cause IP IP does not granger cause BRENT	34.896*** 2.757	0.000 0.251	2	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	40.311*** 0.697	0.000 0.873	3	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	33.961*** 1.168	0.000 0.557	2	DUBAI→IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	15.911** 3.089	0.025 0.876	7	RUSSIA→IP
SI does not granger cause IP IP does not granger cause SI	5.244* 5.372*	0.072 0.068	2	SI↔IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

UK

UNIT ROOT TEST RESULTS

Table 420 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-0.443 [2] (0.890)	-0.002 [4] (0.994)	-2.957 [1]** (0.049)	-6.440 [0]*** (0.000)
LN(GDP)	-1.189 [1] (0.668)	-2.602 [1] (0.281)	-3.461 [0]** (0.015)	-3.560 [0]** (0.048)
	PP (Level)		PP (First Difference)	
LN(EC)	-0.093 [3] (0.942)	-0.130 [2] (0.996)	-5.991 [3]*** (0.000)	-6.444 [2]*** (0.000)
LN(GDP)	-1.471 [1] (0.536)	-0.607 [0] (0.972)	-3.123 [8]** (0.033)	-3.125 [9] (0.116)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.177 [4]	0.157 [4]**	0.386 [3]*	0.139 [2]*
LN(GDP)	0.712 [5]**	0.097 [3]	0.318 [0]	0.080 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 421 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-6.718 [0]*** (0.000)	-5.013 [0]*** (0.001)	-5.824 [0]*** (0.000)	-6.204 [0]*** (0.000)
LN(GDP)	-1.162 [1] (0.681)	-2.172 [1] (0.492)	-4.315 [0]*** (0.001)	-4.391 [0]*** (0.006)
	PP (Level)		PP (First Difference)	
LN(NG)	-4.998 [4]*** (0.000)	4.206 [4]*** (0.009)	-6.308 [3]*** (0.000)	-6.698 [2]*** (0.000)
LN(GDP)	-1.395 [2] (0.575)	-1.314 [1] (0.870)	-4.101 [6]*** (0.002)	-4.132 [7]** (0.011)

	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.772 [5]***	0.174 [4]**	0.560 [4]**	0.120 [4]*
LN(GDP)	0.827 [5]***	0108 [4*	0.193 [2]	0.087 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 422 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(OIL)	-1.864 [0] (0.345)	-2.513 [0] (0.320)	-7.292 [0]*** (0.000)	-7.216 [0]*** (0.000)
LN(GDP)	-1.162 [1] (0.681)	-2.172 [1] (0.492)	-4.315 [0]*** (0.001)	-4.391 [0]*** (0.006)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-1.454 [16] (0.546)	-2.435 [7] (0.357)	-8.838 [23]*** (0.000)	-10.592 [29]*** (0.000)
LN(GDP)	-1.395 [2] (0.575)	-1.314 [1] (0.870)	-4.101 [6]*** (0.002)	-4.132 [7]** (0.011)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.567 [5]**	0.142 [4]*	0.425 [34]*	0.488 [41]***
LN(GDP)	0.827 [5]***	0108 [4*	0.193 [2]	0.087 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 423 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-4.852 [0]*** (0.000)	-0.0755 [0] (0.966)	-4.612 [2]*** (0.000)	-5.785 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-4.407 [6]*** (0.000)	-0.789 [6] (0.963)	-14.521 [8]*** (0.000)	-15.269 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.709 [10]***	0.432 [10]***	1.129 [8]***	0.140 [6]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 424 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3]	-3.430 [2]**	-3.724 [0]***	-3.720 [2]**

	(0.346)	(0.050)	(0.004)	(0.0234)
LN(M2)	-4.852 [0]*** (0.000)	-0.0755 [0] (0.966)	-4.612 [2]*** (0.000)	-5.785 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-4.407 [6]*** (0.000)	-0.789 [6] (0.963)	-14.521 [8]*** (0.000)	-15.269 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.709 [10]***	0.432 [10]***	1.129 [8]***	0.140 [6]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 425 Oil Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.547 [0] (0.507)	-2.188 [0] (0.492)	-11.930 [0]*** (0.000)	-11.963 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.876 [6] (0.342)	-2.414 [6] (0.370)	-12.023 [5]*** (0.000)	-12.042 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.407 [10]*	0.120 [10]*	0.166 [6]	0.068 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 426 NG Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.547 [0] (0.507)	-2.188 [0] (0.492)	-11.930 [0]*** (0.000)	-11.963 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)

LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.876 [6] (0.342)	-2.414 [6] (0.370)	-12.023 [5]*** (0.000)	-12.042 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.407 [10]*	0.120 [10]*	0.166 [6]	0.068 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 427 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-0.649 [1] (0.855)	-2.226 [1] (0.471)	-17.729 [0]*** (0.000)	-17.702 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-0.742 [1] (0.832)	-2.546 [4] (0.305)	-17.654 [4*** (0.000)	-17.632 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.474 [11]***	0.217 [11]***	0.080 [0]	0.051 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 428 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-0.649 [1] (0.855)	-2.226 [1] (0.471)	-17.729 [0]*** (0.000)	-17.702 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-0.742 [1]	-2.546 [4]	-17.654 [4***	-17.632 [4]***

	(0.832)	(0.305)	(0.000)	(0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.474 [11]***	0.217 [11]***	0.080 [0]	0.051 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 429 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-1.547 [0] (0.507)	-2.188 [0] (0.492)	-11.930 [0]*** (0.000)	-11.963 [0]*** (0.000)
LN(IP)	-0.983 [1] (0.758)	-1.978 [1] (0.608)	-16.845 [0]*** (0.000)	-16.798 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.876 [6] (0.342)	-2.414 [6] (0.370)	-12.023 [5]*** (0.000)	-12.042 [5]*** (0.000)
LN(IP)	-0.987 [1] (0.757)	2.381 [4] (0.388)	-16.840 [3]*** (0.000)	-16.794 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.407 [10]*	0.120 [10]*	0.166 [6]	0.068 [5]
LN(IP)	1.481 [10]***	0.152 [10]**	0.048 [0]	0.048 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 430 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [3]	H0: r=0 H1: r≤1	0.075731 0.005722	2.788211 0.189384	0.9756 0.6634	2.598826 0.189384	0.9698 0.6634
OILC GDP [2]	H0: r=0 H1: r≤1	0.176072 0.071503	10.98228 3.041712*	0.2126 0.0811	7.940564 3.041712*	0.3848 0.0811
BRENT PRICE M2 [4]	H0: r=0 H1: r≤1	0.069182 0.042893	20.21809*** 7.672018***	0.0090 0.0056	12.54607* 7.672018***	0.0918 0.0056
WTI PRICE M2 [4]	H0: r=0 H1: r≤1	0.070634 0.058267	23.32500*** 10.50581***	0.0027 0.0012	12.81919* 10.50581***	0.0835 0.0012
DUBAI PRICE M2 [4]	H0: r=0 H1: r≤1	0.073765 0.042149	20.94581*** 7.536032***	0.0068 0.0060	13.40978* 7.536032***	0.0679 0.0060
HH PRICE M2 [4]	H0: r=0 H1: r≤1	0.086268 0.049192	24.61574*** 8.827588***	0.0016 0.0030	15.78815** 8.827588***	0.0285 0.0030
LNG PRICE M2 [4]	H0: r=0 H1: r≤1	0.071734 0.039896	20.15147*** 7.124921***	0.0092 0.0076	13.02655* 7.124921***	0.0777 0.0076
RUS PRICE M2 [7]	H0: r=0 H1: r≤1	0.090398 0.041698	23.62261*** 7.325916***	0.0024 0.0068	16.29670** 7.325916***	0.0235 0.0068
BRENT PRICE SI [3]	H0: r=0 H1: r≤1	0.040799 0.023059	11.43717 4.105870**	0.1860 0.0427	7.331302 4.105870**	0.4507 0.0427
WTI PRICE SI [5]	H0: r=0 H1: r≤1	0.042685 0.026181	12.20656 4.616224**	0.1473 0.0317	7.590334 4.616224**	0.4219 0.0317
DUBAI PRICE SI [3]	H0: r=0 H1: r≤1	0.037344 0.022467	10.69768 3.999304**	0.2308 0.0455	6.698374 3.999304**	0.5254 0.0455
HH PRICE SI [1]	H0: r=0 H1: r≤1	0.041300 0.015286	10.24939 2.741846*	0.2620 0.0977	7.507543 2.741846*	0.4310 0.0977
LNG PRICE SI [3]	H0: r=0 H1: r≤1	0.034220 0.008369	7.607205 1.479104	0.5083 0.2239	6.128102 1.479104	0.5968 0.2239
RUS PRICE SI [7]	H0: r=0 H1: r≤1	0.055949 0.015579	12.60357 2.700688	0.1302 0.1003	9.902877 2.700688	0.2184 0.1003
BRENT PRICE IP [2]	H0: r=0 H1: r≤1	0.033971 0.007126	8.384415 1.437537	0.4252 0.2305	6.946878 1.437537	0.4954 0.2305
WTI PRICE	H0: r=0	0.039024	9.181995	0.3488	8.001074	0.3786

IP [2]	H1: r≤1	0.005858	1.180921	0.2772	1.180921	0.2772
DUBAI PRICE **IP [2]**	H0: r=0 H1: r≤1	0.038585 0.007383	9.398735 1.489517	0.3298 0.2223	7.909217 1.489517	0.3880 0.2223
HH PRICE **IP [2]**	H0: r=0 H1: r≤1	0.037688 0.004806	8.690116 0.968349	0.3948 0.3251	7.721767 0.968349	0.4077 0.3251
LNG PRICE **IP [3]**	H0: r=0 H1: r≤1	0.054996 0.002065	11.72649 0.413331	0.1705 0.5203	11.31316 0.413331	0.1392 0.5203
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.059936 0.004378	13.17280 0.873129	0.1086 0.3501	12.29967* 0.873129	0.0999 0.3501
SI **IP [2]**	H0: r=0 H1: r≤1	0.051266 0.005408	10.27480 0.959804	0.2602 0.3272	9.314994 0.959804	0.2609 0.3272

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 431 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	7.410* 1.855	0.059 0.603	3	EC→GDP
OILC does not granger cause GDP GDP does not granger cause OILC	4.436 8.093**	0.108 0.017	2	GDP→OILC
BRENT does not granger cause SI SI does not granger cause BRENT	2.351 12.218***	0.502 0.006	3	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	7.842 13.464**	0.165 0.019	5	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	2.355 12.925***	0.501 0.004	3	SI→DUBAI
HH does not granger cause SI SI does not granger cause HH	0.334 0.109	0.563 0.740	1	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	4.866 22.473***	0.181 0.000	3	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	7.838 19.360***	0.347 0.007	7	SI→RUSSIA
BRENT does not granger cause IP IP does not granger cause BRENT	8.696** 2.116	0.012 0.347	2	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	12.754*** 2.555	0.001 0.278	2	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	8.738** 2.056	0.012 0.357	2	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	1.471 1.606	0.479 0.447	2	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	15.453*** 10.292**	0.001 0.016	3	LNG↔IP
SI does not granger cause IP IP does not granger cause SI	2.068 9.526***	0.355 0.008	2	IP→SI

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 432 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	2.565 21.599***	0.633 0.000	4	M2→BRENT
WTI does not granger cause M2 M2 does not granger cause WTI	0.627 22.682***	0.730 0.000	4	M2→WTI
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	1.873 21.299***	0.759 0.000	4	M2→DUBAI
HH does not granger cause M2 M2 does not granger cause HH	0.945 15.094***	0.917 0.004	4	M2→HH
LNG does not granger cause M2 M2 does not granger cause LNG	3.990 15.528***	0.407 0.003	4	M2→LNG

RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	5.438 26.658***	0.606 0.000	7	M2→RUSSIA
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	3.524 13.513**	0.474 0.009	4	IP→RUSSIA

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

US

UNIT ROOT TEST RESULTS

Table 433 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-0.428 [0] (0.893)	-4.708 [5]*** (0.003)	-5.555 [0]*** (0.000)	-5.660 [0]*** (0.000)
LN(GDP)	-1.135 [0] (0.690)	-1.537 [0] (0.797)	-4.583 [0]*** (0.000)	-3.930 [1]** (0.021)
	PP (Level)		PP (First Difference)	
LN(EC)	-0.561 [3] (0.866)	-1.938 [3] (0.613)	-5.571 [3]*** (0.000)	-5.666 [3]*** (0.000)
LN(GDP)	-1.688 [2] (0.428)	-2.047 [2] (0.556)	-4.583 [0]*** (0.000)	-4.487 [0]*** (0.005)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.531 [5]**	0.104 [4]	0.161 [3]	0.090 [3]
LN(GDP)	0.175 [4]	0.093 [4]	0.147 [1]	0.074 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 434 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-0.209 [0] (0.929)	-1.476 [0] (0.822)	-5.773 [0]*** (0.000)	-6.199 [0]*** (0.000)
LN(GDP)	-1.626 [0] (0.460)	-2.113 [1] (0.523)	-4.729 [0]*** (0.000)	-4.872 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(NG)	-0.465 [3] (0.888)	-1.504 [2] (0.812)	-5.809 [3]*** (0.000)	-6.197 [2]*** (0.000)
LN(GDP)	-1.791 [6] (0.379)	-1.473 [3] (0.823)	-4.499 [7]*** (0.000)	-4.714 [9]*** (0.002)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.468 [5]**	0.151 [5]**	0.282 [3]	0.077 [2]
LN(GDP)	0.831 [5]***	0.150 [4]**	0.243 [4]	0.096 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 435 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-2.456 [1] (0.133)	-2.809 [1] (0.202)	-3.992 [0]*** (0.003)	-3.939 [0]** (0.018)
LN(GDP)	-1.626 [0] (0.460)	-2.113 [1] (0.523)	-4.729 [0]*** (0.000)	-4.872 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(OIL)	-2.166 [2] (0.221)	-2.121 [2] (0.519)	-3.846 [4]*** (0.005)	-3.793 [4]** (0.026)
LN(GDP)	-1.791 [6] (0.379)	-1.473 [3] (0.823)	-4.499 [7]*** (0.000)	-4.714 [9]*** (0.002)
	KPSS (Level)		KPSS (First Difference)	
LN(OIL)	0.411 [5]*	0.100 [4]	0.109 [1]	0.085 [1]
LN(GDP)	0.831 [5]***	0.150 [4]**	0.243 [4]	0.096 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 436 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-0.367 [4] (0.910)	-2.307 [4] (0.427)	-10.819 [0]*** (0.000)	-10.793 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-0.295 [4] (0.921)	-2.176 [4] (0.499)	-10.805 [1]*** (0.000)	-10.779 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.730 [10]***	0.152 [10]**	0.074 [4]	0.074 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 437 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.367 [4] (0.910)	-2.307 [4] (0.427)	-10.819 [0]*** (0.000)	-10.793 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-0.295 [4] (0.921)	-2.176 [4] (0.499)	-10.805 [1]*** (0.000)	-10.779 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.730 [10]***	0.152 [10]**	0.074 [4]	0.074 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 438 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)	ADF (First Difference)

	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-0.645 [1] (0.856)	-1.830 [1] (0.685)	-11.286 [0]*** (0.000)	-11.347 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-0.714 [6] (0.839)	-2.078 [6] (0.553)	-11.318 [4]*** (0.000)	-11.371 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.875 [10]***	0.152 [10]**	0.198 [6]	0.048 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 439 NG Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-0.645 [1] (0.856)	-1.830 [1] (0.685)	-11.286 [0]*** (0.000)	-11.347 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-0.714 [6] (0.839)	-2.078 [6] (0.553)	-11.318 [4]*** (0.000)	-11.371 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.875 [10]***	0.152 [10]**	0.198 [6]	0.048 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 440 Oil Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)

LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-1.912 [4] (0.326)	-2.798 [4] (0.199)	-3.616 [3]*** (0.006)	-3.620 [3]** (0.030)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-1.362 [10] (0.600)	-1.965 [10] (0.616)	-13.487 [9]*** (0.000)	-13.473 [9]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	0.805 [11]***	0.110 [11]	0.089 [10]	0.086 [10]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 441 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-1.912 [4] (0.326)	-2.798 [4] (0.199)	-3.616 [3]*** (0.006)	-3.620 [3]** (0.030)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-1.362 [10] (0.600)	-1.965 [10] (0.616)	-13.487 [9]*** (0.000)	-13.473 [9]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	0.805 [11]***	0.110 [11]	0.089 [10]	0.086 [10]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 442 SI and IP (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-0.645 [1] (0.856)	-1.830 [1] (0.685)	-11.286 [0]*** (0.000)	-11.347 [0]*** (0.000)
LN(IP)	-1.819 [4] (0.370)	-2.720 [4] (0.229)	-3.315 [3]** (0.015)	-3.436 [3]** (0.049)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-0.714 [6] (0.839)	-2.078 [6] (0.553)	-11.318 [4]*** (0.000)	-11.371 [4]*** (0.000)
LN(IP)	-0.907 [9] (0.784)	-1.589 [9] (0.793)	-12.375 [9]*** (0.000)	-12.420 [9]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	

LN(SI)	0.875 [10]***	0.152 [10]**	0.198 [6]	0.048 [5]
LN(IP)	0.546 [10]**	0.125 [10]*	0.140 [9]	0.080 [9]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 443 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC **GDP [2]**	H0: r=0 H1: r≤1	0.171011 5.21E-05	6.378411 0.001771	0.6508 0.9637	6.376640 0.001771	0.5654 0.9637
NGC **GDP [1]**	H0: r=0 H1: r≤1	0.178274 0.024407	9.284467 1.037824	0.3397 0.3083	8.246643 1.037824	0.3542 0.3083
OILC **GDP [2]**	H0: r=0 H1: r≤1	0.185168 0.052282	10.59731 2.201609	0.2375 0.1379	8.395703 2.201609	0.3399 0.1379
BRENT PRICE **M2 [5]**	H0: r=0 H1: r≤1	0.043913 0.008216	9.249265 1.435573	0.3428 0.2309	7.813692 1.435573	0.3979 0.2309
WTI PRICE **M2 [6]**	H0: r=0 H1: r≤1	0.029568 0.011365	7.169724 1.977392	0.5580 0.1597	5.192332 1.977392	0.7174 0.1597
DUBAI PRICE **M2 [5]**	H0: r=0 H1: r≤1	0.042558 0.008435	9.041246 1.473876	0.3616 0.2247	7.567370 1.473876	0.4244 0.2247
HH PRICE **M2 [6]**	H0: r=0 H1: r≤1	0.073900 0.000831	13.42549 0.143742	0.1001 0.7046	13.28175* 0.143742	0.0710 0.7046
LNG PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.113327 7.12E-05	21.30195*** 0.012596	0.0059 0.9104	21.28935*** 0.012596	0.0033 0.9104
RUS PRICE **M2 [5]**	H0: r=0 H1: r≤1	0.045987 0.000545	8.286319 0.094784	0.4353 0.7582	8.191535 0.094784	0.3596 0.7582
BRENT PRICE **SI [2]**	H0: r=0 H1: r≤1	0.030581 0.005012	6.386558 0.889282	0.6498 0.3457	5.497276 0.889282	0.6782 0.3457
WTI PRICE **SI [4]**	H0: r=0 H1: r≤1	0.028067 0.005470	5.941727 0.959819	0.7024 0.3272	4.981908 0.959819	0.7441 0.3272
DUBAI PRICE **SI [5]**	H0: r=0 H1: r≤1	0.024569 0.011040	6.260041 1.931587	0.6648 0.1646	4.328454 1.931587	0.8232 0.1646
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.052559 0.000903	9.716244 0.159823	0.3032 0.6893	9.556421 0.159823	0.2427 0.6893
LNG PRICE **SI [3]**	H0: r=0 H1: r≤1	0.026282 0.005126	5.592021 0.904471	0.7431 0.3416	4.687550 0.904471	0.7806 0.3416
RUS PRICE **SI [7]**	H0: r=0 H1: r≤1	0.023453 0.004154	4.797957 0.716035	0.8299 0.3974	4.081922 0.716035	0.8506 0.3974
BRENT PRICE **IP [6]**	H0: r=0 H1: r≤1	0.042240 0.014834	11.44618 2.944127*	0.1855 0.0862	8.502054 2.944127*	0.3299 0.0862
WTI PRICE **IP [7]**	H0: r=0 H1: r≤1	0.029439 0.013367	8.494203 2.637598	0.4142 0.1044	5.856605 2.637598	0.6317 0.1044
DUBAI PRICE **IP [7]**	H0: r=0 H1: r≤1	0.031546 0.013394	8.925424 2.642879	0.3723 0.1040	6.282545 2.642879	0.5772 0.1040
HH PRICE **IP [5]**	H0: r=0 H1: r≤1	0.057222 0.008079	13.27320 1.606147	0.1052 0.2050	11.66706 1.606147	0.1238 0.2050
LNG PRICE **IP [6]**	H0: r=0 H1: r≤1	0.045812 0.011061	11.42944 2.191117	0.1864 0.1388	9.238321 2.191117	0.2669 0.1388
RUS PRICE **IP [9]**	H0: r=0 H1: r≤1	0.022518 0.007298	5.839309 1.420935	0.7144 0.2332	4.418374 1.420935	0.8127 0.2332
SI **IP [7]**	H0: r=0 H1: r≤1	0.049376 0.004997	9.571101 0.861611	0.3152 0.3533	8.709490 0.861611	0.3111 0.3533

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level.
MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 444 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	12.280*** 1.115	0.002 0.572	2	EC→GDP

NGC does not granger cause GDP GDP does not granger cause NGC	1.493 4.397**	0.221 0.036	1	GDP→NGC
OILC does not granger cause GDP GDP does not granger cause OILC	12.433*** 6.914**	0.002 0.031	2	OILC↔GDP
BRENT does not granger cause M2 M2 does not granger cause BRENT	23.620*** 2.582	0.000 0.764	5	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	20.009*** 7.707	0.002 0.260	6	WTI→M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	26.091*** 2.887	0.000 0.717	5	DUBAI→M2
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	5.842 17.351***	0.321 0.003	5	M2→RUSSIA
BRENT does not granger cause SI SI does not granger cause BRENT	0.870 13.222***	0.647 0.001	2	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	3.881 16.018***	0.422 0.003	4	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	9.107 22.897***	0.104 0.000	5	SI→DUBAI
HH does not granger cause SI SI does not granger cause HH	2.097 1.408	0.350 0.494	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	5.660 21.563***	0.129 0.000	3	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	6.047 19.536***	0.534 0.006	7	SI→RUSSIA
BRENT does not granger cause IP IP does not granger cause BRENT	5.409 10.775*	0.492 0.095	6	IP→BRENT
WTI does not granger cause IP IP does not granger cause WTI	9.635 10.887	0.210 0.143	7	No causal relation
DUBAI does not granger cause IP IP does not granger cause DUBAI	8.636 13.356*	0.279 0.063	7	IP→DUBAI
HH does not granger cause IP IP does not granger cause HH	7.653 3.398	0.176 0.638	5	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	10.395 10.652*	0.108 0.099	6	IP→LNG
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	15.982* 26.652***	0.067 0.001	9	RUSSIA↔IP
SI does not granger cause IP IP does not granger cause SI	31.927*** 26.785***	0.000 0.000	7	SI↔IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 445 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
HH does not granger cause M2 M2 does not granger cause HH	1.883 12.666**	0.930 0.048	6	M2→HH
LNG does not granger cause M2 M2 does not granger cause LNG	15.908*** 2.943	0.000 0.229	2	LNG→M2

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

B. ANALYSIS RESULTS OF GCC COUNTRIES

BAHRAIN

UNIT ROOT TEST RESULTS

Table 446 EC and GDP (1980-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-3.127 [0]** (0.034)	-3.384 [0]* (0.072)	-3.324 [4]** (0.024)	-3.395 [4]* (0.073)
LN(GDP)	-1.178 [0] (0.670)	-1.973 [0] (0.592)	-4.577 [0]*** (0.001)	-4.473 [0]*** (0.006)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-3.127 [0]** (0.034)	-3.306 [2]* (0.084)	-7.479 [16]*** (0.000)	-14.152 [29]*** (0.000)
LN(GDP)	-1.322 [2] (0.606)	-2.285 [3] (0.429)	-4.577 [0]*** (0.001)	-4.456 [1]*** (0.006)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.234 [1]	0.164 [1]**	0.386 [10]*	0.468 [28]***
LN(GDP)	0.448 [4]*	0.124 [4]*	0.189 [2]	0.192 [2]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 447 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-0.815 [0] (0.811)	-1.376 [6] (0.864)	-3.364 [5]** (0.013)	-3.406 [5]* (0.053)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-0.813 [7] (0.812)	-0.955 [8] (0.946)	-14.893 [8]*** (0.000)	-14.892 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.717 [10]***	0.213 [10]**	0.247 [7]	0.204 [7]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 448 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.815 [0] (0.811)	-1.376 [6] (0.864)	-3.364 [5]** (0.013)	-3.406 [5]* (0.053)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-0.813 [7] (0.812)	-0.955 [8] (0.946)	-14.893 [8]*** (0.000)	-14.892 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.717 [10]***	0.213 [10]**	0.247 [7]	0.204 [7]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 449 Oil Prices and SI (2003-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-2.041 [1] (0.269)	-1.848 [1] (0.675)	-8.228 [0]*** (0.000)	-8.329 [0]*** (0.000)
LN(WTI)	-2.641 [2]* (0.087)	-2.854 [2] (0.180)	-8.223 [0]*** (0.000)	-8.296 [0]*** (0.000)
LN(DUBAI)	-1.980 [1] (0.295)	-2.424 [2] (0.365)	-7.264 [0]*** (0.000)	-7.372 [0]*** (0.000)
LN(SI)	-1.722 [1] (0.417)	-2.543 [1] (0.306)	-6.167 [0]*** (0.000)	-6.344 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-2.054 [4] (0.263)	-1.863 [4] (0.668)	-8.177 [1]*** (0.000)	-8.385 [2]*** (0.000)
LN(WTI)	-2.279 [4] (0.180)	-2.266 [4] (0.449)	-8.159 [1]*** (0.000)	-8.296 [0]*** (0.000)
LN(DUBAI)	-2.031 [4] (0.273)	-1.775 [4] (0.711)	-7.186 [1]*** (0.000)	-7.473 [2]*** (0.000)
LN(SI)	-1.613 [7] (0.472)	-2.249 [7] (0.458)	-6.189 [4]*** (0.000)	-6.366 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.177 [9]***	0.173 [9]**	0.177 [4]	0.046 [3]
LN(WTI)	1.099 [9]***	0.186 [9]**	0.148 [4]	0.034 [4]
LN(DUBAI)	1.223 [9]***	0.198 [9]**	0.190 [4]	0.044 [4]
LN(SI)	0.471 [0]**	0.260 [9]***	0.347 [7]*	0.179 [7]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 450 NG Prices and SI (2003-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-1.948 [0]	-2.796 [0]	-12.215 [0]***	-12.169 [0]***

	(0.309)	(0.201)	(0.000)	(0.000)
LN(LNG)	-1.285 [1] (0.635)	-2.771 [1] (0.210)	-8.879 [0]*** (0.000)	-8.849 [0]*** (0.000)
LN(RUS)	-2.163 [3] (0.220)	-2.851 [3] (0.181)	-3.623 [2]*** (0.006)	-3.638 [2]** (0.030)
LN(SI)	-1.722 [1] (0.417)	-2.543 [1] (0.306)	-6.167 [0]*** (0.000)	-6.344 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.016 [3] (0.279)	-2.979 [4] (0.141)	-12.204 [2]*** (0.000)	-12.160 [2]*** (0.000)
LN(LNG)	-1.372 [5] (0.594)	-2.713 [5] (0.232)	-8.921 [2]*** (0.000)	-8.891 [2]*** (0.000)
LN(RUS)	-2.116 [8] (0.238)	-2.049 [8] (0.569)	-10.767 [7]*** (0.000)	-10.834 [7]*** (0.000)
LN(SI)	-1.613 [7] (0.472)	-2.249 [7] (0.458)	-6.189 [4]*** (0.000)	-6.366 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.881 [9]***	0.146 [9]**	0.052 [1]	0.039 [1]
LN(LNG)	1.219 [10]***	0.072 [9]	0.043 [4]	0.038 [4]
LN(RUS)	0.960 [10]***	0.229 [9]***	0.153 [8]	0.036 [8]
LN(SI)	0.471 [0]**	0.260 [9]***	0.347 [7]*	0.179 [7]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 451 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
BRENT PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.100260 0.009072	20.31299*** 1.613036	0.0087 0.2041	18.69996*** 1.613036	0.0093 0.2041
WTI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.131098 0.011564	26.77948*** 2.047075	0.0007 0.1525	24.73241*** 2.047075	0.0008 0.1525
DUBAI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.123366 0.012102	25.31625*** 2.143026	0.0012 0.1432	23.17323*** 2.143026	0.0015 0.1432
HH PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.074480 0.006578	14.44797* 1.135207	0.0714 0.2867	13.31277* 1.135207	0.0703 0.2867
LNG PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.039083 0.005870	7.869797 1.012604	0.4794 0.3143	6.857194 1.012604	0.5062 0.3143
RUS PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.086432 0.006224	16.62229** 1.073955	0.0337 0.3001	15.54833** 1.073955	0.0312 0.3001
BRENT PRICE **SI [2]**	H0: r=0 H1: r≤1	0.090890 0.007778	14.53664* 1.100916	0.0693 0.2941	13.43573* 1.100916	0.0673 0.2941
WTI PRICE **SI [2]**	H0: r=0 H1: r≤1	0.096524 0.007956	15.43858* 1.126345	0.0510 0.2886	14.31223** 1.126345	0.0491 0.2886
DUBAI PRICE **SI [2]**	H0: r=0 H1: r≤1	0.099813 0.008386	16.01393** 1.187430	0.0418 0.2758	14.82650** 1.187430	0.0407 0.2758
HH PRICE **SI [3]**	H0: r=0 H1: r≤1	0.116358 0.024971	20.85881*** 3.540342*	0.0070 0.0599	17.31847*** 3.540342*	0.0159 0.0599
LNG PRICE **SI [2]**	H0: r=0 H1: r≤1	0.078967 0.002625	11.96919 0.370555	0.1584 0.5427	11.59863 0.370555	0.1266 0.5427
RUS PRICE **SI [4]**	H0: r=0 H1: r≤1	0.078438 0.013740	13.27733 1.923124	0.1050 0.1655	11.35420 1.923124	0.1373 0.1655

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level.
MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 452 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	9.414*** 7.015**	0.009 0.030	2	BRENT↔M2
WTI does not granger cause M2 M2 does not granger cause WTI	13.414*** 12.330***	0.003 0.006	3	WTI↔M2

DUBAI does not granger cause M2 M2 does not granger cause DUBAI	12.255*** 8.668**	0.006 0.034	3	DUBAI↔M2
HH does not granger cause M2 M2 does not granger cause HH	17.654** 9.318	0.013 0.230	7	HH→M2
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	9.233 15.094**	0.236 0.034	7	M2→RUSSIA
BRENT does not granger cause SI SI does not granger cause BRENT	10.391*** 1.259	0.005 0.532	2	BRENT→SI
WTI does not granger cause SI SI does not granger cause WTI	13.064*** 2.160	0.001 0.339	2	WTI→SI
DUBAI does not granger cause SI SI does not granger cause DUBAI	9.822*** 1.221	0.007 0.543	2	DUBAI→SI
HH does not granger cause SI SI does not granger cause HH	13.935*** 11.742***	0.003 0.008	3	HH↔SI

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 453 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
LNG does not granger cause M2 M2 does not granger cause LNG	11.739 4.498	0.109 0.720	7	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	0.654 3.630	0.721 0.162	2	No causal relation
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	3.022 7.173	0.554 0.127	4	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

OMAN

UNIT ROOT TEST RESULTS

Table 454 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-2.130 [0] (0.234)	-4.629 [0]*** (0.003)	-6.821 [1]*** (0.000)	-6.618 [1]*** (0.000)
LN(GDP)	-1.786 [2] (0.380)	-2.389 [1] (0.378)	-4.151 [1]*** (0.002)	-4.238 [1]** (0.010)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-2.269 [1] (0.186)	-4.664 [2]*** (0.003)	-7.877 [1]*** (0.000)	-8.035 [2]*** (0.000)
LN(GDP)	-1.603 [4] (0.470)	-2.077 [2] (0.540)	-4.444 [2]*** (0.001)	-4.354 [3]*** (0.007)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.733 [5]**	0.149 [4]**	0.210 [1]	0.058 [0]
LN(GDP)	0.670 [5]**	0.149 [4]**	0.153 [4]	0.057 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 455 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-0.256 [0] (0.975)	-1.396 [0] (0.858)	-11.845 [0]*** (0.000)	-11.833 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	

LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-0.163 [4] (0.969)	-1.559 [5] (0.805)	-11.923 [3]*** (0.000)	-11.911 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.719 [10]***	0.191 [10]**	0.232 [4]	0.211 [4]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 456 NG Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.256 [0] (0.975)	-1.396 [0] (0.858)	-11.845 [0]*** (0.000)	-11.833 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-0.163 [4] (0.969)	-1.559 [5] (0.805)	-11.923 [3]*** (0.000)	-11.911 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276 [10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.719 [10]***	0.191 [10]**	0.232 [4]	0.211 [4]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 457 Oil Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.592 [1] (0.484)	-1.519 [1] (0.819)	-6.941 [0]*** (0.000)	-6.953 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4]	-1.995 [4]	-9.132 [1]***	-9.204 [2]***

	(0.461)	(0.599)	(0.000)	(0.000)
LN(SI)	-1.180 [7] (0.682)	-1.568 [7] (0.801)	-6.942 [1]*** (0.000)	-6.954 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	1.309 [10]***	0.316 [10]***	0.117 [7]	0.092 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 458 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.592 [1] (0.484)	-1.519 [1] (0.819)	-6.941 [0]*** (0.000)	-6.953 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.180 [7] (0.682)	-1.568 [7] (0.801)	-6.942 [1]*** (0.000)	-6.954 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	1.309 [10]***	0.316 [10]***	0.117 [7]	0.092 [7]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 459 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-1.312 [1] (0.623)	-1.053 [1] (0.933)	-18.854 [0]*** (0.000)	-18.876 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-1.462 [2] (0.550)	-1.223 [2] (0.902)	-18.558 [4]*** (0.000)	-18.649 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]

LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	0.495 [11]**	0.330 [11]***	0.172 [0]	0.116 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 460 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-1.312 [1] (0.623)	-1.053 [1] (0.933)	-18.854 [0]*** (0.000)	-18.876 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-1.462 [2] (0.550)	-1.223 [2] (0.902)	-18.558 [4]*** (0.000)	-18.649 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	0.495 [11]**	0.330 [11]***	0.172 [0]	0.116 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 461 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-1.592 [1] (0.484)	-1.519 [1] (0.819)	-6.941 [0]*** (0.000)	-6.953 [0]*** (0.000)
LN(IP)	-1.458 [1] (0.552)	-1.197 [1] (0.907)	-18.524 [0]*** (0.000)	-18.633 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.180 [7] (0.682)	-1.568 [7] (0.801)	-6.942 [1]*** (0.000)	-6.954 [1]*** (0.000)
LN(IP)	-1.318 [5] (0.620)	-1.150 [4] (0.916)	-17.968 [5]*** (0.000)	-18.179 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	1.309 [10]***	0.316 [10]***	0.117 [7]	0.092 [7]
LN(IP)	0.382 [10]*	0.354 [10]***	0.265 [4]	0.138 [3]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 462 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC **GDP [2]**	H0: r=0 H1: r≤1	0.175668 0.023899	7.390625 0.822423	0.5327 0.3645	6.568201 0.822423	0.5414 0.3645
BRENT PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.113022 0.004894	22.09688*** 0.868337	0.0044 0.3514	21.22854*** 0.868337	0.0034 0.3514

WTI PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.117702 0.003381	22.76444*** 0.599532	0.0034 0.4388	22.16491*** 0.599532	0.0023 0.4388
DUBAI PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.116698 0.004736	22.80374*** 0.840178	0.0033 0.3593	21.96356*** 0.840178	0.0025 0.3593
HH PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.099851 0.001289	18.84789** 0.228353	0.0150 0.6327	18.61953*** 0.228353	0.0096 0.6327
LNG PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.071359 7.71E-05	13.04332 0.013571	0.1132 0.9071	13.02975* 0.013571	0.0776 0.9071
RUS PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.123464 0.000248	23.10443*** 0.043437	0.0030 0.8349	23.06099*** 0.043437	0.0016 0.8349
BRENT PRICE **SI [5]**	H0: r=0 H1: r≤1	0.028325 0.013899	7.435002 2.435356	0.5276 0.1186	4.999645 2.435356	0.7419 0.1186
WTI PRICE **SI [3]**	H0: r=0 H1: r≤1	0.056790 0.011165	12.26620 1.976127	0.1446 0.1598	10.29007 1.976127	0.1936 0.1598
DUBAI PRICE **SI [7]**	H0: r=0 H1: r≤1	0.018478 0.014021	5.636669 2.428724	0.7380 0.1191	3.207945 2.428724	0.9319 0.1191
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.047010 0.010504	10.39177 1.868996	0.2518 0.1716	8.522778 1.868996	0.3280 0.1716
LNG PRICE **SI [2]**	H0: r=0 H1: r≤1	0.016801 0.013692	5.439283 2.440225	0.7605 0.1183	2.999058 2.440225	0.9468 0.1183
RUS PRICE **SI [8]**	H0: r=0 H1: r≤1	0.042981 0.013401	9.819492 2.307120	0.2949 0.1288	7.512372 2.307120	0.4304 0.1288
BRENT PRICE **IP [2]**	H0: r=0 H1: r≤1	0.030043 0.009498	8.049525 1.918272	0.4601 0.1660	6.131253 1.918272	0.5964 0.1660
WTI PRICE **IP [2]**	H0: r=0 H1: r≤1	0.036469 0.009735	9.433486 1.966304	0.3268 0.1608	7.467183 1.966304	0.4355 0.1608
DUBAI PRICE **IP [2]**	H0: r=0 H1: r≤1	0.033501 0.009360	8.739252 1.890171	0.3901 0.1692	6.849081 1.890171	0.5071 0.1692
HH PRICE **IP [2]**	H0: r=0 H1: r≤1	0.057127 0.009818	13.80690* 1.983241	0.0884 0.1590	11.82365 1.983241	0.1174 0.1590
LNG PRICE **IP [2]**	H0: r=0 H1: r≤1	0.015388 0.007394	4.608807 1.491761	0.8489 0.2219	3.117046 1.491761	0.9386 0.2219
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.027740 0.010123	7.622914 2.024702	0.5066 0.1548	5.598212 2.024702	0.6651 0.1548
SI **IP [2]**	H0: r=0 H1: r≤1	0.065360 0.024583	16.36975** 4.405544**	0.0368 0.0358	11.96420 4.405544**	0.1120 0.0358

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 463 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	13.578*** 2.914	0.001 0.232	2	EC→GDP
BRENT does not granger cause SI SI does not granger cause BRENT	12.644** 28.110***	0.027 0.000	5	BRENT↔SI
WTI does not granger cause SI SI does not granger cause WTI	11.618*** 26.047***	0.008 0.000	3	WTI↔SI
DUBAI does not granger cause SI SI does not granger cause DUBAI	16.288** 32.652***	0.026 0.000	7	DUBAI↔SI
HH does not granger cause SI SI does not granger cause HH	2.390 4.836*	0.302 0.089	2	SI→HH

LNG does not granger cause SI SI does not granger cause LNG	1.313 11.325***	0.518 0.003	2	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	21.216*** 43.955***	0.006 0.000	8	RUSSIA↔SI
BRENT does not granger cause IP IP does not granger cause BRENT	1.427 6.842**	0.489 0.032	2	IP→BRENT
WTI does not granger cause IP IP does not granger cause WTI	1.573 7.565**	0.455 0.022	2	IP→WTI
DUBAI does not granger cause IP IP does not granger cause DUBAI	2.707 5.447*	0.258 0.065	2	IP→DUBAI
HH does not granger cause IP IP does not granger cause HH	0.327 6.096**	0.848 0.047	2	IP→HH
LNG does not granger cause IP IP does not granger cause LNG	1.074 0.273	0.584 0.872	2	No causal relation
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	2.846 4.535	0.583 0.338	4	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 464 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	8.885** 1.977	0.011 0.372	2	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	7.483** 3.215	0.023 0.200	2	WTI→M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	6.706** 3.599	0.035 0.165	2	DUBAI→M2
HH does not granger cause M2 M2 does not granger cause HH	0.762 5.661*	0.683 0.059	2	M2→HH
LNG does not granger cause M2 M2 does not granger cause LNG	0.548 6.611*	0.908 0.085	3	M2→LNG
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	1.782 4.212	0.775 0.378	4	No causal relation
SI does not granger cause IP IP does not granger cause SI	3.463 2.334	0.177 0.311	2	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

C. ANALYSIS RESULTS OF OPEC COUNTRIES

ALGERIA

UNIT ROOT TEST RESULTS

Table 465 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-4.253 [0]*** (0.001)	-3.474 [0]* (0.057)	-4.555 [0]*** (0.000)	-4.981 [0]*** (0.001)
LN(GDP)	-0.870 [1] (0.785)	-4.785 [8]*** (0.003)	-4.001 [9]*** (0.005)	-3.547 [0]* (0.049)
	PP (Level)		PP (First Difference)	
LN(EC)	-4.265 [1]*** (0.001)	-3.479 [1]* (0.057)	-4.484 [2]*** (0.001)	-4.937 [2]*** (0.001)
LN(GDP)	-1.198 [4] (0.664)	-1.457 [4] (0.825)	-3.523 [3]** (0.013)	-3.450 [2]* (0.060)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.669 [4]**	0.148 [4]**	0.381 [4]*	0.204 [3]**
LN(GDP)	0.308 [5]	0.132 [0]*	0.147 [4]	0.141 [4]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 466 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-5.222 [0]*** (0.000)	-2.723 [0] (0.232)	-3.450 [0]** (0.014)	-4.325 [0]*** (0.007)
LN(GDP)	-3.285 [1]** (0.022)	-4.426 [7]*** (0.006)	-9.121 [0]*** (0.000)	-9.353 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(NG)	-4.246 [3]*** (0.001)	-2.421 [3] (0.363)	-3.500 [4]** (0.012)	-4.452 [3]*** (0.005)
LN(GDP)	-1.436 [3] (0.555)	-1.793 [3] (0.690)	-8.316 [4]*** (0.000)	-8.391 [4]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.641 [5]**	0.186 [5]**	0.467 [5]**	0.157 [4]**
LN(GDP)	0.522 [5]**	0.104 [5]	0.150 [2]	0.146 [2]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 467 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-2.027 [1] (0.274)	-2.417 [2] (0.365)	-4.026 [0]*** (0.003)	-4.192 [0]** (0.010)
LN(GDP)	-3.285 [1]** (0.022)	-4.426 [7]*** (0.006)	-9.121 [0]*** (0.000)	-9.353 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(OIL)	-2.507 [4] (0.120)	-2.438 [4] (0.355)	-4.056 [3]*** (0.002)	-4.293 [3]*** (0.007)
LN(GDP)	-1.436 [3] (0.555)	-1.793 [3] (0.690)	-8.316 [4]*** (0.000)	-8.391 [4]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(OIL)	0.758 [5]***	0.150 [5]**	0.359 [4]*	0.197 [4]**
LN(GDP)	0.522 [5]**	0.104 [5]	0.150 [2]	0.146 [2]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 468 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-3.015 [0]** (0.035)	-6.423 [0]*** (0.000)	-16.678 [0]*** (0.000)	-16.647 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-2.793 [7]* (0.061)	-6.520 [3]*** (0.000)	-22.684 [17]*** (0.000)	-22.488 [17]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.693 [11]***	0.136 [9]*	0.166 [17]	0.072 [16]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 469 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-3.015 [0]** (0.035)	-6.423 [0]*** (0.000)	-16.678 [0]*** (0.000)	-16.647 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-2.793 [7]* (0.061)	-6.520 [3]*** (0.000)	-22.684 [17]*** (0.000)	-22.488 [17]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.693 [11]***	0.136 [9]*	0.166 [17]	0.072 [16]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 470 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
NGC	H0: r=0	0.191873	10.59476	0.2377	8.521420	0.3282
GDP [3]	H1: r≤1	0.050513	2.073344	0.1499	2.073344	0.1499
OILC	H0: r=0	0.296109	14.75771*	0.0644	14.39643**	0.0477

GDP [2]	H1: r≤1	0.008773	0.361284	0.5478	0.361284	0.5478

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level.
MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 471 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
NGC does not granger cause GDP	0.484	0.922	3	No causal relation
GDP does not granger cause NGC	5.025	0.170		

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 472 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
OILC does not granger cause GDP	0.118	0.942	2	No causal relation
GDP does not granger cause OILC	2.125	0.345		

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

ANGOLA

UNIT ROOT TEST RESULTS

Table 473 EC and GDP (1985-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-0.394 [0] (0.978)	-1.057 [0] (0.917)	-4.445 [0]*** (0.001)	-4.738 [0]*** (0.004)
LN(GDP)	-0.934 [1] (0.759)	-1.655 [1] (0.740)	-2.661 [0]* (0.094)	-2.881 [0]*** (0.184)
	PP (Level)		PP (First Difference)	
LN(EC)	-0.358 [1] (0.976)	-1.081 [1] (0.913)	-4.443 [1]*** (0.001)	-4.709 [3]*** (0.004)
LN(GDP)	-0.290 [2] (0.913)	-1.103 [2] (0.909)	-2.661 [0]* (0.094)	-2.940 [1] (0.167)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.518 [3]**	0.187 [3]**	0.373 [0]*	0.089 [4]
LN(GDP)	0.383 [3]*	0.187 [3]**	0.326 [2]	0.071 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 474 Oil Prices and M2 (2010-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.207 [1] (0.665)	-0.049 [1] (0.994)	-3.650 [0]*** (0.007)	-4.358 [0]*** (0.005)
LN(WTI)	-1.701 [1] (0.425)	-0.753 [1] (0.963)	-4.673 [0]*** (0.000)	-5.038 [0]*** (0.000)
LN(DUBAI)	-1.199 [1] (0.669)	-0.057 [4] (0.996)	-3.043 [0]** (0.036)	-3.739 [0]** (0.027)
LN(M2)	-0.601 [0] (0.862)	-2.259 [0] (0.448)	-8.428 [0]*** (0.000)	-8.395 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.025 [2] (0.738)	-0.514 [1] (0.999)	-3.665 [2]*** (0.007)	-4.182 [4]*** (0.008)
LN(WTI)	-1.297 [1] (0.625)	-0.283 [1] (0.989)	-4.592 [3]*** (0.000)	-4.947 [4]*** (0.000)
LN(DUBAI)	-1.038 [3] (0.734)	-1.471 [0] (1.000)	-2.994 [4]** (0.041)	-3.573 [5]** (0.041)
LN(M2)	-0.553 [5]	-2.239 [1]	-8.686 [6]***	-8.674 [7]***

	(0.872)	(0.459)	(0.000)	(0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	0.333 [5]	0.227 [5]***	0.547 [2]**	0.128 [0]*
LN(WTI)	0.328 [5]	0.153 [4]**	0.359 [1]*	0.103 [1]
LN(DUBAI)	0.352 [5]*	0.230 [5]***	0.490 [3]**	0.109 [1]
LN(M2)	0.935 [6]***	0.181 [5]**	0.087 [5]	0.074 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 475 NG Prices and M2 (2010-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.381 [0] (0.151)	-2.321 [0] (0.416)	-6.206 [0]*** (0.000)	-6.148 [0]*** (0.000)
LN(LNG)	-1.883 [0] (0.337)	-0.807 [0] (0.958)	-2.680 [0]* (0.056)	-6.901 [0]*** (0.000)
LN(RUS)	-2.305 [0] (0.173)	-1.466 [0] (0.830)	-9.477 [0]*** (0.000)	-10.326 [0]*** (0.000)
LN(M2)	-0.601 [0] (0.862)	-2.259 [0] (0.448)	-8.428 [0]*** (0.000)	-8.395 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.381 [0] (0.151)	-2.321 [0] (0.416)	-6.104 [5]*** (0.000)	-6.032 [5]*** (0.000)
LN(LNG)	-1.821 [4] (0.366)	-1.010 [4] (0.934)	-6.649 [4]*** (0.000)	-6.944 [4]*** (0.000)
LN(RUS)	-2.372 [4] (0.153)	-1.297 [4] (0.879)	-9.308 [4]*** (0.000)	-10.581 [3]*** (0.000)
LN(M2)	-0.553 [5] (0.872)	-2.239 [1] (0.459)	-8.686 [6]*** (0.000)	-8.674 [7]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.193 [5]	0.190 [5]**	0.141 [3]	0.078 [3]
LN(LNG)	0.600 [6]**	0.216 [6]***	0.320 [4]	0.078 [4]
LN(RUS)	0.463 [6]**	0.233 [6]***	0.541 [4]**	0.090 [3]
LN(M2)	0.935 [6]***	0.181 [5]**	0.087 [5]	0.074 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 476 Johansen Cointegration Test Results

Variables	**Hypothesis**	**Eigenvalue**	**Trace Statistic**	**Prob.**	**Max-Eigen Statistic**	**Prob.**
EC GDP [2]	H0: r=0 H1: r≤1	0.301143 0.004932	8.718059 0.118651	0.3921 0.7305	8.599408 0.118651	0.3210 0.7305
BRENT PRICE M2 [2]	H0: r=0 H1: r≤1	0.124827 0.001832	7.704574 0.104530	0.4975 0.7465	7.600044 0.104530	0.4208 0.7465
WTI PRICE M2 [2]	H0: r=0 H1: r≤1	0.061323 0.011840	4.286057 0.678894	0.8791 0.4100	3.607162 0.678894	0.8983 0.4100
DUBAI PRICE M2 [2]	H0: r=0 H1: r≤1	0.109616 0.001424	6.699094 0.081246	0.6129 0.7756	6.617847 0.081246	0.5353 0.7756
HH PRICE M2 [3]	H0: r=0 H1: r≤1	0.074444 0.040156	6.627365 2.295139	0.6213 0.1298	4.332226 2.295139	0.8227 0.1298
LNG PRICE M2 [1]	H0: r=0 H1: r≤1	0.082592 0.016318	5.954034 0.954239	0.7010 0.3286	4.999795 0.954239	0.7419 0.3286
RUS PRICE M2 [3]	H0: r=0 H1: r≤1	0.104768 0.000260	6.212170 0.014535	0.6704 0.9039	6.197635 0.014535	0.5880 0.9039

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level.

MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 477 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	2.934 10.260***	0.230 0.005	2	GDP→EC
BRENT does not granger cause M2 M2 does not granger cause BRENT	5.255* 4.459	0.072 0.107	2	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	1.304 1.721	0.520 0.422	2	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	4.540 3.237	0.103 0.198	2	No causal relation
HH does not granger cause M2 M2 does not granger cause HH	1.552 7.176*	0.670 0.066	3	M2→HH
LNG does not granger cause M2 M2 does not granger cause LNG	1.191 0.311	0.275 0.576	1	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	10.938** 7.873**	0.012 0.048	3	RUSSIA↔M2

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

ECUADOR

UNIT ROOT TEST RESULTS

Table 478 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(EC)	-1.788 [0] (0.380)	-2.484 [0] (0.333)	-6.742 [0]*** (0.000)	-6.633 [0]*** (0.000)
LN(GDP)	-0.701 [0] (0.990)	-0.570 [0] (0.974)	-5.553 [0]*** (0.000)	-5.878 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-1.758 [1] (0.394)	-2.575 [2] (0.292)	6.753 [2]*** (0.000)	-6.662 [1]*** (0.000)
LN(GDP)	-0.847 [2] (0.993)	-0.543 [2] (0.976)	-5.553 [2]*** (0.000)	-5.878 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.665 [4]**	0.135 [4]*	0.124 [2]	0.126 [2]*
LN(GDP)	0.620 [5]**	0.150 [4]**	0.257 [3]	0.136 [2]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 479 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(NG)	-1.322 [0] (0.610)	-3.217 [0]* (0.094)	-7.968 [0]*** (0.000)	-7.866 [0]*** (0.000)
LN(GDP)	-1.908 [0] (0.325)	-2.383 [0] (0.382)	-4.332 [0]*** (0.001)	-4.294 [0]*** (0.007)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-1.205 [1] (0.663)	-3.316 [3]* (0.077)	7.968 [0]*** (0.000)	-7.866 [0]*** (0.000)
LN(GDP)	-1.811 [4]	-2.499 [3]	-4.297 [2]***	-4.327 [3]***

	(0.370)	(0.326)	(0.001)	(0.007)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.777 [5]***	0.075 [4]	0.036 [1]	0.036 [1]
LN(GDP)	0.733 [5]**	0.115 [4]	0.192 [4]	0.173 [4]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 480 Oil Consumption and GDP (1970-2013)-Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(OIL)	-1.940 [0] (0.311)	-2.292 [0] (0.428)	-6.611 [0]*** (0.000)	-6.822 [0]*** (0.000)
LN(GDP)	-1.908 [0] (0.325)	-2.383 [0] (0.382)	-4.332 [0]*** (0.001)	-4.294 [0]*** (0.007)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-2.387 [7] (0.151)	-2.221 [4] (0.466)	-6.612 [1]*** (0.000)	-6.947 [5]*** (0.000)
LN(GDP)	-1.811 [4] (0.370)	-2.499 [3] (0.326)	-4.297 [2]*** (0.001)	-4.327 [3]*** (0.007)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.817 [5]***	0.171 [5]**	0.299 [1]	0.113 [5]
LN(GDP)	0.733 [5]**	0.115 [4]	0.192 [4]	0.173 [4]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 481 Oil Prices and M2 (2007-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-2.623 [1]* (0.091)	-2.346 [1] (0.405)	-5.017 [0]*** (0.000)	-5.142 [0]*** (0.000)
LN(WTI)	-3.825 [2]*** (0.003)	-3.761 [2]** (0.023)	-5.600 [0]*** (0.000)	-5.683 [0]*** (0.000)
LN(DUBAI)	-2.739 [1]* (0.071)	-2.515 [1] (0.320)	-4.657 [0]*** (0.000)	-4.784 [0]*** (0.001)
LN(M2)	-0.375 [1] (0.908)	-3.049 [0] (0.124)	-1.769 [11] (0.393)	-1.736 [11] (0.726)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-2.528 [5] (0.111)	-2.211 [5] (0.477)	-5.050 [2]*** (0.000)	-5.192 [2]*** (0.000)
LN(WTI)	-2.866 [5]* (0.053)	-2.646 [5] (0.261)	-5.675 [2]*** (0.000)	-5.768 [2]*** (0.000)
LN(DUBAI)	-2.566 [5] (0.103)	2.254 [5] (0.454)	-4.502 [1]*** (0.000)	-4.784 [0]*** (0.001)
LN(M2)	-0.158 [12] (0.938)	-2.898 [1] (0.167)	-12.096 [6]*** (0.000)	-12.040 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	0.553 [7]**	0.090 [6]	0.158 [5]	0.060 [5]
LN(WTI)	0.390 [6]*	0.058 [6]	0.125 [5]	0.051 [5]
LN(DUBAI)	0.603 [7]**	0.087 [6]**	0.161 [5]	0.058 [5]
LN(M2)	1.306 [7]***	0.090 [7]	0.060 [11]	0.060 [11]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 482 NG Prices and M2 (2007-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-1.557 [0] (0.500)	-2.324 [1] (0.416)	-8.215 [0]*** (0.000)	-8.188 [0]*** (0.000)
LN(LNG)	-1.763 [1] (0.396)	-2.789 [0] (0.000)	-6.638 [0]*** (0.000)	-6.630 [0]*** (0.000)

LN(RUS)	-3.567 [3]*** (0.008)	-3.586 [3]** (0.036)	-3.063 [2]** (0.032)	-3.069 [2] (0.119)
LN(M2)	-0.375 [1] (0.908)	-3.049 [0] (0.124)	-1.769 [11] (0.393)	-1.736 [11] (0.726)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-1.669 [1] (0.443)	-2.217 [2] (0.474)	-8.245 [3]*** (0.000)	-8.216 [3]*** (0.000)
LN(LNG)	-1.563 [5] (0.497)	-2.154 [5] (0.509)	-6.820 [4]*** (0.000)	-6.810 [4]*** (0.000)
LN(RUS)	-2.298 [6] (0.174)	-2.317 [6] (0.420)	-8.159 [6]*** (0.000)	-8.127 [6]*** (0.000)
LN(M2)	-0.158 [12] (0.938)	-2.898 [1] (0.167)	-12.096 [6]*** (0.000)	-12.040 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.727 [7]**	0.175 [7]**	0.071 [0]	0.064 [0]
LN(LNG)	0.961 [7]***	0.108 [7]	0.063 [5]	0.057 [5]
LN(RUS)	0.195 [7]**	0.068 [7]	0.053 [0]	0.049 [6]
LN(M2)	1.306 [7]***	0.090 [7]	0.060 [11]	0.060 [11]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 483 Oil Prices and SI (2005-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-2.694 [1]* (0.078)	-2.573 [1] (0.293)	-6.528 [0]*** (0.000)	-6.646 [0]*** (0.000)
LN(WTI)	-3.348 [2]** (0.014)	-3.691 [2]** (0.026)	-6.875 [0]*** (0.000)	-6.963 [0]*** (0.000)
LN(DUBAI)	-2.778 [1]* (0.064)	-3.066 [2] (0.119)	-5.885 [0]*** (0.000)	-6.033 [0]*** (0.000)
LN(SI)	-1.355 [0] (0.602)	-1.397 [0] (0.856)	-9.719 [0]*** (0.000)	-9.678 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-2.592 [5]* (0.097)	-2.458 [5] (0.348)	-6.570 [3]*** (0.000)	-6.698 [3]*** (0.000)
LN(WTI)	-2.907 [5]** (0.047)	-2.874 [5] (0.174)	-7.002 [3]*** (0.000)	-7.095 [3]*** (0.000)
LN(DUBAI)	-2.695 [5]* (0.077)	-2.516 [5] (0.319)	-5.931 [2]*** (0.000)	-6.098 [2]*** (0.000)
LN(SI)	-1.355 [0] (0.602)	-1.397 [0] (0.856)	-9.719 [0]*** (0.000)	-9.678 [0]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	0.837 [9]***	0.068 [8]	0.155 [5]	0.050 [5]
LN(WTI)	0.741 [8]***	0.053 [8]	0.120 [5]	0.040 [5]
LN(DUBAI)	0.905 [9]***	0.077 [8]	0.182 [5]	0.048 [5]
LN(SI)	0.245 [9]	0.159 [9]**	0.159 [5]	0.160 [5]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 484 NG Prices and SI (2005-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-1.654 [0] (0.451)	-2.667 [0] (0.252)	-10.397 [0]*** (0.000)	-10.354 [0]*** (0.000)
LN(LNG)	-1.598 [1] (0.480)	-2.955 [2] (0.149)	-7.956 [0]*** (0.000)	-7.934 [0]*** (0.000)
LN(RUS)	-3.3460 [3]** (0.015)	-3.804 [3]** (0.019)	-3.303 [2]** (0.016)	-3.312 [2]* (0.069)
LN(SI)	-1.355 [0] (0.602)	-1.397 [0] (0.856)	-9.719 [0]*** (0.000)	-9.678 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-1.806 [3]	-2.986 [4]	-10.415 [2]***	-10.373 [2]***

	(0.376)	(0.140)	(0.000)	(0.000)
LN(LNG)	-1.685 [5] (0.436)	-2.505 [5] (0.325)	-8.113 [4]*** (0.000)	-8.094 [4]*** (0.000)
LN(RUS)	-2.650 [7]* (0.085)	-2.633 [7] (0.266)	-9.517 [7]*** (0.000)	-9.554 [7]*** (0.000)
LN(SI)	-1.355 [0] (0.602)	-1.397 [0] (0.856)	-9.719 [0]*** (0.000)	-9.678 [0]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.905 [9]***	0.121 [8]*	0.046 [2]	0.046 [2]
LN(LNG)	1.051 [9]***	0.099 [8]	0.057 [5]	0.047 [5]
LN(RUS)	0.551 [9]**	0.087 [9]	0.107 [7]	0.045 [7]
LN(SI)	0.245 [9]	0.159 [9]**	0.159 [5]	0.160 [5]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 485 Oil Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-1.366 [1] (0.598)	-2.052 [1] (0.568)	-20.260 [0]*** (0.000)	-20.210 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-1.384 [8] (0.589)	-2.409 [2] (0.373)	-20.789 [5]*** (0.000)	-20.740 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.251 [11]***	0.248 [11]***	0.063 [12]	0.063 [12]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 486 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-1.366 [1] (0.598)	-2.052 [1] (0.568)	-20.260 [0]*** (0.000)	-20.210 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9]	-2.429 [9]	-13.746 [9]***	-13.722 [9]***

	(0.626)	(0.363)	(0.000)	(0.000)
LN(IP)	-1.384 [8] (0.589)	-2.409 [2] (0.373)	-20.789 [5]*** (0.000)	-20.740 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.251 [11]***	0.248 [11]***	0.063 [12]	0.063 [12]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 487 SI and IP (2005-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-1.355 [0] (0.602)	-1.397 [0] (0.856)	-9.719 [0]*** (0.000)	-9.678 [0]*** (0.000)
LN(IP)	-2.046 [0] (0.266)	-2.083 [0] (0.549)	-14.844 [0]*** (0.000)	-14.969 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.355 [0] (0.602)	-1.397 [0] (0.856)	-9.719 [0]*** (0.000)	-9.678 [0]*** (0.000)
LN(IP)	-1.640 [6] (0.458)	-1.607 [6] (0.784)	-15.508 [5]*** (0.000)	-16.008 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.245 [9]	0.159 [9]**	0.159 [5]	0.160 [5]**
LN(IP)	0.292 [9]	0.291 [9]***	0.252 [4]	0.043 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 488 Johansen Cointegration Test Results

Variables	**Hypothesis**	**Eigenvalue**	**Trace Statistic**	**Prob.**	**Max-Eigen Statistic**	**Prob.**
EC GDP [1]	H0: r=0 H1: r≤1	0.254245 0.006848	10.50805 0.240494	0.2437 0.6238	10.26756 0.240494	0.1949 0.6238
NGC GDP [1]	H0: r=0 H1: r≤1	0.129973 0.034516	7.322984 1.475272	0.5404 0.2245	5.847712 1.475272	0.6328 0.2245
OILC GDP [3]	H0: r=0 H1: r≤1	0.293257 0.011118	14.33070* 0.447197	0.0743 0.5037	13.88350* 0.447197	0.0573 0.5037
BRENT PRICE M2 [3]	H0: r=0 H1: r≤1	0.128512 0.014405	13.98978* 1.334898	0.0832 0.2479	12.65488* 1.334898	0.0884 0.2479
WTI PRICE M2 [3]	H0: r=0 H1: r≤1	0.194672 0.015292	21.33632*** 1.417772	0.0059 0.2338	19.91855*** 1.417772	0.0057 0.2338
DUBAI PRICE M2 [4]	H0: r=0 H1: r≤1	0.094488 0.011260	10.06269 1.030463	0.2759 0.3100	9.032228 1.030463	0.2835 0.3100
HH PRICE M2 [7]	H0: r=0 H1: r≤1	0.079651 0.013990	8.544063 1.239817	0.4092 0.2655	7.304246 1.239817	0.4538 0.2655
LNG PRICE M2 [3]	H0: r=0 H1: r≤1	0.107816 0.001853	10.66627 0.170621	0.2329 0.6796	10.49565 0.170621	0.1814 0.6796
RUS PRICE M2 [5]	H0: r=0 H1: r≤1	0.147448 0.003734	14.69359* 0.336712	0.0658 0.5617	14.35688** 0.336712	0.0483 0.5617
BRENT PRICE SI [3]	H0: r=0 H1: r≤1	0.065502 0.045153	13.21820 5.359702**	0.1070 0.0206	7.858498 5.359702**	0.3932 0.0206
WTI PRICE SI [3]	H0: r=0 H1: r≤1	0.088961 0.045068	16.15710** 5.349392**	0.0397 0.0207	10.80770 5.349392**	0.1641 0.0207
DUBAI PRICE SI [3]	H0: r=0 H1: r≤1	0.061343 0.041394	12.24739 4.903930**	0.1455 0.0268	7.343457 4.903930**	0.4493 0.0268
HH PRICE SI [1]	H0: r=0 H1: r≤1	0.030142 0.009815	4.775311 1.163905	0.8322 0.2807	3.611407 1.163905	0.8979 0.2807
LNG PRICE SI [3]	H0: r=0 H1: r≤1	0.046731 0.020075	7.903886 2.352377	0.4757 0.1251	5.551509 2.352377	0.6712 0.1251
RUS PRICE	H0: r=0	0.117692	16.94340**	0.0301	14.39955**	0.0476

SI [4]	H1: r≤1	0.021878	2.543848	0.1107	2.543848	0.1107
BRENT PRICE **IP [2]**	H0: r=0 H1: r≤1	0.036164 0.010370	9.498992 2.095254	0.3212 0.1478	7.403738 2.095254	0.4425 0.1478
WTI PRICE **IP [2]**	H0: r=0 H1: r≤1	0.047815 0.010170	11.90280 2.054671	0.1617 0.1517	9.848128 2.054671	0.2221 0.1517
DUBAI PRICE **IP [2]**	H0: r=0 H1: r≤1	0.036545 0.010548	9.614684 2.131454	0.3115 0.1443	7.483230 2.131454	0.4337 0.1443
HH PRICE **IP [2]**	H0: r=0 H1: r≤1	0.037644 0.009636	9.658844 1.946322	0.3079 0.1630	7.712522 1.946322	0.4087 0.1630
LNG PRICE **IP [2]**	H0: r=0 H1: r≤1	0.024515 0.007811	6.564995 1.576095	0.6287 0.2093	4.988900 1.576095	0.7432 0.2093
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.057270 0.009196	13.57457* 1.838525	0.0954 0.1751	11.73605 1.838525	0.1210 0.1751
SI **IP [3]**	H0: r=0 H1: r≤1	0.117023 0.007319	15.28913* 0.852180	0.0537 0.3559	14.43695** 0.852180	0.0470 0.3559

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 489 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	0.475 4.408**	0.490 0.035	1	GDP→EC
NGC does not granger cause GDP GDP does not granger cause NGC	1.138 2.275	0.285 0.131	1	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	12.971** 1.353	0.011 0.852	4	DUBAI→M2
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	21.651*** 12.004**	0.006 0.034	5	RUSSIA↔M2
BRENT does not granger cause SI SI does not granger cause BRENT	6.036 4.609	0.109 0.202	3	No causal relation
DUBAI does not granger cause SI SI does not granger cause DUBAI	4.997 3.847	0.172 0.278	3	No causal relation
HH does not granger cause SI SI does not granger cause HH	0.260 0.205	0.609 0.650	1	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	3.917 1.884	0.270 0.596	3	No causal relation
BRENT does not granger cause IP IP does not granger cause BRENT	3.158 5.941*	0.206 0.051	2	IP→BRENT
WTI does not granger cause IP IP does not granger cause WTI	3.560 5.212*	0.168 0.073	2	IP→WTI
DUBAI does not granger cause IP IP does not granger cause DUBAI	2.368 5.273*	0.305 0.071	2	IP→DUBAI
HH does not granger cause IP IP does not granger cause HH	2.821 0.979	0.244 0.612	2	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	1.493 2.271	0.473 0.321	2	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 490 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
OILC does not granger cause GDP GDP does not granger cause OILC	4.468 0.487	0.215 0.921	3	No causal relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	0.686 0.978	0.876 0.806	3	No causal relation
WTI does not granger cause M2 M2 does not granger cause WTI	0.721 3.630	0.868 0.304	3	No causal relation
HH does not granger cause M2	13.293*	0.065	7	HH↔M2

M2 does not granger cause HH	12.409*	0.087		
LNG does not granger cause M2 M2 does not granger cause LNG	6.012 0.355	0.111 0.949	3	No causal relation
WTI does not granger cause SI SI does not granger cause WTI	2.174 2.644	0.537 0.449	3	No causal relation
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	19.190*** 1.559	0.007 0.816	4	RUSSIA→SI
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	1.965 4.454	0.742 0.348	4	No causal relation
SI does not granger cause IP IP does not granger cause SI	2.854 0.438	0.414 0.932	3	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

IRAN

UNIT ROOT TEST RESULTS

Table 491 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-0.531 [0] (0.873)	-2.989 [0] (0.149)	-8.703 [0]*** (0.000)	-8.592 [0]*** (0.000)
LN(GDP)	-0.863 [3] (0.868)	-2.285 [3] (0.429)	-3.608 [2]** (0.011)	-4.777 [2]*** (0.002)
	PP (Level)		PP (First Difference)	
LN(EC)	-0.531 [0] (0.873)	-2.991 [3] (0.148)	-8.905 [1]*** (0.000)	-9.090 [2]*** (0.000)
LN(GDP)	-0.889 [1] (0.780)	-1.119 [10] (0.911)	-3.745 [1]*** (0.007)	-4.751 [6]*** (0.002)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.718 [5]**	0.149 [4]**	0.067 [2]	0.069 [2]
LN(GDP)	0.281 [4]	0.208 [4]**	0.475 [1]**	0.111 [9]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 492 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-0.636 [0] (0.851)	-2.907 [0] (0.170)	-8.094 [0]*** (0.000)	-8.000 [0]*** (0.000)
LN(GDP)	-1.903 [1] (0.327)	-1.356 [3] (0.858)	-3.597 [0]*** (0.010)	-3.868 [2]** (0.022)
	PP (Level)		PP (First Difference)	
LN(NG)	-0.622 [9] (0.854)	-2.907 [0] (0.170)	-8.908 [8]*** (0.000)	-8.748 [8]*** (0.000)
LN(GDP)	-1.259 [2] (0.639)	-1.377 [2] (0.853)	-3.236 [6]** (0.024)	-3.142 [7] (0.110)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.834 [5]***	0.109 [4]	0.134 [10]	0.122 [10]*
LN(GDP)	0.243 [5]	0.185 [5]**	0.132 [2]	0.111 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 493 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-3.617 [3]*** (0.009)	-2.791 [3] (0.208)	-4.074 [2]*** (0.002)	-5.120 [2]*** (0.000)
LN(GDP)	-1.903 [1] (0.327)	-1.356 [3] (0.858)	-3.597 [0]*** (0.010)	-3.868 [2]** (0.022)

	PP (Level)		PP (First Difference)	
LN(OIL)	-6.745 [11]*** (0.000)	-3.371 [11]* (0.068)	-3.597 [8]*** (0.010)	-4.170 [14]*** (0.106)
LN(GDP)	-1.259 [2] (0.639)	-1.377 [2] (0.853)	-3.236 [6]** (0.024)	-3.142 [7] (0.110)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.805 [5]***	0.206 [5]**	0.591 [2]**	0.106 [6]
LN(GDP)	0.243 [5]	0.185 [5]**	0.132 [2]	0.111 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 494 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-0.360 [0] (0.912)	-1.449 [0] (0.843)	-17.445 [0]*** (0.000)	-17.539 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-0.031 [4] (0.953)	-1.202 [4] (0.906)	-17.319 [5]*** (0.000)	-17.460 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	0.862 [11]***	0.353 [11]***	0.310 [4]	0.056 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 495 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-0.360 [0] (0.912)	-1.449 [0] (0.843)	-17.445 [0]*** (0.000)	-17.539 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-0.031 [4] (0.953)	-1.202 [4] (0.906)	-17.319 [5]*** (0.000)	-17.460 [5]*** (0.000)

	KPSS (Level)		KPSS (First Difference)	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	0.862 [11]***	0.353 [11]***	0.310 [4]	0.056 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 496 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [2]	H0: r=0 H1: r≤1	0.338998 0.009324	14.39442* 0.318500	0.0727 0.5725	14.07592* 0.318500	0.0535 0.5725
NGC GDP [3]	H0: r=0 H1: r≤1	0.156442 0.038759	8.386240 1.581188	0.4251 0.2086	6.805052 1.581188	0.5125 0.2086
OILC GDP [2]	H0: r=0 H1: r≤1	0.405251 0.064187	24.02412*** 2.719906*	0.0021 0.0991	21.30422*** 2.719906*	0.0033 0.0991
BRENT PRICE IP [2]	H0: r=0 H1: r≤1	0.028231 0.001431	6.043769 0.287748	0.6904 0.5917	5.756022 0.287748	0.6447 0.5917
WTI PRICE IP [2]	H0: r=0 H1: r≤1	0.028556 0.000406	5.905005 0.081645	0.7067 0.7751	5.823360 0.081645	0.6360 0.7751
DUBAI PRICE IP [2]	H0: r=0 H1: r≤1	0.032319 0.001975	7.000675 0.397284	0.5776 0.5285	6.603391 0.397284	0.5371 0.5285
HH PRICE IP [2]	H0: r=0 H1: r≤1	0.044975 1.16E-05	9.252002 0.002328	0.3426 0.9594	9.249674 0.002328	0.2660 0.9594
LNG PRICE IP [3]	H0: r=0 H1: r≤1	0.042331 0.000691	8.788942 0.138285	0.3853 0.7100	8.650657 0.138285	0.3164 0.7100
RUS PRICE IP [4]	H0: r=0 H1: r≤1	0.032335 0.000369	6.614400 0.073490	0.6229 0.7863	6.540910 0.073490	0.5448 0.7863

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level.
MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively**

GRANGER CAUSALITY TEST RESULTS

Table 497 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
NGC does not granger cause GDP GDP does not granger cause NGC	1.890 15.485***	0.595 0.001	3	GDP→NGC
BRENT does not granger cause IP IP does not granger cause BRENT	2.140 0.898	0.342 0.638	2	No causal relation
WTI does not granger cause IP IP does not granger cause WTI	2.260 0.815	0.323 0.665	2	No causal relation
DUBAI does not granger cause IP IP does not granger cause DUBAI	3.018 0.533	0.221 0.765	2	No causal relation
HH does not granger cause IP IP does not granger cause HH	2.654 0.239	0.265 0.887	2	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	8.847** 1.197	0.031 0.753	3	LNG→IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	5.453 1.877	0.243 0.758	4	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 498 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	1.687 2.375	0.304 0.430	2	No causal relation
OILC does not granger cause GDP GDP does not granger cause OILC	1.488 12.403***	0.475 0.002	2	GDP→OILC

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

IRAQ

UNIT ROOT TEST RESULTS

Table 499 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-2.199 [0] (0.209)	-2.008 [0] (0.577)	-5.239 [0]*** (0.000)	-5.185 [0]*** (0.000)
LN(GDP)	-2.627 [0]* (0.096)	-3.498 [0]* (0.054)	-8.224 [0]*** (0.000)	-8.097 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-2.234 [1] (0.198)	-2.093 [1] (0.532)	-5.213 [5]*** (0.000)	-5.146 [5]*** (0.001)
LN(GDP)	-2.484 [2] (0.127)	-3.494 [2]* (0.055)	-8.875 [4]*** (0.000)	-8.729 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.403 [4]*	0.176 [4]**	0.162 [2]	0.082 [4]
LN(GDP)	0.555 [4]**	0.107 [3]	0.080 [5]	0.081 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 500 Oil Prices and M2 (2004-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-2.761 [1]* (0.066)	-2.453 [1] (0.350)	-7.567 [0] (0.000)	-7.759 [0]*** (0.000)
LN(WTI)	-3.201 [2]** (0.022)	-3.487 [2]** (0.044)	-7.610 [0]*** (0.000)	-7.748 [0]*** (0.000)
LN(DUBAI)	-2.700 [1]* (0.076)	-2.892 [2] (0.168)	-6.621 [0]*** (0.000)	-6.829 [0]*** (0.000)
LN(M2)	-2.492 [0] (0.119)	-1.491 [0] (0.827)	-12.251 [0]*** (0.000)	-12.736 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-2.612 [4]* (0.093)	-2.327 [4] (0.416)	-7.567 [0]*** (0.000)	-7.707 [1]*** (0.000)
LN(WTI)	-2.832 [4]* (0.056)	-2.740 [4] (0.222)	-7.507 [1]*** (0.000)	-7.658 [1]*** (0.000)
LN(DUBAI)	-2.520 [4] (0.112)	-2.194 [4] (0.488)	-6.621 [0]*** (0.000)	-6.718 [1]*** (0.000)
LN(M2)	-2.708 [2]* (0.075)	-1.402 [1] (0.856)	-12.231 [3]*** (0.000)	-12.741 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.032 [9]***	0.113 [8]	0.214 [4]	0.046 [4]
LN(WTI)	0.934 [9]***	0.113 [8]	0.168 [4]	0.037 [4]
LN(DUBAI)	1.075 [9]***	0.141 [8]*	0.219 [5]	0.043 [4]
LN(M2)	1.405 [9]***	0.301 [9]***	0.536 [3]**	0.037 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 501 NG Prices and M2 (2004-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-1.753 [0] (0.401)	-2.649 [0] (0.259)	-11.021 [0]*** (0.000)	-10.985 [0]*** (0.000)
LN(LNG)	-1.630 [1] (0.464)	-2.655 [1] (0.257)	-8.479 [0]*** (0.000)	-8.465 [0]*** (0.000)
LN(RUS)	-3.153 [3]** (0.025)	-3.538 [3]** (0.039)	-3.325 [2]** (0.015)	-3.435 [2]* (0.051)
LN(M2)	-2.492 [0] (0.119)	-1.491 [0] (0.827)	-12.251 [0]*** (0.000)	-12.736 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-1.894 [3] (0.334)	-2.909 [4] (0.162)	-11.020 [1]*** (0.000)	-10.985 [1]*** (0.000)
LN(LNG)	-1.617 [5] (0.471)	-2.620 [5] (0.272)	-8.515 [2]*** (0.000)	-8.501 [2]*** (0.000)
LN(RUS)	-2.547 [8] (0.106)	-2.344 [8] (0.406)	-10.279 [7]*** (0.000)	-10.362 [7]*** (0.000)
LN(M2)	-2.708 [2]* (0.075)	-1.402 [1] (0.856)	-12.231 [3]*** (0.000)	-12.741 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.917 [9]***	0.111 [9]	0.047 [1]	0.043 [1]
LN(LNG)	1.194 [9]***	0.082 [9]	0.055 [4]	0.043 [4]
LN(RUS)	0.818 [9]***	0.174 [9]**	0.178 [8]	0.046 [8]
LN(M2)	1.405 [9]***	0.301 [9]***	0.536 [3]**	0.037 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 502 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-4.953 [0]*** (0.000)	-5.480 [0]*** (0.000)	-16.677 [0]*** (0.000)	-16.639 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-4.903 [1]*** (0.000)	-5.437 [2]*** (0.000)	-22.587 [16]*** (0.000)	-22.696 [16]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	0.776 [10]***	0.241 [9]***	0.059 [18]	0.059 [18]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 503 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0]	-2.228 [0]	-13.428 [0]***	-13.440 [0]***

	(0.150)	(0.471)	(0.000)	(0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-4.953 [0]*** (0.000)	-5.480 [0]*** (0.000)	-16.677 [0]*** (0.000)	-16.639 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-4.903 [1]*** (0.000)	-5.437 [2]*** (0.000)	-22.587 [16]*** (0.000)	-22.696 [16]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	0.776 [10]***	0.241 [9]***	0.059 [18]	0.059 [18]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 504 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [1]	H0: r=0 H1: r≤1	0.119875 0.084101	7.543919 3.074708*	0.5154 0.0795	4.469211 3.074708*	0.8068 0.0795
BRENT PRICE M2 [2]	H0: r=0 H1: r≤1	0.091964 0.059827	20.40293*** 7.958130***	0.0084 0.0048	12.44480* 7.958130***	0.0950 0.0048
WTI PRICE M2 [3]	H0: r=0 H1: r≤1	0.111029 0.048030	21.36488*** 6.300448**	0.0058 0.0121	15.06443** 6.300448**	0.0373 0.0121
DUBAI PRICE M2 [3]	H0: r=0 H1: r≤1	0.089190 0.050868	18.64040** 6.682550***	0.0162 0.0097	11.95785 6.682550***	0.1122 0.0097
HH PRICE M2 [1]	H0: r=0 H1: r≤1	0.089287 0.043447	17.93306** 5.774453**	0.0210 0.0163	12.15861 5.774453**	0.1048 0.0163
LNG PRICE M2 [2]	H0: r=0 H1: r≤1	0.067418 0.057871	16.69400** 7.690023***	0.0329 0.0055	9.003982 7.690023***	0.2858 0.0055
RUS PRICE M2 [4]	H0: r=0 H1: r≤1	0.104703 0.032117	18.19194** 4.145782**	0.0191 0.0417	14.04616* 4.145782**	0.0541 0.0417

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level.
MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 505 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	0.228 4.648**	0.632 0.031	1	GDP→EC

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 506 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	1.051 0.964	0.591 0.617	2	No causal relation

WTI does not granger cause M2 M2 does not granger cause WTI	1.957 0.571	0.581 0.902	3	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	0.142 1.284	0.986 0.732	3	No causal relation
HH does not granger cause M2 M2 does not granger cause HH	0.018 5.787**	0.891 0.016	1	M2→HH
LNG does not granger cause M2 M2 does not granger cause LNG	0.256 0.757	0.879 0.684	2	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	5.324 6.520	0.255 0.163	4	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

LIBYA

UNIT ROOT TEST RESULTS

Table 507 EC and GDP (1999-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-2.407 [2] (0.163)	-1.713 [2] (0.669)	-5.571 [1]*** (0.001)	-7.004 [1]*** (0.001)
LN(GDP)	-1.538 [0] (0.481)	-0.225 [0] (0.981)	-0.615 [0] (0.829)	-0.267 [0] (0.977)
	PP (Level)		PP (First Difference)	
LN(EC)	-1.215 [11] (0.630)	-2.901 [11] (1.000)	-4.633 [10] (1.000)	-7.432 [8] (1.000)
LN(GDP)	-1.538 [0] (0.481)	-0.225 [0] (0.981)	-0.615 [0] (0.829)	-0.457 [1] (0.996)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.500 [12]**	0.461 [11]***	0.381 [5]*	0.236 [6]***
LN(GDP)	0.126 [0]	0.128 [0]*	0.298 [0]	0.139 [0]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 508 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-4.121 [3]*** (0.001)	-4.767 [3]*** (0.000)	-9.676 [0]*** (0.000)	-9.660 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-3.063 [6]** (0.031)	-3.461 [6]** (0.046)	-9.823 [4]*** (0.000)	-9.807 [4]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	0.570 [10]**	0.190 [10]**	0.028 [6]	0.018 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 509 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-4.121 [3]*** (0.001)	-4.767 [3]*** (0.000)	-9.676 [0]*** (0.000)	-9.660 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-3.063 [6]** (0.031)	-3.461 [6]** (0.046)	-9.823 [4]*** (0.000)	-9.807 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	0.570 [10]**	0.190 [10]**	0.028 [6]	0.018 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

NIGERIA

UNIT ROOT TEST RESULTS

Table 510 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-3.474 [0]** (0.014)	-2.741 [0] (0.227)	-5.542 [0]*** (0.000)	-5.899 [0]*** (0.000)
LN(GDP)	-0.242 [0] (0.923)	-0.421 [0] (0.982)	-4.660 [0]*** (0.000)	-5.697 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-3.616 [5]** (0.010)	-2.689 [6] (0.246)	-5.534 [3]*** (0.000)	-6.603 [8]*** (0.000)
LN(GDP)	-0.634 [3] (0.850)	-0.421 [0] (0.982)	-4.713 [3]*** (0.000)	-5.742 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.403 [4]*	0.156 [4]**	0.342 [1]	0.133 [8]*
LN(GDP)	0.196 [5]	0.184 [5]**	0.497 [3]**	0.066 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 511 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)

LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-2.351 [0] (0.157)	-1.470 [0] (0.836)	-13.525 [0]*** (0.000)	-13.756 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-2.430 [2] (0.134)	-1.470 [0] (0.836)	-13.530 [1]*** (0.000)	-13.820 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.726 [10]***	0.246 [10]***	0.463 [1]**	0.087 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 512 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-2.351 [0] (0.157)	-1.470 [0] (0.836)	-13.525 [0]*** (0.000)	-13.756 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-2.430 [2] (0.134)	-1.470 [0] (0.836)	-13.530 [1]*** (0.000)	-13.820 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276 [10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.726 [10]***	0.246 [10]***	0.463 [1]**	0.087 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 513 Oil Prices and SI (2010-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.207 [1] (0.665)	-0.049 [1] (0.994)	-3.650 [0]*** (0.007)	-4.358 [0]*** (0.005)
LN(WTI)	-1.701 [1] (0.425)	-0.753 [1] (0.963)	-4.673 [0]*** (0.000)	-5.038 [0]*** (0.000)
LN(DUBAI)	-1.199 [1] (0.669)	-0.057 [4] (0.996)	-3.043 [0]** (0.036)	-3.739 [0]** (0.027)

LN(SI)	-1.238 [1] (0.651)	-1.493 [1] (0.820)	-5.251 [0]*** (0.000)	-5.242 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.025 [2] (0.738)	-0.514 [1] (0.999)	-3.665 [2]*** (0.007)	-4.182 [4]*** (0.008)
LN(WTI)	-1.297 [1] (0.625)	-0.283 [1] (0.989)	-4.592 [3]*** (0.000)	-4.947 [4]*** (0.000)
LN(DUBAI)	-1.038 [3] (0.734)	-1.471 [0] (1.000)	-2.994 [4]** (0.041)	-3.573 [5]** (0.041)
LN(SI)	-1.340 [4] (0.604)	-1.391 [4] (0.853)	-5.188 [2]*** (0.000)	-5.186 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	0.333 [5]	0.227 [5]***	0.547 [2]**	0.128 [0]*
LN(WTI)	0.328 [5]	0.153 [4]**	0.359 [1]*	0.103 [1]
LN(DUBAI)	0.352 [5]*	0.230 [5]***	0.490 [3]**	0.109 [1]
LN(SI)	0.749 [6]***	0.141 [6]*	0.155 [3]	0.136 [4]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 514 NG Prices and SI (2010-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.381 [0] (0.151)	-2.321 [0] (0.416)	-6.206 [0]*** (0.000)	-6.148 [0]*** (0.000)
LN(LNG)	-1.883 [0] (0.337)	-0.807 [0] (0.958)	-2.680 [0]* (0.056)	-6.901 [0]*** (0.000)
LN(RUS)	-2.305 [0] (0.173)	-1.466 [0] (0.830)	-9.477 [0]*** (0.000)	-10.326 [0]*** (0.000)
LN(SI)	-1.238 [1] (0.651)	-1.493 [1] (0.820)	-5.251 [0]*** (0.000)	-5.242 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.381 [0] (0.151)	-2.321 [0] (0.416)	-6.104 [5]*** (0.000)	-6.032 [5]*** (0.000)
LN(LNG)	-1.821 [4] (0.366)	-1.010 [4] (0.934)	-6.649 [4]*** (0.000)	-6.944 [4]*** (0.000)
LN(RUS)	-2.372 [4] (0.153)	-1.297 [4] (0.879)	-9.308 [4]*** (0.000)	-10.581 [3]*** (0.000)
LN(SI)	-1.340 [4] (0.604)	-1.391 [4] (0.853)	-5.188 [2]*** (0.000)	-5.186 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.193 [5]	0.190 [5]**	0.141 [3]	0.078 [3]
LN(LNG)	0.600 [6]**	0.216 [6]***	0.320 [4]	0.078 [4]
LN(RUS)	0.463 [6]**	0.233 [6]***	0.541 [4]**	0.090 [3]
LN(SI)	0.749 [6]***	0.141 [6]*	0.155 [3]	0.136 [4]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 515 Johansen Cointegration Test Results

Variables	**Hypothesis**	**Eigenvalue**	**Trace Statistic**	**Prob.**	**Max-Eigen Statistic**	**Prob.**
EC **GDP [1]**	H0: r=0 H1: r≤1	0.337912 0.014032	14.92712* 0.494609	0.0607 0.4819	14.43251** 0.494609	0.0470 0.4819
BRENT PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.098029 0.022244	22.11760*** 3.959215**	0.0043 0.0466	18.15839** 3.959215**	0.0115 0.0466
WTI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.106571 0.021333	23.62844*** 3.795191*	0.0024 0.0514	19.83325*** 3.795191*	0.0059 0.0514
DUBAI PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.103706 0.020786	22.96659*** 3.696945*	0.0031 0.0545	19.26965*** 3.696945*	0.0074 0.0545
HH PRICE **M2 [1]**	H0: r=0 H1: r≤1	0.054538 0.030198	15.44050* 5.458025**	0.0510 0.0195	9.982473 5.458025**	0.2131 0.0195
LNG PRICE	H0: r=0	0.069724	15.30423*	0.0534	12.79254*	0.0843

M2 [2]	H1: r≤1	0.014090	2.511693	0.1130	2.511693	0.1130
RUS PRICE M2 [7]	H0: r=0 H1: r≤1	0.097360 0.009268	19.21967** 1.601470	0.0131 0.2057	17.61820** 1.601470	0.0142 0.2057
BRENT PRICE SI [2]	H0: r=0 H1: r≤1	0.057149 0.014001	4.158032 0.803724	0.8904 0.3700	3.354308 0.803724	0.9204 0.3700
WTI PRICE SI [2]	H0: r=0 H1: r≤1	0.048070 0.011967	3.494303 0.686257	0.9400 0.4074	2.808046 0.686257	0.9587 0.4074
DUBAI PRICE SI [2]	H0: r=0 H1: r≤1	0.053210 0.014552	3.952198 0.835581	0.9074 0.3607	3.116617 0.835581	0.9387 0.3607
HH PRICE SI [1]	H0: r=0 H1: r≤1	0.141713 0.032609	10.78617 1.922818	0.2250 0.1655	8.863355 1.922818	0.2977 0.1655
LNG PRICE SI [1]	H0: r=0 H1: r≤1	0.088765 0.032055	7.281033 1.889668	0.5452 0.1692	5.391365 1.889668	0.6918 0.1692
RUS PRICE SI [4]	H0: r=0 H1: r≤1	0.152344 0.091877	14.39110* 5.300670**	0.0728 0.0213	9.090430 5.300670**	0.2787 0.0213

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 516 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause SI SI does not granger cause BRENT	2.048 2.640	0.359 0.267	2	No causal relation
WTI does not granger cause SI SI does not granger cause WTI	6.291** 0.565	0.043 0.753	2	WTI→SI
DUBAI does not granger cause SI SI does not granger cause DUBAI	2.018 2.966	0.364 0.226	2	No causal relation
HH does not granger cause SI SI does not granger cause HH	1.304 4.676**	0.253 0.030	1	SI→HH
LNG does not granger cause SI SI does not granger cause LNG	0.171 0.599	0.678 0.438	1	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 517 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	0.795 1.833	0.372 0.175	1	No causal relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	2.632 4.834	0.451 0.184	3	No causal relation
WTI does not granger cause M2 M2 does not granger cause WTI	2.211 4.110	0.529 0.249	3	No causal relation
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	3.443 3.434	0.328 0.329	3	No causal relation
HH does not granger cause M2 M2 does not granger cause HH	0.222 0.120	0.637 0.728	1	No causal relation
LNG does not granger cause M2 M2 does not granger cause LNG	2.549 2.298	0.279 0.317	2	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	16.751** 17.511**	0.019 0.014	7	RUSSIA↔M2
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	8.067* 3.617	0.089 0.460	4	RUSSIA→SI

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

VENEZUELA

UNIT ROOT TEST RESULTS

Table 518 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)	ADF (First Difference)

	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-3.388 [0]** (0.018)	-3.525 [0]* (0.051)	-8.054 [0]*** (0.000)	-8.004 [0]*** (0.000)
LN(GDP)	-1.854 [0] (0.349)	-1.476 [0] (0.819)	-4.662 [0]*** (0.000)	-4.830 [0]*** (0.002)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-3.306 [2]** (0.021)	-3.442 [1]* (0.061)	-8.083 [1]*** (0.000)	-8.037 [1]*** (0.000)
LN(GDP)	-1.987 [1] (0.290)	-1.653 [2] (0.751)	-4.587 [4]*** (0.000)	-5.140 [9]*** (0.001)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.353 [4]*	0.077 [3]	0.153 [7]	0.104 [8]
LN(GDP)	0.285 [4]	0.145 [4]*	0.165 [2]	0.062 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 519 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-2.203 [0] (0.207)	-1.390 [0] (0.849)	-6.567 [0]*** (0.000)	-7.237 [0]*** (0.000)
LN(GDP)	-2.095 [1] (0.247)	-1.333 [0] (0.865)	-5.149 [0]*** (0.000)	-5.217 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-2.474 [3] (0.128)	-1.318 [1] (0.869)	-6.574 [2]*** (0.000)	-7.713 [4]*** (0.000)
LN(GDP)	-1.914 [1] (0.322)	-1.551 [1] (0.795)	-5.036 [5]*** (0.000)	-5.088 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.785 [5]***	0.206 [5]**	0.403 [2]*	0.045 [4]
LN(GDP)	0.338 [5]	0.161 [5]**	0.182 [2]	0.054 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 520 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-1.539 [0] (0.504)	-3.068 [0] (0.126)	-7.754 [0]*** (0.000)	-7.723 [0]*** (0.000)
LN(GDP)	-2.095 [1] (0.247)	-1.333 [0] (0.865)	-5.149 [0]*** (0.000)	-5.217 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-1.501 [4] (0.523)	-3.005 [1] (0.142)	-7.998 [3]*** (0.000)	-8.054 [4]*** (0.000)
LN(GDP)	-1.914 [1] (0.322)	-1.551 [1] (0.795)	-5.036 [5]*** (0.000)	-5.088 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.780 [5]***	0.110 [4]	0.151 [5]	0.120 [5]*
LN(GDP)	0.338 [5]	0.161 [5]**	0.182 [2]	0.054 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 521 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1]	-2.141 [1]	-9.147 [0]***	-9.181 [0]***

	(0.453)	(0.518)	(0.000)	(0.000)
LN(M2)	-0.304 [12] (0.978)	-3.729 [12]** (0.023)	-1.508 [11]*** (0.527)	-1.679 [11]*** (0.756)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-1.689 [6] (0.999)	-1.648 [6] (0.769)	-11.022 [6]*** (0.000)	-11.170 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.716 [10]***	0.115 [10]	0.372 [6]*	0.149 [6]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 522 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.304 [12] (0.978)	-3.729 [12]** (0.023)	-1.508 [11]*** (0.527)	-1.679 [11]*** (0.756)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-1.689 [6] (0.999)	-1.648 [6] (0.769)	-11.022 [6]*** (0.000)	-11.170 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276 [10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.716 [10]***	0.115 [10]	0.372 [6]*	0.149 [6]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 523 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-0.720 [2] (0.992)	-1.366 [2] (0.867)	-14.795 [1]*** (0.000)	-14.893 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	

LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-0.288 [11] (0.977)	-3.323 [6]* (0.065)	-27.682 [13]*** (0.000)	-30.467 [16]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	1.496 [10]***	0.265 [10]***	0.277 [21]	0.100 [25]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 524 NG Prices and SI (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-0.720 [2] (0.992)	-1.366 [2] (0.867)	-14.795 [1]*** (0.000)	-14.893 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-0.288 [11] (0.977)	-3.323 [6]* (0.065)	-27.682 [13]*** (0.000)	-30.467 [16]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	1.496 [10]***	0.265 [10]***	0.277 [21]	0.100 [25]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 525 Oil Prices and IP (1998-2012)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.376 [1] (0.592)	-3.112 [1] (0.106)	-11.116 [0]*** (0.000)	-11.093 [0]*** (0.000)
LN(WTI)	-1.577 [1] (0.492)	-3.028 [1] (0.127)	-10.267 [0]*** (0.000)	-10.255 [0]*** (0.000)
LN(DUBAI)	-1.471 [1] (0.545)	-3.426 [1]* (0.051)	-9.914[0]*** (0.000)	-9.898 [0]*** (0.000)
LN(IP)	-2.110 [2] (0.241)	-2.836 [2] (0.186)	-14.621 [1]*** (0.000)	-14.589 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.245 [4] (0.654)	-3.118 [5] (0.105)	-11.111 [1]*** (0.000)	-11.087 [1]*** (0.000)
LN(WTI)	-1.474 [4] (0.544)	-2.907 [4] (0.162)	-10.267 [0]*** (0.000)	-10.224 [1]*** (0.000)
LN(DUBAI)	-1.251 [3]	-3.141 [4]	-9.917 [2]***	-9.899 [2]***

	(0.651)	(0.100)	(0.000)	(0.000)
LN(IP)	-3.243 [2]** (0.019)	-4.459 [1]*** (0.002)	-24.208 [30]*** (0.000)	-24.447 [31]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.597 [10]***	0.115 [10]	0.033 [4]	0.027 [4]
LN(WTI)	1.570 [10]***	0.156 [10]**	0.045 [4]	0.027 [4]
LN(DUBAI)	1.627 [10]***	0.103 [10]	0.034 [3]	0.026 [3]
LN(IP)	0.793 [10]***	0.148 [10]**	0.157 [56]	0.138 [58]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 526 NG Prices and IP (1998-2012)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.185 [0] (0.212)	-1.976 [0] (0.609)	-12.616 [0]*** (0.000)	-12.638 [0]*** (0.000)
LN(LNG)	-0.946 [1] (0.771)	-3.428 [2]* (0.050)	-10.987 [0]*** (0.000)	-10.954 [0]*** (0.000)
LN(RUS)	-1.749 [3] (0.404)	-4.068 [3]*** (0.008)	-3.742 [2]*** (0.004)	-3.731 [2]** (0.022)
LN(IP)	-2.110 [2] (0.241)	-2.836 [2] (0.186)	-14.621 [1]*** (0.000)	-14.589 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.401 [6] (0.142)	-2.229 [6] (0.469)	-12.646 [5]*** (0.000)	-12.661 [5]*** (0.000)
LN(LNG)	-0.774 [5] (0.823)	-3.157 [6]* (0.096)	-11.112 [4]*** (0.000)	-11.082 [4]*** (0.000)
LN(RUS)	-1.081 [9] (0.722)	-2.698 [9] (0.238)	-12.735 [8]*** (0.000)	-12.710 [8]*** (0.000)
LN(IP)	-3.243 [2]** (0.019)	-4.459 [1]*** (0.002)	-24.208 [30]*** (0.000)	-24.447 [31]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.505 [10]**	0.338 [10]***	0.119 [5]	0.025 [5]
LN(LNG)	1.539 [10]***	0.064 [10]	0.041 [5]	0.029 [5]
LN(RUS)	1.519 [10]**	0.110 [10]	0.044 [9]	0.044 [9]
LN(IP)	0.793 [10]***	0.148 [10]**	0.157 [56]	0.138 [58]*

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 527 SI and IP (2000-2012)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-0.002 [3] (0.956)	-4.433 [1]*** (0.002)	-11.140 [2]*** (0.000)	-11.157 [2]*** (0.000)
LN(IP)	-2.043 [2] (0.268)	-2.498 [2] (0.328)	-13.606 [1]*** (0.000)	-13.560 [1]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.134 [3] (0.701)	-8.170 [7]*** (0.000)	-32.570 [21]*** (0.000)	-35.073 [23]*** (0.000)
LN(IP)	-3.099 [2]** (0.028)	-3.934 [2]** (0.012)	-23.400 [33]*** (0.000)	-23.297 [33]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	1.422 [10]***	0.102 [9]	0.209 [32]	0.130 [34]*
LN(IP)	0.758 [10]***	0.163 [9]**	0.202 [70]	0.202 [70]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 528 Johansen Cointegration Test Results

Variables	**Hypothesis**	**Eigenvalue**	**Trace Statistic**	**Prob.**	**Max-Eigen Statistic**	**Prob.**

NGC **GDP [1]**	H0: r=0 H1: r≤1	0.211009 0.131996	15.89949** 5.945464**	0.0434 0.0148	9.954021 5.945464**	0.2150 0.0148
OILC **GDP [2]**	H0: r=0 H1: r≤1	0.133803 0.029466	7.115614 1.226275	0.5642 0.2681	5.889339 1.226275	0.6275 0.2681
BRENT PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.048781 0.001487	9.115397 0.263437	0.3548 0.6078	8.851959 0.263437	0.2987 0.6078
WTI PRICE **M2 [5]**	H0: r=0 H1: r≤1	0.041996 0.005807	8.478648 1.013418	0.4157 0.3141	7.465231 1.013418	0.4357 0.3141
DUBAI PRICE **M2 [2]**	H0: r=0 H1: r≤1	0.046998 0.002834	9.022933 0.502384	0.3633 0.4785	8.520549 0.502384	0.3282 0.4785
HH PRICE **M2 [5]**	H0: r=0 H1: r≤1	0.059816 0.003601	11.36001 0.627777	0.1903 0.4282	10.73223 0.627777	0.1681 0.4282
LNG PRICE **M2 [5]**	H0: r=0 H1: r≤1	0.057868 0.009924	12.10758 1.735483	0.1518 0.1877	10.37210 1.735483	0.1886 0.1877
RUS PRICE **M2 [5]**	H0: r=0 H1: r≤1	0.079413 0.011832	16.46834** 2.070988	0.0356 0.1501	14.39736** 2.070988	0.0476 0.1501
BRENT PRICE **SI [3]**	H0: r=0 H1: r≤1	0.028426 0.001604	5.357894 0.282488	0.7697 0.5951	5.075405 0.282488	0.7323 0.5951
WTI PRICE **SI [3]**	H0: r=0 H1: r≤1	0.030118 0.003174	5.941703 0.559492	0.7024 0.4545	5.382211 0.559492	0.6930 0.4545
DUBAI PRICE **SI [3]**	H0: r=0 H1: r≤1	0.026221 0.000903	4.835454 0.158975	0.8260 0.6901	4.676478 0.158975	0.7820 0.6901
HH PRICE **SI [3]**	H0: r=0 H1: r≤1	0.052810 0.007384	10.85348 1.304418	0.2206 0.2534	9.549062 1.304418	0.2433 0.2534
LNG PRICE **SI [3]**	H0: r=0 H1: r≤1	0.050659 0.004441	9.933179 0.783423	0.2859 0.3761	9.149756 0.783423	0.2739 0.3761
RUS PRICE **SI [4]**	H0: r=0 H1: r≤1	0.033612 0.009037	7.572020 1.588739	0.5122 0.2075	5.983282 1.588739	0.6154 0.2075
BRENT PRICE **IP [4]**	H0: r=0 H1: r≤1	0.059178 0.009809	12.40015 1.724998	0.1387 0.1890	10.67515 1.724998	0.1713 0.1890
WTI PRICE **IP [3]**	H0: r=0 H1: r≤1	0.073022 0.010661	15.23161* 1.886332	0.0547 0.1696	13.34527* 1.886332	0.0695 0.1696
DUBAI PRICE **IP [4]**	H0: r=0 H1: r≤1	0.058275 0.009462	12.17110 1.663688	0.1489 0.1971	10.50741 1.663688	0.1807 0.1971
HH PRICE **IP [3]**	H0: r=0 H1: r≤1	0.062683 0.024733	15.80105** 4.407823**	0.0450 0.0358	11.39322 4.407823**	0.1356 0.0358
LNG PRICE **IP [7]**	H0: r=0 H1: r≤1	0.043694 0.006072	8.732115 1.047622	0.3907 0.3061	7.684493 1.047622	0.4117 0.3061
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.058772 0.011346	12.59664 1.996869	0.1305 0.1576	10.59977 1.996869	0.1754 0.1576
SI **IP [3]**	H0: r=0 H1: r≤1	0.056092 4.79E-05	8.781714 0.007274	0.3860 0.9316	8.774440 0.007274	0.3054 0.9316

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 529 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	**Chi-sq**	**Prob.**	**df**	**Causal Relation**
OILC does not granger cause GDP GDP does not granger cause OILC	3.992 6.273**	0.135 0.043	2	GDP→OILC
BRENT does not granger cause M2 M2 does not granger cause BRENT	4.993* 1.911	0.082 0.384	2	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	10.734* 3.953	0.056 0.552	5	WTI→M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	3.390 2.982	0.183 0.225	2	No causal relation
HH does not granger cause M2 M2 does not granger cause HH	4.062 18.797***	0.540 0.002	5	M2→HH
LNG does not granger cause M2 M2 does not granger cause LNG	13.844** 14.343**	0.016 0.013	5	LNG↔M2

BRENT does not granger cause SI SI does not granger cause BRENT	0.345 0.332	0.951 0.953	3	No causal relation
WTI does not granger cause SI SI does not granger cause WTI	0.497 0.639	0.919 0.887	3	No causal relation
DUBAI does not granger cause SI SI does not granger cause DUBAI	0.502 0.220	0.918 0.974	3	No causal relation
HH does not granger cause SI SI does not granger cause HH	1.394 0.797	0.706 0.850	3	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	4.106 5.208	0.250 0.157	3	No causal relation
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	0.809 3.673	0.937 0.452	4	No causal relation
BRENT does not granger cause IP IP does not granger cause BRENT	11.070** 2.577	0.025 0.630	4	BRENT→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	11.238** 3.214	0.024 0.522	4	DUBAI→IP
LNG does not granger cause IP IP does not granger cause LNG	39.704*** 8.576	0.000 0.284	7	LNG→IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	10.508** 2.072	0.032 0.722	4	RUSSIA→IP
SI does not granger cause IP IP does not granger cause SI	3.755 0.237	0.289 0.971	3	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 530 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
NGC does not granger cause GDP GDP does not granger cause NGC	1.613 0.457	0.204 0.498	1	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	4.148 0.663	0.528 0.984	5	No causal relation
WTI does not granger cause IP IP does not granger cause WTI	0.922 3.804	0.820 0.283	3	No causal relation
HH does not granger cause IP IP does not granger cause HH	1.012 11.734***	0.798 0.008	3	IP→HH

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

APPENDIX 4- MUTUAL COUNTRIES OF BOTH GCC and OPEC

KUWAIT

UNIT ROOT TEST RESULTS

Table 531 EC and GDP (1995-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.641 [0] (0.439)	-1.962 [0] (0.576)	-3.947 [0]** (0.010)	-4.016 [0]** (0.032)
LN(GDP)	-2.441 [1] (0.147)	-4.148 [3]** (0.030)	-2.173 [0] (0.222)	-2.030 [0] (0.539)
	PP (Level)		PP (First Difference)	
LN(EC)	-1.514 [9] (0.500)	-1.894 [2] (0.610)	-4.205 [9]*** (0.006)	-7.686 [14]*** (0.000)
LN(GDP)	-1.540 [1] (0.488)	-1.520 [1] (0.778)	-2.248 [1] (0.199)	-2.116 [1] (0.496)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.542 [2]**	0.153 [1]**	0.500 [15]**	0.500 [15]***
LN(GDP)	0.159 [2]	0.088 [2]	0.113 [1]	0.109 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 532 NG Consumption and GDP (1995-2012) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-0.668 [0] (0.987)	-1.862 [0] (0.629)	-4.240 [0]*** (0.005)	-4.774 [0]*** (0.008)
LN(GDP)	-2.552 [1] (0.122)	-4.497 [3]** (0.016)	-2.249 [0] (0.198)	-2.151 [0] (0.481)
	PP (Level)		PP (First Difference)	
LN(NG)	-2.610 [8] (0.999)	-1.642 [3] (0.731)	-4.266 [2]*** (0.005)	-5.527 [5]*** (0.002)
LN(GDP)	-1.646 [1] (0.438)	-1.680 [1] (0.714)	-2.334 [1] (0.174)	-2.239 [1] (0.439)
	KPSS (Level)		KPSS (First Difference)	
LN(NG)	0.549 [3]**	0.138 [1]*	0.291 [3]	0.500 [16]***
LN(GDP)	0.153 [2]	0.086 [2]	0.089 [1]	0.090 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 533 Oil Consumption and GDP (1995-2012)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-2.336 [3] (0.174)	-0.493 [3] (0.969)	-3.122 [0]** (0.045)	-3.423 [3]* (0.091)
LN(GDP)	-2.552 [1] (0.122)	-4.497 [3]** (0.016)	-2.249 [0] (0.198)	-2.151 [0] (0.481)
	PP (Level)		PP (First Difference)	
LN(OIL)	-3.722 [16]** (0.013)	-0.728 [8] (0.952)	-3.126 [2]** (0.044)	-4.964 [8]*** (0.006)
LN(GDP)	-1.646 [1] (0.438)	-1.680 [1] (0.714)	-2.334 [1] (0.174)	-2.239 [1] (0.439)
	KPSS (Level)		KPSS (First Difference)	
LN(OIL)	0.538 [3]**	0.167 [2]**	0.297 [3]	0.500 [16]***
LN(GDP)	0.153 [2]	0.086 [2]	0.089 [1]	0.090 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 534 Oil Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-0.792 [0] (0.818)	-1.195 [0] (0.907)	-13.805 [0]*** (0.000)	-13.799 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-0.791 [2] (0.818)	-1.234 [3] (0.899)	-13.797 [2]*** (0.000)	-13.798 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.728 [10]***	0.242 [10]***	0.172 [2]	0.135 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 535 NG Prices and M2 (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.792 [0] (0.818)	-1.195 [0] (0.907)	-13.805 [0]*** (0.000)	-13.799 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-0.791 [2] (0.818)	-1.234 [3] (0.899)	-13.797 [2]*** (0.000)	-13.798 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276 [10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(M2)	1.728 [10]***	0.242 [10]***	0.172 [2]	0.135 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 536 Oil Prices and SI (2011-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.560 [2] (0.999)	-0.499 [1] (0.980)	-3.006 [0]** (0.041)	-3.472 [0]* (0.054)
LN(WTI)	-1.408 [1] (0.570)	-1.256 [1] (0.886)	-3.586 [0]*** (0.009)	-3.911 [0]** (0.019)
LN(DUBAI)	-0.370 [1] (0.979)	-0.196 [1] (0.991)	-2.441 [0] (0.136)	-2.919 [0] (0.166)
LN(SI)	-1.551 [1] (0.498)	-1.659 [1] (0.753)	-4.118 [0]*** (0.002)	-4.003 [0]** (0.015)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.162 [4] (0.997)	-0.426 [2] (0.983)	-2.677 [4]* (0.085)	-3.203 [4]* (0.096)
LN(WTI)	-0.032 [0] (0.956)	-0.625 [1] (0.972)	-3.456 [5]** (0.013)	-3.830 [5]** (0.023)
LN(DUBAI)	-0.742 [3] (0.991)	-0.247 [2] (0.990)	-2.215 [4] (0.203)	-2.767 [4] (0.216)
LN(SI)	-1.381 [3] (0.583)	-1.979 [3] (0.596)	-4.090 [1]*** (0.002)	-3.958 [1]** (0.017)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	0.489 [4]**	0.146 [3]**	0.690 [0]**	0.118 [1]
LN(WTI)	0.109 [3]	0.094 [3]	0.421 [0]*	0.122 [1]*
LN(DUBAI)	0.456 [3]*	0.149 [3]**	0.528 [1]**	0.175 [0]**
LN(SI)	0.540 [5]**	0.113 [5]	0.166 [3]	0.165 [3]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 537 NG Prices and SI (2011-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-1.690 [0] (0.429)	-1.882 [0] (0.647)	-5.873 [0]*** (0.000)	-5.770 [0]*** (0.000)
LN(LNG)	-5.033 [0]*** (0.000)	-4.362 [0]*** (0.005)	-6.002 [0]*** (0.000)	-6.486 [0]*** (0.000)
LN(RUS)	-2.401 [0] (0.146)	-2.603 [0] (0.280)	-8.034 [0]*** (0.000)	-8.666 [0]*** (0.000)
LN(SI)	-1.551 [1] (0.498)	-1.659 [1] (0.753)	-4.118 [0]*** (0.002)	-4.003 [0]** (0.015)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-1.862 [2] (0.346)	-2.035 [2] (0.567)	-5.866 [1]*** (0.000)	-5.762 [1]*** (0.000)
LN(LNG)	-5.219 [2]*** (0.000)	-5.050 [4]*** (0.000)	-5.999 [3]*** (0.000)	-6.483 [2]*** (0.000)
LN(RUS)	-2.368 [3] (0.156)	-2.603 [0] (0.280)	-7.940 [4]*** (0.000)	-8.843 [2]*** (0.000)
LN(SI)	-1.381 [3] (0.583)	-1.979 [3] (0.596)	-4.090 [1]*** (0.002)	-3.958 [1]** (0.017)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.227 [5]	0.135 [5]*	0.142 [1]	0.118 [1]
LN(LNG)	0.270 [4]	0.177 [5]**	0.450 [4]*	0.150 [3]**
LN(RUS)	0.197 [5]	0.181 [5]**	0.419 [3]*	0.107 [1]
LN(SI)	0.540 [5]**	0.113 [5]	0.166 [3]	0.165 [3]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 538 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1]	-2.199 [1]	-10.385 [0]***	-10.449 [0]***

	(0.319)	(0.486)	(0.000)	(0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-1.017 [0] (0.747)	-3.209 [0]* (0.085)	-18.924 [0]*** (0.000)	-18.891 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-0.905 [6] (0.785)	-3.279 [7]* (0.072)	-18.261 [6]*** (0.000)	-18.241 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.403 [11]***	0.082 [11]	0.109 [5]	0.059 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 539 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-1.017 [0] (0.747)	-3.209 [0]* (0.085)	-18.924 [0]*** (0.000)	-18.891 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-0.905 [6] (0.785)	-3.279 [7]* (0.072)	-18.261 [6]*** (0.000)	-18.241 [6]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.403 [11]***	0.082 [11]	0.109 [5]	0.059 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 540 SI and IP (2011-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-1.551 [1] (0.498)	-1.659 [1] (0.753)	-4.118 [0]*** (0.002)	-4.003 [0]** (0.015)
LN(IP)	-3.073 [0]** (0.035)	-2.475 [0] (0.338)	-7.986 [0]*** (0.000)	-8.522 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.381 [3] (0.583)	-1.979 [3] (0.596)	-4.090 [1]*** (0.002)	-3.958 [1]** (0.017)
LN(IP)	-3.312 [2]**	-2.446 [1]	-7.925 [3]***	-8.522 [0]***

	(0.019)	(0.351)	(0.000)	(0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.540 [5]**	0.113 [5]	0.166 [3]	0.165 [3]**
LN(IP)	0.511 [5]**	0.180 [5]**	0.445 [2]*	0.097 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 541 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
BRENT PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.109559 0.010784	21.82338*** 1.864858	0.0049 0.1721	19.95852*** 1.864858	0.0057 0.1721
WTI Price **M2 [7]**	H0: r=0 H1: r≤1	0.113505 0.010912	22.60960*** 1.887157	0.0036 0.1695	20.72245*** 1.887157	0.0042 0.1695
DUBAI PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.105879 0.010871	21.12941*** 1.880116	0.0063 0.1703	19.24929*** 1.880116	0.0075 0.1703
HH PRICE **M2 [1]**	H0: r=0 H1: r≤1	0.066593 0.008927	13.86265* 1.596056	0.0868 0.2065	12.26660 1.596056	0.1010 0.2065
LNG PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.065420 0.003589	12.54055 0.632713	0.1328 0.4264	11.90784 0.632713	0.1142 0.4264
RUS PRICE **M2 [7]**	H0: r=0 H1: r≤1	0.116078 0.005814	22.22537*** 1.002881	0.0042 0.3166	21.22249*** 1.002881	0.0034 0.3166
BRENT PRICE **SI [2]**	H0: r=0 H1: r≤1	0.093140 0.020511	5.332095 0.932585	0.7726 0.3342	4.399510 0.932585	0.8150 0.3342
WTI Price **SI [2]**	H0: r=0 H1: r≤1	0.062868 0.011424	3.438963 0.517050	0.9435 0.4721	2.921913 0.517050	0.9518 0.4721
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.148337 0.044825	9.289168 2.063751	0.3393 0.1508	7.225417 2.063751	0.4628 0.1508
RUS PRICE **SI [2]**	H0: r=0 H1: r≤1	0.312567 0.053928	19.36024** 2.494633	0.0124 0.1142	16.86561** 2.494633	0.0190 0.1142
BRENT PRICE **IP [2]**	H0: r=0 H1: r≤1	0.059066 0.019926	16.28288** 4.045481**	0.0380 0.0443	12.23739 4.045481**	0.1020 0.0443
WTI Price **IP [2]**	H0: r=0 H1: r≤1	0.057684 0.016447	15.27557* 3.333288*	0.0539 0.0679	11.94228 3.333288*	0.1128 0.0679
DUBAI PRICE **IP [2]**	H0: r=0 H1: r≤1	0.057899 0.016899	15.41410* 3.425821*	0.0514 0.0642	11.98828 3.425821*	0.1111 0.0642
HH PRICE **IP [2]**	H0: r=0 H1: r≤1	0.033174 0.002934	7.371703 0.590529	0.5348 0.4422	6.781174 0.590529	0.5153 0.4422
LNG PRICE **IP [2]**	H0: r=0 H1: r≤1	0.059925 0.011296	14.70437* 2.283410	0.0655 0.1308	12.42096* 2.283410	0.0958 0.1308
RUS PRICE **IP [5]**	H0: r=0 H1: r≤1	0.032877 0.009911	8.591210 1.972216	0.4045 0.1602	6.618994 1.972216	0.5351 0.1602
SI **IP [2]**	H0: r=0 H1: r≤1	0.235770 0.051658	14.48672* 2.386812	0.0705 0.1224	12.09991 2.386812	0.1069 0.1224

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 542 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
LNG does not granger cause M2 M2 does not granger cause LNG	8.058** 9.596**	0.044 0.022	3	LNG↔M2
BRENT does not granger cause SI SI does not granger cause BRENT	2.616 1.755	0.270 0.415	2	No causal relation
WTI does not granger cause SI SI does not granger cause WTI	3.326 0.259	0.189 0.878	2	No causal relation
HH does not granger cause SI SI does not granger cause HH	1.075 2.450	0.584 0.293	2	No causal relation
HH does not granger cause IP IP does not granger cause HH	2.699 0.087	0.259 0.957	2	No causal relation
RUSSIA does not granger cause IP	5.624	0.344	5	IP→RUSSIA

IP does not granger cause RUSSIA	17.900***	0.003		

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 543 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	21.092*** 17.280**	0.003 0.015	7	BRENT↔M2
WTI does not granger cause M2 M2 does not granger cause WTI	21.573*** 16.344**	0.003 0.022	7	WTI↔M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	20.562*** 17.014**	0.004 0.017	7	DUBAI↔M2
HH does not granger cause M2 M2 does not granger cause HH	0.052 1.927	0.818 0.165	1	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	7.571 7.190	0.371 0.409	7	No causal relation
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	0.925 3.625	0.629 0.163	2	No causal relation
BRENT does not granger cause IP IP does not granger cause BRENT	4.900* 0.488	0.086 0.783	2	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	5.707* 0.560	0.057 0.755	2	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	3.648 0.545	0.161 0.761	2	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	7.216** 4.096	0.027 0.129	2	LNG→IP
SI does not granger cause IP IP does not granger cause SI	0.785 0.390	0.675 0.302	2	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

QATAR

UNIT ROOT TEST RESULTS

Table 544 EC and GDP (1994-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-1.736 [0] (0.396)	-1.582 [0] (0.756)	-3.472 [0]** (0.023)	-3.885 [0]** (0.038)
LN(GDP)	-3.275 [3]** (0.036)	-1.785 [0] (0.666)	-4.161 [0]*** (0.006)	-4.849 [0]*** (0.007)
	PP (Level)		PP (First Difference)	
LN(EC)	-1.784 [1] (0.374)	-1.532 [2] (0.776)	-3.472 [0]** (0.023)	-3.963 [4]** (0.033)
LN(GDP)	-4.719 [16]*** (0.001)	-1.526 [6] (0.778)	-4.162 [1]*** (0.006)	-5.454 [4]*** (0.002)
	KPSS (Level)		KPSS (First Difference)	
LN(EC)	0.172 [2]	0.170 [2]**	0.298 [1]	0.125 [4]*
LN(GDP)	0.510 [3]**	0.162 [2]**	0.240 [0]	0.234 [8]***

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 545 NG Consumption and GDP (1994-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-0.207 [0] (0.922)	-1.617 [0] (0.746)	-3.423 [0]** (0.023)	-3.500 [0]* (0.069)
LN(GDP)	-3.248 [1]** (0.033)	-2.298 [1] (0.413)	-4.346 [0]*** (0.003)	-5.241 [0]*** (0.002)
	PP (Level)		PP (First Difference)	
LN(NG)	-0.342 [1] (0.900)	-1.713 [1] (0.705)	-3.419 [1]** (0.024)	-3.500 [0]* (0.069)

LN(GDP)	-6.051 [18]*** (0.000)	-1.566 [10] (0.767)	-4.346 [1]*** (0.003)	-5.651 [3]*** (0.001)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.469 [3]**	0.133 [2]*	0.176 [1]	0.076 [0]
LN(GDP)	0.544 [3]**	0.174 [2]**	0.301 [0]	0.209 [8]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 546 Oil Consumption and GDP (1994-2013)-Annual

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(OIL)	-0.431 [0] (0.978)	-2.538 [1] (0.308)	-3.508 [1]** (0.021)	-3.597 [1]** (0.060)
LN(GDP)	-3.248 [1]** (0.033)	-2.298 [1] (0.413)	-4.346 [0]*** (0.003)	-5.241 [0]*** (0.002)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-0.478 [4] (0.981)	-2.126 [4] (0.499)	-3.242 [7]*** (0.034)	-3.127 [8]*** (0.129)
LN(GDP)	-6.051 [18]*** (0.000)	-1.566 [10] (0.767)	-4.346 [1]*** (0.003)	-5.651 [3]*** (0.001)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.597 [3]**	0.134 [2]*	0.195 [3]	0.137 [5]*
LN(GDP)	0.544 [3]**	0.174 [2]**	0.301 [0]	0.209 [8]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 547 Oil Prices and M2 (2007-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-2.623 [1]* (0.091)	-2.346 [1] (0.405)	-5.017 [0]*** (0.000)	-5.142 [0]*** (0.000)
LN(WTI)	-3.825 [2]*** (0.003)	-3.761 [2]** (0.023)	-5.600 [0]*** (0.000)	-5.683 [0]*** (0.000)
LN(DUBAI)	-2.739 [1]* (0.071)	-2.515 [1] (0.320)	-4.657 [0]*** (0.000)	-4.784 [0]*** (0.001)
LN(M2)	-1.601 [0] (0.478)	-4.123 [3]*** (0.008)	-10.431 [0]*** (0.000)	-10.542 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-2.528 [5] (0.111)	-2.211 [5] (0.477)	-5.050 [2]*** (0.000)	-5.192 [2]*** (0.000)
LN(WTI)	-2.866 [5]* (0.053)	-2.646 [5] (0.261)	-5.675 [2]*** (0.000)	-5.768 [2]*** (0.000)
LN(DUBAI)	-2.566 [5] (0.103)	2.254 [5] (0.454)	-4.502 [1]*** (0.000)	-4.784 [0]*** (0.001)
LN(M2)	-1.586 [5] (0.485)	-2.826 [5] (0.191)	-10.418 [5]*** (0.000)	-10.506 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	0.553 [7]**	0.090 [6]	0.158 [5]	0.060 [5]
LN(WTI)	0.390 [6]*	0.058 [6]	0.125 [5]	0.051 [5]
LN(DUBAI)	0.603 [7]**	0.087 [6]**	0.161 [5]	0.058 [5]
LN(M2)	1.288 [7]***	0.081 [6]	0.148 [5]	0.044 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 548 NG Prices and M2 (2007-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-1.557 [0] (0.500)	-2.324 [1] (0.416)	-8.215 [0]*** (0.000)	-8.188 [0]*** (0.000)
LN(LNG)	-1.763 [1] (0.396)	-2.789 [0] (0.000)	-6.638 [0]*** (0.000)	-6.630 [0]*** (0.000)

LN(RUS)	-3.567 [3]*** (0.008)	-3.586 [3]** (0.036)	-3.063 [2]** (0.032)	-3.069 [2] (0.119)
LN(M2)	-1.601 [0] (0.478)	-4.123 [3]*** (0.008)	-10.431 [0]*** (0.000)	-10.542 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-1.669 [1] (0.443)	-2.217 [2] (0.474)	-8.245 [3]*** (0.000)	-8.216 [3]*** (0.000)
LN(LNG)	-1.563 [5] (0.497)	-2.154 [5] (0.509)	-6.820 [4]*** (0.000)	-6.810 [4]*** (0.000)
LN(RUS)	-2.298 [6] (0.174)	-2.317 [6] (0.420)	-8.159 [6]*** (0.000)	-8.127 [6]*** (0.000)
LN(M2)	-1.586 [5] (0.485)	-2.826 [5] (0.191)	-10.418 [5]*** (0.000)	-10.506 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.727 [7]**	0.175 [7]**	0.071 [0]	0.064 [0]
LN(LNG)	0.961 [7]***	0.108 [7]	0.063 [5]	0.057 [5]
LN(RUS)	0.195 [7]**	0.068 [7]	0.053 [0]	0.049 [6]
LN(M2)	1.288 [7]***	0.081 [6]	0.148 [5]	0.044 [5]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 549 Oil Prices and SI (2011-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.560 [2] (0.999)	-0.499 [1] (0.980)	-3.006 [0]** (0.041)	-3.472 [0]* (0.054)
LN(WTI)	-1.408 [1] (0.570)	-1.256 [1] (0.886)	-3.586 [0]*** (0.009)	-3.911 [0]** (0.019)
LN(DUBAI)	-0.370 [1] (0.979)	-0.196 [1] (0.991)	-2.441 [0] (0.136)	-2.919 [0] (0.166)
LN(SI)	-0.056 [0] (0.948)	-2.170 [0] (0.494)	-5.463 [0]*** (0.000)	5.378 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-0.145 [3] (0.938)	-2.174 [2] (0.492)	-5.394 [2]*** (0.000)	-5.319 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.708 [5]**	0.217 [5]***	0.292 [3]	0.117 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 550 NG Prices and SI (2011-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-1.690 [0] (0.429)	-1.882 [0] (0.647)	-5.873 [0]*** (0.000)	-5.770 [0]*** (0.000)
LN(LNG)	-5.033 [0]*** (0.000)	-4.362 [0]*** (0.005)	-6.002 [0]*** (0.000)	-6.486 [0]*** (0.000)
LN(RUS)	-2.401 [0] (0.146)	-2.603 [0] (0.280)	-8.034 [0]*** (0.000)	-8.666 [0]*** (0.000)
LN(SI)	-0.056 [0] (0.948)	-2.170 [0] (0.494)	-5.463 [0]*** (0.000)	5.378 [0]*** (0.000)

	PP (Level)		PP (First Difference)	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-0.145 [3] (0.938)	-2.174 [2] (0.492)	-5.394 [2]*** (0.000)	-5.319 [1]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.708 [5]**	0.217 [5]***	0.292 [3]	0.117 [1]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 551 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-1.856 [1] (0.352)	-1.584 [1] (0.796)	-17.854 [0]*** (0.000)	-17.883 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-1.974 [4] (0.298)	-1.793 [4] (0.704)	-17.912 [3]*** (0.000)	-17.957 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	0.519 [11]**	0.327 [11]***	0.095 [0]	0.033 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 552 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-1.856 [1] (0.352)	-1.584 [1] (0.796)	-17.854 [0]*** (0.000)	-17.883 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5]	-3.325 [6]*	-11.889 [4]***	-11.860 [4]***

	(0.739)	(0.065)	(0.000)	(0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-1.974 [4] (0.298)	-1.793 [4] (0.704)	-17.912 [3]*** (0.000)	-17.957 [2]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	0.519 [11]**	0.327 [11]***	0.095 [0]	0.033 [0]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 553 SI and IP (2011-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-0.056 [0] (0.948)	-2.170 [0] (0.494)	-5.463 [0]*** (0.000)	5.378 [0]*** (0.000)
LN(IP)	-2.095 [0] (0.247)	-3.539 [0]** (0.046)	-8.365 [0]*** (0.000)	-8.406 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-0.145 [3] (0.938)	-2.174 [2] (0.492)	-5.394 [2]*** (0.000)	-5.319 [1]*** (0.000)
LN(IP)	-1.993 [1] (0.288)	-3.564 [1]** (0.044)	-10.128 [9]*** (0.000)	-11.512 [12]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.708 [5]**	0.217 [5]***	0.292 [3]	0.117 [1]
LN(IP)	0.778 [4]***	0.126 [2]*	0.270 [10]	0.155 [14]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 554 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC **GDP [2]**	H0: r=0 H1: r≤1	0.783989 0.052506	23.79541*** 0.809025	0.0022 0.3684	22.98638*** 0.809025	0.0017 0.3684
NGC **GDP [2]**	H0: r=0 H1: r≤1	0.873055 0.072221	36.36233*** 1.274350	0.0000 0.2590	35.08798*** 1.274350	0.0000 0.2590
OILC **GDP [3]**	H0: r=0 H1: r≤1	0.661995 0.394199	25.37437*** 8.019247***	0.0012 0.0046	17.35512** 8.019247***	0.0157 0.0046
Brent Price **M2 [5]**	H0: r=0 H1: r≤1	0.069171 0.033838	9.549368 3.098153*	0.3170 0.0784	6.451216 3.098153*	0.5560 0.0784
WTI Price **M2 [7]**	H0: r=0 H1: r≤1	0.087431 0.018786	9.720113 1.668866	0.3029 0.1964	8.051247 1.668866	0.3735 0.1964
Dubai Price **M2 [4]**	H0: r=0 H1: r≤1	0.075879 0.015565	8.608525 1.427555	0.4028 0.2322	7.180970 1.427555	0.4679 0.2322
HH PRICE **M2 [6]**	H0: r=0 H1: r≤1	0.153276 0.085095	22.72312*** 7.915224***	0.0034 0.0049	14.80790** 7.915224***	0.0410 0.0049
LNG PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.077056 0.026713	9.868233 2.491035	0.2910 0.1145	7.377199 2.491035	0.4455 0.1145
RUS PRICE **M2 [6]**	H0: r=0 H1: r≤1	0.109162 0.039422	13.86740* 3.579604*	0.0867 0.0585	10.28779 3.579604*	0.1937 0.0585
Brent Price **SI [3]**	H0: r=0 H1: r≤1	0.263478 0.076699	16.96713** 3.511217*	0.0298 0.0609	13.45592* 3.511217*	0.0668 0.0609
WTI Price **SI [3]**	H0: r=0 H1: r≤1	0.309593 0.106023	21.23219*** 4.931303**	0.0061 0.0264	16.30089** 4.931303**	0.0235 0.0264
Dubai Price **SI [3]**	H0: r=0 H1: r≤1	0.266787 0.065091	16.61553** 2.961471*	0.0338 0.0853	13.65405* 2.961471*	0.0623 0.0853
HH PRICE **SI [1]**	H0: r=0 H1: r≤1	0.149116 0.010845	7.929695 0.501615	0.4729 0.4788	7.428080 0.501615	0.4398 0.4788
LNG PRICE **SI [1]**	H0: r=0 H1: r≤1	0.353949 0.010802	20.59592*** 0.499599	0.0078 0.4797	20.09632*** 0.499599	0.0054 0.4797

RUS PRICE **SI [2]**	H0: r=0 H1: r≤1	0.282120 0.006911	15.22746* 0.312088	0.0548 0.5764	14.91537** 0.312088	0.0394 0.5764
Brent Price **IP [3]**	H0: r=0 H1: r≤1	0.021780 0.012356	6.890675 2.486545	0.5904 0.1148	4.404130 2.486545	0.8144 0.1148
WTI Price **IP [3]**	H0: r=0 H1: r≤1	0.022491 0.012289	7.022644 2.473126	0.5750 0.1158	4.549518 2.473126	0.7973 0.1158
Dubai Price **IP [3]**	H0: r=0 H1: r≤1	0.023780 0.012812	7.392513 2.579022	0.5324 0.1083	4.813491 2.579022	0.7652 0.1083
HH PRICE **IP [2]**	H0: r=0 H1: r≤1	0.092517 0.013808	22.30796*** 2.794822*	0.0040 0.0946	19.51314*** 2.794822*	0.0067 0.0946
LNG PRICE **IP [3]**	H0: r=0 H1: r≤1	0.023707 0.002448	5.288719 0.490264	0.7774 0.4838	4.798454 0.490264	0.7670 0.4838
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.030863 0.014172	9.078814 2.840369*	0.3581 0.0919	6.238445 2.840369*	0.5828 0.0919
SI **IP [1]**	H0: r=0 H1: r≤1	0.212605 0.005027	11.22703 0.231846	0.1979 0.6302	10.99518 0.231846	0.1545 0.6302

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 555 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	10.227* 7.403	0.069 0.192	5	BRENT→M2
WTI does not granger cause M2 M2 does not granger cause WTI	16.152** 9.864	0.023 0.196	7	WTI→M2
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	7.780* 7.139	0.099 0.128	4	DUBAI→M2
LNG does not granger cause M2 M2 does not granger cause LNG	6.972* 5.770	0.072 0.123	3	LNG→M2
HH does not granger cause SI SI does not granger cause HH	1.214 0.002	0.270 0.961	1	No causal relation
BRENT does not granger cause IP IP does not granger cause BRENT	11.588*** 9.115**	0.008 0.027	3	BRENT↔IP
WTI does not granger cause IP IP does not granger cause WTI	11.321** 9.683**	0.010 0.021	3	WTI↔IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	9.873** 10.058**	0.019 0.018	3	DUBAI↔IP
LNG does not granger cause IP IP does not granger cause LNG	8.868** 11.288**	0.031 0.010	3	LNG↔IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	3.179 9.205*	0.528 0.056	4	IP→RUSSIA
SI does not granger cause IP IP does not granger cause SI	9.510*** 2.035	0.002 0.153	1	SI↔IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 556 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	0.327 0.271	0.848 0.873	2	No causal relation
NGC does not granger cause GDP GDP does not granger cause NGC	1.195 1.378	0.550 0.502	2	No causal relation
OILC does not granger cause GDP GDP does not granger cause OILC	0.548 4.528	0.908 0.209	3	No causal relation
HH does not granger cause M2 M2 does not granger cause HH	19.956*** 8.836	0.002 0.183	6	HH→M2
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	5.520 11.578*	0.479 0.072	6	M2→RUSSIA
BRENT does not granger cause SI SI does not granger cause BRENT	0.823 6.477*	0.843 0.090	3	SI→BRENT
WTI does not granger cause SI	2.754	0.431	3	SI→WTI

SI does not granger cause WTI	8.926**	0.030		
DUBAI does not granger cause SI SI does not granger cause DUBAI	1.402 6.012	0.705 0.111	3	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	2.936* 0.466	0.086 0.494	1	LNG→SI
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	2.293 2.801	0.317 0.246	2	No causal relation
HH does not granger cause IP IP does not granger cause HH	0.252 4.064	0.881 0.131	2	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

SAUDI ARABIA

UNIT ROOT TEST RESULTS

Table 557 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-3.609 [0]** (0.010)	-6.492 [2]*** (0.000)	-3.605 [2]** (0.011)	-3.659 [2]** (0.039)
LN(GDP)	-2.563 [2] (0.110)	-0.029 [0] (0.995)	-2.206 [1] (0.207)	-4.458 [0]*** (0.005)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-3.367 [3]** (0.019)	-3.156 [5] (0.109)	-3.752 [3]*** (0.007)	-4.096 [3]** (0.014)
LN(GDP)	-1.618 [3] (0.463)	-0.364 [2] (0.985)	-3.375 [1]** (0.018)	-4.414 [4]*** (0.006)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.724 [4]**	0.133 [4]*	0.315 [2]	0.123 [1]
LN(GDP)	0.327 [5]**	0.173 [5]**	0.361 [4]*	0.073 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 558 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-4.303 [1]*** (0.001)	-1.699 [1] (0.733)	-1.200 [6] (0.663)	-7.598 [0]*** (0.000)
LN(GDP)	-2.136 [1] (0.232)	-2.134 [1] (0.512)	-3.312 [0]** (0.020)	-3.237 [0]* (0.091)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-2.821 [1]* (0.063)	-0.754 [1] (0.962)	-5.979 [4]*** (0.000)	-7.714 [1]*** (0.000)
LN(GDP)	-2.123 [4] (0.236)	-2.322 [4] (0.413)	-3.154 [1]** (0.030)	-3.077 [2]*** (0.124)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.773 [5]***	0.205 [5]**	0.456 [4]*	0.112 [1]
LN(GDP)	0.203 [5]	0.122 [5]*	0.145 [4]	0.148 [4]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 559 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-0.511 [1] (0.878)	-2.721 [0] (0.233)	-7.852 [0]*** (0.000)	-7.755 [0]*** (0.000)
LN(GDP)	-2.136 [1] (0.232)	-2.134 [1] (0.512)	-3.312 [0]** (0.020)	-3.237 [0]* (0.091)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-0.362 [4] (0.906)	-2.684 [2] (0.247)	-8.191 [4]*** (0.000)	-8.081 [4]*** (0.000)

LN(GDP)	-2.123 [4] (0.236)	-2.322 [4] (0.413)	-3.154 [1]** (0.030)	-3.077 [2]*** (0.124)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.824 [5]***	0.123 [4]*	0.068 [5]	0.067 [5]
LN(GDP)	0.203 [5]	0.122 [5]*	0.145 [4]	0.148 [4]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 560 Oil Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(M2)	-0.609 [0] (0.989)	-2.694 [0] (0.240)	-13.861 [0]*** (0.000)	-13.859 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(M2)	-0.660 [3] (0.991)	-2.686 [4] (0.243)	-13.870 [3]*** (0.000)	-13.870 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(M2)	1.739 [10]***	0.176 [10]**	0.195 [3]	0.143 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 561 NG Prices and M2 (2000-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(M2)	-0.609 [0] (0.989)	-2.694 [0] (0.240)	-13.861 [0]*** (0.000)	-13.859 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(M2)	-0.660 [3] (0.991)	-2.686 [4] (0.243)	-13.870 [3]*** (0.000)	-13.870 [3]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.335 [10]	0.276 [10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]

LN(M2)	1.739 [10]***	0.176 [10]**	0.195 [3]	0.143 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 562 Oil Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.603 [1] (0.478)	-2.042 [1] (0.573)	-10.414 [0]*** (0.000)	-10.437 [0]*** (0.000)
LN(WTI)	-1.766 [1] (0.396)	-2.266 [1] (0.449)	-9.643 [0]*** (0.000)	-9.666 [0]*** (0.000)
LN(DUBAI)	-1.652[1] (0.453)	-2.141 [1] (0.518)	-9.147 [0]*** (0.000)	-9.181 [0]*** (0.000)
LN(SI)	-1.906 [1] (0.328)	-1.585 [1] (0.795)	-9.166 [0]*** (0.000)	-9.224 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(BRENT)	-1.659 [3] (0.450)	-2.034 [4] (0.578)	-10.408 [1]*** (0.000)	-10.432 [1]*** (0.000)
LN(WTI)	-1.788 [4] (0.385)	-2.250 [4] (0.458)	-9.601 [1]*** (0.000)	-9.626 [0]*** (0.000)
LN(DUBAI)	-1.637 [4] (0.461)	-1.995 [4] (0.599)	-9.132 [1]*** (0.000)	-9.204 [2]*** (0.000)
LN(SI)	-1.790 [6] (0.384)	-1.561 [6] (0.804)	-9.191 [2]*** (0.000)	-9.249 [2]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(BRENT)	1.525 [10]***	0.184 [10]**	0.136 [3]	0.061 [3]
LN(WTI)	1.479 [10]***	0.216 [10]***	0.114 [4]	0.048 [4]
LN(DUBAI)	1.556 [10]***	0.192 [10]**	0.136 [4]	0.063 [3]
LN(SI)	0.823 [10]***	0.287 [10]***	0.186 [6]	0.085 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 563 NG Prices and SI (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.598 [0]* (0.095)	-2.772 [0] (0.209)	-12.310 [0]*** (0.000)	-12.325 [0]*** (0.000)
LN(LNG)	-1.055 [1] (0.732)	-3.547 [2]** (0.037)	-11.178 [0]*** (0.000)	-11.146 [0]*** (0.000)
LN(RUS)	-1.869 [3] (0.346)	-3.430 [2]** (0.050)	-3.724 [0]*** (0.004)	-3.720 [2]** (0.0234)
LN(SI)	-1.906 [1] (0.328)	-1.585 [1] (0.795)	-9.166 [0]*** (0.000)	-9.224 [0]*** (0.000)
	PP (Level)		PP (First Difference)	
LN(HH)	-2.922 [6]** (0.044)	-3.055 [6] (0.120)	-12.331 [3]*** (0.000)	-12.344 [4]*** (0.000)
LN(LNG)	-1.090 [4] (0.719)	-3.058 [5] (0.119)	-11.289 [4]*** (0.000)	-11.259 [3]*** (0.000)
LN(RUS)	-1.471[9] (0.545)	-2.142 [9] (0.518)	-12.469 [8]*** (0.000)	-12.462 [8]*** (0.000)
LN(SI)	-1.790 [6] (0.384)	-1.561 [6] (0.804)	-9.191 [2]*** (0.000)	-9.249 [2]*** (0.000)
	KPSS (Level)		KPSS (First Difference)	
LN(HH)	0.335 [10]	0.276[10]***	0.110 [5]	0.034 [5]
LN(LNG)	1.558 [10]***	0.085 [10]	0.034 [4]	0.034 [4]
LN(RUS)	1.423 [10]***	0.187 [10]**	0.073 [9]	0.048[4]
LN(SI)	0.823 [10]***	0.287 [10]***	0.186 [6]	0.085 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 564 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-1.759 [0] (0.400)	-2.846 [0] (0.182)	-15.313 [0]*** (0.000)	-15.279 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.000)
LN(WTI)	-1.803 [4] (0.377)	-2.233 [5] (0.468)	-10.335 [1]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-1.904 [5] (0.329)	-3.107 [6] (0.107)	-15.239 [5]*** (0.000)	-15.209 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	0.843 [11]***	0.084 [11]**	0.080 [4]	0.044 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 565 NG Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-1.759 [0] (0.400)	-2.846 [0] (0.182)	-15.313 [0]*** (0.000)	-15.279 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-1.904 [5] (0.329)	-3.107 [6] (0.107)	-15.239 [5]*** (0.000)	-15.209 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	0.843 [11]***	0.084 [11]**	0.080 [4]	0.044 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 566 SI and IP (2000-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(SI)	-1.906 [1]	-1.585 [1]	-9.166 [0]***	-9.224 [0]***

	(0.328)	(0.795)	(0.000)	(0.000)
LN(IP)	-1.779 [0] (0.389)	-2.244 [0] (0.461)	-13.240 [0]*** (0.000)	-13.202 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.790 [6] (0.384)	-1.561 [6] (0.804)	-9.191 [2]*** (0.000)	-9.249 [2]*** (0.000)
LN(IP)	-2.025 [5] (0.275)	-2.579 [5] (0.290)	-13.281 [4]*** (0.000)	-13.246 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.823 [10]***	0.287 [10]***	0.186 [6]	0.085 [6]
LN(IP)	0.711 [10]**	0.107 [10]	0.045 [4]	0.045 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 567 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC **GDP [2]**	H0: r=0 H1: r≤1	0.616477 0.042175	34.04914*** 1.465051	0.0000 0.2261	32.58409*** 1.465051	0.0000 0.2261
NGC **GDP [4]**	H0: r=0 H1: r≤1	0.474392 0.016835	25.74697*** 0.662159	0.0010 0.4158	25.08482*** 0.662159	0.0007 0.4158
OILC **GDP [2]**	H0: r=0 H1: r≤1	0.253005 0.000732	11.98960 0.030024	0.1574 0.8624	11.95958 0.030024	0.1122 0.8624
Brent Price **M2 [3]**	H0: r=0 H1: r≤1	0.070117 0.000356	12.85727 0.062727	0.1201 0.8022	12.79454* 0.062727	0.0842 0.8022
WTI Price **M2 [3]**	H0: r=0 H1: r≤1	0.076779 0.000209	14.09691* 0.036860	0.0803 0.8477	14.06005* 0.036860	0.0538 0.8477
Dubai Price **M2 [3]**	H0: r=0 H1: r≤1	0.063221 0.000300	11.54703 0.052818	0.1800 0.8182	11.49422 0.052818	0.1311 0.8182
HH PRICE **M2 [1]**	H0: r=0 H1: r≤1	0.070825 3.68E-05	13.08211 0.006548	0.1118 0.9349	13.07556* 0.006548	0.0764 0.9349
LNG PRICE **M2 [3]**	H0: r=0 H1: r≤1	0.075774 0.001832	14.19118* 0.322714	0.0778 0.5700	13.86847* 0.322714	0.0577 0.5700
RUS PRICE **M2 [4]**	H0: r=0 H1: r≤1	0.072654 0.001195	13.40917 0.209228	0.1006 0.6474	13.19994* 0.209228	0.0731 0.6474
Brent Price **SI [2]**	H0: r=0 H1: r≤1	0.028108 0.015194	7.756411 2.710010*	0.4918 0.0997	5.046400 2.710010*	0.7360 0.0997
WTI Price **SI [2]**	H0: r=0 H1: r≤1	0.032658 0.018368	9.158378 3.281397*	0.3510 0.0701	5.876981 3.281397*	0.6291 0.0701
Dubai Price **SI [2]**	H0: r=0 H1: r≤1	0.029945 0.014396	7.947818 2.566652	0.4710 0.1091	5.381166 2.566652	0.6931 0.1091
HH PRICE **SI [2]**	H0: r=0 H1: r≤1	0.043627 0.019618	11.40256 3.506984*	0.1879 0.0611	7.895574 3.506984*	0.3894 0.0611
LNG PRICE **SI [2]**	H0: r=0 H1: r≤1	0.025539 0.010635	6.471721 1.892541	0.6397 0.1689	4.579179 1.892541	0.7937 0.1689
RUS PRICE **SI [7]**	H0: r=0 H1: r≤1	0.034042 0.019307	9.310408 3.353217*	0.3375 0.0671	5.957192 3.353217*	0.6187 0.0671
Brent Price **IP [3]**	H0: r=0 H1: r≤1	0.035870 0.023874	12.13854 4.832764**	0.1504 0.0279	7.305777 4.832764**	0.4536 0.0279
WTI Price **IP [3]**	H0: r=0 H1: r≤1	0.034805 0.025613	12.27451 5.189392**	0.1442 0.0227	7.085118 5.189392**	0.4791 0.0227
Dubai Price **IP [2]**	H0: r=0 H1: r≤1	0.033455 0.023289	11.57602 4.736498**	0.1784 0.0295	6.839521 4.736498**	0.5083 0.0295
HH PRICE **IP [1]**	H0: r=0 H1: r≤1	0.031455 0.015204	9.550751 3.094800*	0.3169 0.0785	6.455950 3.094800*	0.5554 0.0785
LNG PRICE **IP [3]**	H0: r=0 H1: r≤1	0.039236 0.015566	11.14297 3.137658*	0.2029 0.0765	8.005309 3.137658*	0.3782 0.0765
RUS PRICE **IP [4]**	H0: r=0 H1: r≤1	0.037370 0.015080	10.60286 3.023739*	0.2371 0.0821	7.579118 3.023739*	0.4231 0.0821
SI **IP [2]**	H0: r=0 H1: r≤1	0.040467 0.021122	11.09015 3.778599*	0.2060 0.0519	7.311555 3.778599*	0.4530 0.0519

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level.

MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 568 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
OILC does not granger cause GDP GDP does not granger cause OILC	2.922 5.668*	0.232 0.058	2	GDP→OILC
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	4.760 13.194***	0.190 0.004	3	M2→DUBAI
BRENT does not granger cause SI SI does not granger cause BRENT	3.462 5.221*	0.177 0.073	2	SI→BRENT
WTI does not granger cause SI SI does not granger cause WTI	6.788** 4.406	0.033 0.110	2	WTI→SI
DUBAI does not granger cause SI SI does not granger cause DUBAI	3.189 5.458*	0.202 0.065	2	SI→DUBAI
HH does not granger cause SI SI does not granger cause HH	0.288 0.762	0.865 0.683	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	2.873 11.894***	0.237 0.002	2	SI→LNG
RUSSIA does not granger cause SI SI does not granger cause RUSSIA	10.186 18.919***	0.178 0.008	7	SI→RUSSIA
BRENT does not granger cause IP IP does not granger cause BRENT	15.222*** 2.962	0.001 0.397	3	BRENT→IP
WTI does not granger cause IP IP does not granger cause WTI	16.447*** 3.181	0.000 0.364	3	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	8.995** 2.166	0.011 0.338	2	DUBAI→IP
HH does not granger cause IP IP does not granger cause HH	1.681 0.000	0.194 0.980	1	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	10.503** 6.776*	0.014 0.079	3	LNG↔IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	7.510 10.512**	0.111 0.032	4	IP→RUSSIA
SI does not granger cause IP IP does not granger cause SI	12.286*** 1.743	0.002 0.418	2	SI→IP

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 569 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	2.662 18.249***	0.264 0.000	2	GDP→EC
NGC does not granger cause GDP GDP does not granger cause NGC	8.059* 24.483***	0.089 0.000	4	NGC↔GDP
BRENT does not granger cause M2 M2 does not granger cause BRENT	1.151 10.715**	0.764 0.013	3	M2→BRENT
WTI does not granger cause M2 M2 does not granger cause WTI	1.245 9.986**	0.742 0.018	3	M2→WTI
HH does not granger cause M2 M2 does not granger cause HH	3.358* 0.355	0.066 0.551	1	HH→M2
LNG does not granger cause M2 M2 does not granger cause LNG	0.510 5.619	0.916 0.131	3	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	10.125** 1.170	0.038 0.882	4	RUSSIA→M2

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

UAE

UNIT ROOT TEST RESULTS

Table 570 EC and GDP (1975-2011) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(EC)	-3.818 [0]*** (0.006)	-20.000 [0] (0.581)	-4.106 [1]*** (0.003)	-7.307 [0]*** (0.000)
LN(GDP)	-0.371 [1] (0.903)	-1.924 [1] (0.620)	-4.282 [0]*** (0.001)	-4.282 [0]*** (0.009)
	PP (Level)		**PP (First Difference)**	
LN(EC)	-3.593 [3]** (0.010)	-2.540 [9] (0.308)	-4.734 [3]*** (0.000)	-7.926 [7]*** (0.000)
LN(GDP)	-0.038 [2] (0.956)	-1.504 [2] (0.809)	-4.282 [0]*** (0.001)	-4.282 [0]*** (0.009)
	KPSS (Level)		**KPSS (First Difference)**	
LN(EC)	0.386 [4]*	0.216 [4]***	0.702 [4]**	0.144 [11]*
LN(GDP)	0.716 [4]**	0.088 [4]	0.146 [2]	0.106 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 571 NG Consumption and GDP (1970-2013) -Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(NG)	-3.667 [0]*** (0.008)	-3.101 [0] (0.120)	-5.545 [0]*** (0.000)	-6.735 [0]*** (0.000)
LN(GDP)	-0.782 [1] (0.812)	-2.253 [1] (0.447)	-4.295 [0]*** (0.001)	-4.228 [0]*** (0.010)
	PP (Level)		**PP (First Difference)**	
LN(NG)	-6.072 [10]*** (0.000)	-3.836 [7]** (0.025)	-5.533 [1]*** (0.000)	-6.823 [4]*** (0.000)
LN(GDP)	-0.418 [2] (0.895)	-1.852 [2] (0.659)	-4.295 [0]*** (0.001)	-4.228 [0]*** (0.010)
	KPSS (Level)		**KPSS (First Difference)**	
LN(NG)	0.746 [5]***	0.222 [4]***	0.666 [2]**	0.152 [6]**
LN(GDP)	0.654 [5]**	0.089 [4]	0.088 [2]	0.072 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 572 Oil Consumption and GDP (1970-2013)-Annual

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(OIL)	-5.613 [0]*** (0.000)	-3.685 [0]** (0.035)	-4.375 [0]*** (0.001)	-5.262 [0]*** (0.000)
LN(GDP)	-0.782 [1] (0.812)	-2.253 [1] (0.447)	-4.295 [0]*** (0.001)	-4.228 [0]*** (0.010)
	PP (Level)		**PP (First Difference)**	
LN(OIL)	-10.369 [18]*** (0.000)	-8.310 [21]*** (0.000)	-4.302 [2]*** (0.001)	-5.256 [1]*** (0.000)
LN(GDP)	-0.418 [2] (0.895)	-1.852 [2] (0.659)	-4.295 [0]*** (0.001)	-4.228 [0]*** (0.010)
	KPSS (Level)		**KPSS (First Difference)**	
LN(OIL)	0.658 [5]**	0.183 [5]**	0.581 [4]**	0.204 [2]**
LN(GDP)	0.654 [5]**	0.089 [4]	0.088 [2]	0.072 [2]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 573 Oil Prices and M2 (2002-2013)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	Constant-Trend	Constant	Constant-Trend
LN(BRENT)	-2.052 [1] (0.264)	-3.078 [1] (0.115)	-8.985 [0]*** (0.000)	-9.003 [0]*** (0.000)
LN(WTI)	-2.353 [1] (0.157)	-3.216 [1]* (0.085)	-8.745 [0]*** (0.000)	-8.770 [0]*** (0.000)

LN(DUBAI)	-1.999 [1] (0.286)	-3.224 [1]* (0.083)	-8.117 [0]*** (0.000)	-8.135 [0]*** (0.000)
LN(M2)	-1.645 [0] (0.456)	-0.290 [0] (0.990)	-4.639 [2]*** (0.000)	-4.789 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-2.051 [2] (0.264)	-2.858 [3] (0.179)	-8.990 [5]*** (0.000)	-8.941 [6]*** (0.000)
LN(WTI)	-2.374 [3] (0.150)	-2.994 [3] (0.137)	-8.777 [3]*** (0.000)	-8.806 [3*** (0.000)
LN(DUBAI)	-1.976 [3] (0.296)	-2.887 [4] (0.169)	-8.107 [5]*** (0.000)	-8.125 [5]*** (0.000)
LN(M2)	-1.422 [6] (0.569)	-0.565 [6] (0.979)	-11.633 [6]*** (0.000)	-11.651 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.311 [9]***	0.193 [9]**	0.118 [1]	0.033 [1]
LN(WTI)	1.249 [9]***	0.229 [9]***	0.114 [3]	0.028 [2]
LN(DUBAI)	1.241 [10]***	0.202 [9]**	0.096 [3]	0.027 [2]
LN(M2)	1.366 [10]***	0.296 [10]***	0.394 [6]*	0.176 [6]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 574 NG Prices and M2 (2002-2013)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.483 [0] (0.121)	-3.148 [0]* (0.099)	-11.240 [0]*** (0.000)	-11.281 [0]*** (0.000)
LN(LNG)	-1.426 [1] (0.567)	-2.850 [1] (0.182)	-10.065 [0]*** (0.000)	-10.038 [0]*** (0.000)
LN(RUS)	-2.032 [6] (0.272)	-3.284 [3]* (0.073)	-4.249 [5]*** (0.000)	-4.360 [5]*** (0.003)
LN(M2)	-1.645 [0] (0.456)	-0.290 [0] (0.990)	-4.639 [2]*** (0.000)	-4.789 [2]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.609 [4]* (0.093)	-3.200 [3]* (0.088)	-11.244 [2]*** (0.000)	-11.281 [1]*** (0.000)
LN(LNG)	-1.476 [4] (0.543)	-2.980 [5] (0.141)	-10.179 [3]*** (0.000)	-10.154 [3]*** (0.000)
LN(RUS)	-1.671 [8] (0.443)	-1.869 [8] (0.651)	-10.615 [7]*** (0.000)	-10.621 [7]*** (0.000)
LN(M2)	-1.422 [6] (0.569)	-0.565 [6] (0.979)	-11.633 [6]*** (0.000)	-11.651 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.534 [9]**	0.271 [9]***	0.180 [2]	0.074 [1]
LN(LNG)	1.240 [10]***	0.085 [9]**	0.044 [4]	0.037 [4]
LN(RUS)	1.102 [10]***	0.254 [9]***	0.114 [8]	0.040 [8]
LN(M2)	1.366 [10]***	0.296 [10]***	0.394 [6]*	0.176 [6]**

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 575 Oil Prices and SI (2002-2013)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-2.052 [1] (0.264)	-3.078 [1] (0.115)	-8.985 [0]*** (0.000)	-9.003 [0]*** (0.000)
LN(WTI)	-2.353 [1] (0.157)	-3.216 [1]* (0.085)	-8.745 [0]*** (0.000)	-8.770 [0]*** (0.000)
LN(DUBAI)	-1.999 [1] (0.286)	-3.224 [1]* (0.083)	-8.117 [0]*** (0.000)	-8.135 [0]*** (0.000)
LN(SI)	-1.869 [1] (0.346)	-1.904 [1] (0.647)	-6.857 [0]*** (0.000)	-6.832 [0]*** (0.000)

	PP (Level)		PP (First Difference)	
LN(BRENT)	-2.051 [2] (0.264)	-2.858 [3] (0.179)	-8.990 [5]*** (0.000)	-8.941 [6]*** (0.000)
LN(WTI)	-2.374 [3] (0.150)	-2.994 [3] (0.137)	-8.777 [3]*** (0.000)	-8.806 [3*** (0.000)
LN(DUBAI)	-1.976 [3] (0.296)	-2.887 [4] (0.169)	-8.107 [5]*** (0.000)	-8.125 [5]*** (0.000)
LN(SI)	-1.957 [6] (0.305)	-1.903 [6] (0.647)	-6.905 [3]*** (0.000)	-6.837 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.311 [9]***	0.193 [9]**	0.118 [1]	0.033 [1]
LN(WTI)	1.249 [9]***	0.229 [9]***	0.114 [3]	0.028 [2]
LN(DUBAI)	1.241 [10]***	0.202 [9]**	0.096 [3]	0.027 [2]
LN(SI)	0.404 [9]*	0.250 [9]***	0.132 [6]	0.092 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 576 NG Prices and SI (2002-2013)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.483 [0] (0.121)	-3.148 [0]* (0.099)	-11.240 [0]*** (0.000)	-11.281 [0]*** (0.000)
LN(LNG)	-1.426 [1] (0.567)	-2.850 [1] (0.182)	-10.065 [0]*** (0.000)	-10.038 [0]*** (0.000)
LN(RUS)	-2.032 [6] (0.272)	-3.284 [3]* (0.073)	-4.249 [5]*** (0.000)	-4.360 [5]*** (0.003)
LN(SI)	-1.869 [1] (0.346)	-1.904 [1] (0.647)	-6.857 [0]*** (0.000)	-6.832 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.609 [4]* (0.093)	-3.200 [3]* (0.088)	-11.244 [2]*** (0.000)	-11.281 [1]*** (0.000)
LN(LNG)	-1.476 [4] (0.543)	-2.980 [5] (0.141)	-10.179 [3]*** (0.000)	-10.154 [3]*** (0.000)
LN(RUS)	-1.671 [8] (0.443)	-1.869 [8] (0.651)	-10.615 [7]*** (0.000)	-10.621 [7]*** (0.000)
LN(SI)	-1.957 [6] (0.305)	-1.903 [6] (0.647)	-6.905 [3]*** (0.000)	-6.837 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.534 [9]**	0.271 [9]***	0.180 [2]	0.074 [1]
LN(LNG)	1.240 [10]***	0.085 [9]**	0.044 [4]	0.037 [4]
LN(RUS)	1.102 [10]***	0.254 [9]***	0.114 [8]	0.040 [8]
LN(SI)	0.404 [9]*	0.250 [9]***	0.132 [6]	0.092 [6]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 577 Oil Prices and IP (1998-2014)-Monthly

Variable	ADF (Level)		ADF (First Difference)	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(BRENT)	-1.863 [1] (0.349)	-2.018 [1] (0.587)	-11.261 [0]*** (0.000)	-11.332 [0]*** (0.000)
LN(WTI)	-1.927 [1] (0.319)	-2.199 [1] (0.486)	-10.385 [0]*** (0.000)	-10.449 [0]*** (0.000)
LN(DUBAI)	-1.965 [1] (0.302)	-2.203 [1] (0.484)	-9.902 [0]*** (0.000)	-9.991 [0]*** (0.000)
LN(IP)	-1.154 [1] (0.693)	-2.785 [1] (0.204)	-20.952 [0]*** (0.000)	-20.949 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(BRENT)	-1.721 [4] (0.418)	-2.098 [5] (0.543)	-11.256 [2]*** (0.000)	-11.323 [2]*** (0.0000)
LN(WTI)	-1.803 [4]	-2.233 [5]	-10.335 [1]***	-10.449 [0]***

	(0.377)	(0.468)	(0.000)	(0.000)
LN(DUBAI)	-1.756 [4] (0.401)	-2.031 [4] (0.580)	-9.902 [0]*** (0.000)	-9.967 [1]*** (0.000)
LN(IP)	-1.619 [6] (0.470)	-4.147 [8]*** (0.006)	-21.015 [6]*** (0.000)	-21.168 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(BRENT)	1.637 [11]***	0.208 [10]**	0.146 [4]	0.048 [4]
LN(WTI)	1.611 [11]***	0.247 [10]**	0.134 [4]	0.040 [4]
LN(DUBAI)	1.667 [11]***	0.203 [10]**	0.157 [4]	0.048 [4]
LN(IP)	1.195 [11]***	0.097 [10]	0.112 [4]	0.037 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 578 NG Prices and IP (1998-2014)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(HH)	-2.374 [0] (0.150)	-2.228 [0] (0.471)	-13.428 [0]*** (0.000)	-13.440 [0]*** (0.000)
LN(LNG)	-1.248 [1] (0.653)	-3.634 [2]** (0.029)	-11.757[0]*** (0.000)	-11.730 [0]*** (0.000)
LN(RUS)	-1.856 [3] (0.352)	-3.652 [3]** (0.027)	-4.139 [2]*** (0.001)	-4.146 [2]** (0.006)
LN(IP)	-1.154 [1] (0.693)	-2.785 [1] (0.204)	-20.952 [0]*** (0.000)	-20.949 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(HH)	-2.595 [6]* (0.095)	-2.466 [6] (0.344)	-13.456 [5]*** (0.000)	-13.463 [5]*** (0.000)
LN(LNG)	-1.036 [5] (0.739)	-3.325 [6]* (0.065)	-11.889 [4]*** (0.000)	-11.860 [4]*** (0.000)
LN(RUS)	-1.307 [9] (0.626)	-2.429 [9] (0.363)	-13.746 [9]*** (0.000)	-13.722 [9]*** (0.000)
LN(IP)	-1.619 [6] (0.470)	-4.147 [8]*** (0.006)	-21.015 [6]*** (0.000)	-21.168 [5]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(HH)	0.403 [11]*	0.339 [11]***	0.105 [5]	0.027 [5]
LN(LNG)	1.650 [11]***	0.050 [10]	0.030 [5]	0.030 [5]
LN(RUS)	1.562 [11]***	0.176 [11]**	0.059 [9]	0.045 [9]
LN(IP)	1.195 [11]***	0.097 [10]	0.112 [4]	0.037 [3]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 579 SI and IP (2002-2013)-Monthly

Variable	**ADF (Level)**		**ADF (First Difference)**	
	Constant	**Constant-Trend**	**Constant**	**Constant-Trend**
LN(SI)	-1.869 [1] (0.346)	-1.904 [1] (0.647)	-6.857 [0]*** (0.000)	-6.832 [0]*** (0.000)
LN(IP)	-2.179 [1] (0.214)	-2.696 [1] (0.239)	-17.317 [0]*** (0.000)	-17.269 [0]*** (0.000)
	PP (Level)		**PP (First Difference)**	
LN(SI)	-1.957 [6] (0.305)	-1.903 [6] (0.647)	-6.905 [3]*** (0.000)	-6.837 [4]*** (0.000)
LN(IP)	-2.405 [6] (0.142)	-3.568 [7]** (0.036)	-18.276 [4]*** (0.000)	-18.243 [4]*** (0.000)
	KPSS (Level)		**KPSS (First Difference)**	
LN(SI)	0.404 [9]*	0.250 [9]***	0.132 [6]	0.092 [6]
LN(IP)	0.857 [9]***	0.150 [9]**	0.075 [4]	0.063 [4]

Notes: MacKinnon (1996) one-sided p-values for ADF and PP tests; Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) for KPSS test. The optimal lag-length for the test was selected by Schwarz Information Criterion. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 580 Johansen Cointegration Test Results

Variables	Hypothesis	Eigenvalue	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
EC GDP [1]	H0: r=0 H1: r≤1	0.441922 0.000346	20.42609*** 0.012122	0.0083 0.9121	20.41396*** 0.012122	0.0047 0.9121
Brent Price M2 [4]	H0: r=0 H1: r≤1	0.116040 0.017331	19.57497** 2.430175	0.0115 0.1190	17.14480** 2.430175	0.0170 0.1190
WTI Price M2 [5]	H0: r=0 H1: r≤1	0.174100 0.021759	29.43275*** 3.035879*	0.0002 0.0814	26.39687*** 3.035879*	0.0004 0.0814
Dubai Price M2 [4]	H0: r=0 H1: r≤1	0.125337 0.016918	20.98606*** 2.371669	0.0067 0.1236	18.61439*** 2.371669	0.0096 0.1236
HH PRICE M2 [1]	H0: r=0 H1: r≤1	0.121971 0.027109	22.37337*** 3.902615**	0.0039 0.0482	18.47076** 3.902615**	0.0102 0.0482
LNG PRICE M2 [4]	H0: r=0 H1: r≤1	0.050039 0.012591	8.896723 1.761296	0.3750 0.1845	7.135426 1.761296	0.4733 0.1845
RUS PRICE M2 [4]	H0: r=0 H1: r≤1	0.109727 0.018930	18.81193** 2.656425	0.0152 0.1031	16.15551** 2.656425	0.0248 0.1031
Brent Price SI [7]	H0: r=0 H1: r≤1	0.042030 0.015547	7.970725 2.131056	0.4685 0.1443	5.839670 2.131056	0.6339 0.1443
WTI Price SI [2]	H0: r=0 H1: r≤1	0.036034 0.022638	8.403317 3.228665*	0.4233 0.0724	5.174653 3.228665*	0.7196 0.0724
Dubai Price SI [7]	H0: r=0 H1: r≤1	0.046899 0.013037	8.317353 1.784721	0.4321 0.1816	6.532632 1.784721	0.5458 0.1816
HH PRICE SI [2]	H0: r=0 H1: r≤1	0.043803 0.025274	9.925009 3.609493*	0.2865 0.0574	6.315516 3.609493*	0.5731 0.0574
LNG PRICE SI [2]	H0: r=0 H1: r≤1	0.031427 0.010515	5.992838 1.490454	0.6964 0.2221	4.502384 1.490454	0.8029 0.2221
RUS PRICE SI [7]	H0: r=0 H1: r≤1	0.037398 0.024432	8.547593 3.363962*	0.4089 0.0666	5.183631 3.363962*	0.7185 0.0666
Brent Price IP [2]	H0: r=0 H1: r≤1	0.045087 0.025444	14.45354* 5.180346**	0.0713 0.0228	9.273197 5.180346**	0.2641 0.0228
WTI Price IP [2]	H0: r=0 H1: r≤1	0.044652 0.023603	13.98264* 4.801030**	0.0834 0.0284	9.181614 4.801030**	0.2714 0.0284
Dubai Price IP [2]	H0: r=0 H1: r≤1	0.046627 0.022179	14.10582* 4.508214**	0.0801 0.0337	9.597610 4.508214**	0.2397 0.0337
HH PRICE IP [2]	H0: r=0 H1: r≤1	0.032167 0.004052	7.388132 0.816201	0.5329 0.3663	6.571930 0.816201	0.5410 0.3663
LNG PRICE IP [2]	H0: r=0 H1: r≤1	0.054031 0.010544	13.29515 2.130598	0.1044 0.1444	11.16455 2.130598	0.1462 0.1444
RUS PRICE IP [4]	H0: r=0 H1: r≤1	0.032743 0.009400	8.504308 1.879377	0.4132 0.1704	6.624931 1.879377	0.5344 0.1704
SI IP [2]	H0: r=0 H1: r≤1	0.043389 0.035351	11.32917 5.074674**	0.1921 0.0243	6.254499 5.074674**	0.5808 0.0243

Notes: Trace test and Max-eigenvalue test indicates no cointegration at the level 0.1 level. MacKinnon-Haug-Michelis (1999) p-values [ ] Lag Length. *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

GRANGER CAUSALITY TEST RESULTS

Table 581 VAR Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
LNG does not granger cause M2 M2 does not granger cause LNG	2.599 8.040*	0.626 0.090	4	M2→LNG
BRENT does not granger cause SI SI does not granger cause BRENT	18.660*** 9.049	0.009 0.249	7	BRENT→SI
WTI does not granger cause SI SI does not granger cause WTI	1.633 5.030*	0.442 0.080	2	SI→WTI
DUBAI does not granger cause SI SI does not granger cause DUBAI	21.371*** 11.191	0.003 0.130	7	DUBAI→SI
HH does not granger cause SI SI does not granger cause HH	2.179 1.493	0.336 0.474	2	No causal relation
LNG does not granger cause SI SI does not granger cause LNG	4.213 3.933	0.121 0.139	2	No causal relation

RUSSIA does not granger cause SI SI does not granger cause RUSSIA	11.542 14.264**	0.116 0.046	7	SI→RUSSIA
HH does not granger cause IP IP does not granger cause HH	1.918 4.120	0.383 0.127	2	No causal relation
LNG does not granger cause IP IP does not granger cause LNG	11.944*** 0.401	0.002 0.818	2	LNG→IP
RUSSIA does not granger cause IP IP does not granger cause RUSSIA	4.817 11.458**	0.306 0.021	4	IP→RUSSIA
SI does not granger cause IP IP does not granger cause SI	1.134 2.233	0.567 0.327	2	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

Table 582 VEC Granger Causality/Block Exogeneity Wald Test Results

Null Hypothesis	Chi-sq	Prob.	df	Causal Relation
EC does not granger cause GDP GDP does not granger cause EC	1.296 2.498	0.254 0.114	1	No causal relation
BRENT does not granger cause M2 M2 does not granger cause BRENT	5.282 12.817**	0.259 0.012	4	M2→BRENT
WTI does not granger cause M2 M2 does not granger cause WTI	7.964 18.829***	0.158 0.002	5	M2→WTI
DUBAI does not granger cause M2 M2 does not granger cause DUBAI	4.925 12.198**	0.295 0.015	4	M2→DUBAI
HH does not granger cause M2 M2 does not granger cause HH	1.554 0.001	0.212 0.972	1	No causal relation
RUSSIA does not granger cause M2 M2 does not granger cause RUSSIA	2.302 6.357	0.680 0.174	4	No causal relation
BRENT does not granger cause IP IP does not granger cause BRENT	4.265 1.083	0.118 0.581	2	No causal relation
WTI does not granger cause IP IP does not granger cause WTI	6.393** 1.775	0.040 0.411	2	WTI→IP
DUBAI does not granger cause IP IP does not granger cause DUBAI	3.567 1.728	0.168 0.421	2	No causal relation

Note: *, ** and * denote statistical significance at 1%, 5% and 10% level of significance respectively.**

TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü ☐

Sosyal Bilimler Enstitüsü ☒ X

YAZARIN

Soyadı: KARACAER-ULUSOY

Adı: MERVE

Bölümü: BANKACILIK ve FİNANS

TEZİN ADI (İngilizce):

THE DYNAMICS OF FINANCIAL AND MACROECONOMIC DETERMINANTS IN NATURAL GAS AND CRUDE OIL MARKETS: EVIDENCE FROM OECD/GCC/OPEC COUNTRIES

TEZİN TÜRÜ: Yüksek Lisans ☐ Doktora ☒ X

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. ☐
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. ☐
3. Tezimden bir bir (1) yıl süreyle fotokopi alınamaz. ☒ X

TEZİN KÜTÜPHANEYE TESLİM TARİHİ : 30 MART 2016

CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: Karacaer-Ulusoy, Merve
Nationality: TC
Date of Birth: 26 August 1986
Place of Birth: Ankara
Phone:+90 312 466 7533
email: mkaracaer@ybu.edu.tr

EDUCATION

Degree	Institution	Year of Graduation
MS	Ankara University, Management	2010
BS	Bilkent University, Economics	2007

PROFESSIONONAL EXPERIENCE

Year	Place	Enrollment
2012- Present	YBU – Department of Marketing	Research Assistant
2009-2012	FNSS Defence Systems	Accounting Specialist

FOREIGN LANGUAGES

Advanced English

AWARDS AND HONORS

International Scientific Meetings Fellowship Programme (September-2013), The Scientific and Technological Research Council of Turkey (TUBITAK-BIDEB).

PUBLICATIONS

Karacaer, Merve. “Value Creation Process in Service Marketing.” Master’s Thesis, Ankara University, 2010.

Unlu, H., Daver, G., Karacaer, M.(2013). Testing of ISE and TurkDEX: Random Walk and Market Efficiency. International Journal of Economics and Finance Studies, 5(2).

Kapusuzoglu, A., Karacaer-Ulusoy, M. (2015). The Interactions between Agricultural Commodity and Oil Prices: An Empirical Analysis. Agricultural Economics-Zemedelska Ekonomika, 61(9), 410-421, SSCI

Yildiz, E., & Karacaer-Ulusoy, M. (2015). The Fragility of Turkish Economy from the Perspective of Oil Dependency. *Managing Global Transitions*, *13*(3), 253

Kapusuzoglu, A., Karacaer-Ulusoy, M. Analyzing the Similarities between Energy Consumption and GDP Levels of World Countries with Multidimensional Scaling Method. Energy Sources, Part B: Economics, Planning, and Policy, DOI: 10.1080/15567249.2015.1026617, Forthcoming, SCI

CONFERENCE PRESENTATIONS

Yildiz, E., Karacaer-Ulusoy, M., Uysal, B., Cetinkaya, N. (2015). Is Oil Price Decline Cure for Turkey's Current Account Deficit? The 5th Multinational Energy and Value Conference, May 7-9, 2015, Istanbul - Turkey

Kapusuzoglu, A., Liang, X., Karacaer-Ulusoy, M. (2015). The Dynamic Interactions of World Natural Gas Markets. The 5th Multinational Energy and Value Conference, May 7-9, 2015, Istanbul - Turkey

Kapusuzoglu, A., Karacaer, M. (2014). Analyzing the Similarities between Energy Consumption and GDP Levels of World Countries with Multidimensional Scaling Method. 4th International Conference on Economics and Social Sciences, October 25-26, 2014, Istanbul - Turkey.

Kapusuzoglu, A., Karacaer, M. (2014). The Interactions between Agricultural Commodity and Oil Prices: Evidence from Cointegration and Causality Analysis. 2nd International Congress on Energy Efficiency and Energy Related Materials, October 16-19, 2014, Mugla - Turkey

Yildiz, E., Karacaer, M. (2014). The Fragility of Turkish Economy from the Perspective of Oil Dependency. 2nd International Congress on Energy Efficiency and Energy Related Materials, October 16-19, 2014, Mugla - Turkey

Karacaer, M., Unlu, H. (2013). The Effect of Soccer Match-Fixing Process on Stock Market Returns: The Case of Fenerbahce and Besiktas. 22nd International Business Research Conference, World Business Institute, September 8-9, 2013, Madrid-Spain

Unlu, H., Karacaer, M. (2013). Why ARCH/GARCH are used in Finance? An Application of Value at Risk; Sport-Related Stocks in Turkey. 22nd International Business Research Conference, World Business Institute, September 8-9, 2013, Madrid-Spain

Unlu, H., Daver, G., Karacaer, M.(2013). Testing of ISE and TurkDEX: Random Walk and Market Efficiency. International Journal of Economics and Finance Studies, 2013, Istanbul

TURKISH SUMMARY

Bu çalışmada enerji, finansal ve makroekonomik değişkenler arasında kısa ve uzun dönemli olarak çeşitli ilişkilerin varlığı araştırılacaktır. Bu doğrultuda, Ekonomik Kalkınma ve İşbirliği Örgütü (OECD), Körfez Arap Ülkeleri İşbirliği Konseyi (GCC) ve Petrol İhraç Eden Ülkeler Teşkilatı (OPEC) grubunda yer alan ülkelerin toplam enerji, doğalgaz ve petrol tüketimi ile ilgili ülkelerin ekonomik büyümeleri arasındaki ilişkinin var olup olmadığı araştırılacaktır. Çalışmada incelenecek olan diğer bir boyut ise, dünya petrol (Brent, West Texas Intermediate (WTI) ve Dubai) ve doğalgaz (Henry Hub (HH), Japonya ve Rusya) fiyatlarındaki değişimin OECD, GCC ve OPEC grubunda yer alan ülkelerin likidite seviyeleri, hisse senedi piyasaları ve sanayi üretimleri üzerinde etkili olup olmadığıdır. Araştırma sürecinde son olarak, çalışma kapsamında yer alan ülkelerinin finansal gelişmeleri ile ekonomik büyümeleri arasında kısa ya da uzun dönemli ilişkinin varlığı incelenecektir.

Analize geçmeden önce teorik ve ampirik çalışmalar ele alınmış ve kapsamlı olarak rapor edilmiştir. İlerleyen aşamada veriler ve yöntem tanıtılmış ve son olarak da sonuç bölümünde çeşitli çıkarımlarda bulunulmuştur.

Ekonomik büyüme, belli bir ekonomide belli bir dönemde üretilen mal ve hizmet miktarı olarak tanımlanmaktadır. Enerji-ekonomik büyüme ilişkisi iktisat literatüründe önemli bir yere sahiptir. Literatürde; enerji ile sermaye arasındaki ikame-tamamlayıcılık ilişkisi, teknolojideki gelişmeler ve girdi-çıktı bileşimindeki değişimler gibi faktörlerin etkisiyle enerjinin, yurtiçi üretim artışı, toplam faktör verimliliği, kaynak dağılımı ve istihdam olanakları gibi kanallar aracılığıyla ekonomik büyümeyi etkilediği görüşü hâkimdir (Yapraklı, 2013: 76).

Klasik Büyüme Teorisi

Enerji ile ekonomik büyüme arasındaki ilişkiyi açıklayan üç temel yaklaşım söz konusudur; Klasik yaklaşım, Neo-Klasik yaklaşım ve Ekolojik yaklaşım. Klasik büyüme teorisi Adam Smith, Thomas R. Malthus ve David Ricardo'nun ekonomik büyümeyi ele aldıkları çalışmaları ile gelişmiştir. 1776-1843 yıllarında hâkimiyet gösteren bu teoride enerji kendi başına bir üretim faktörü olarak ele alınmayarak, ekonomik faaliyetlerin ana kaynağının toprak (doğa) olduğu, toprağın sınırlı olması nedeni ile de ekonomik faaliyetlerin sınırlı olduğu ileri sürülmüştür. Bir başka deyişle, enerji doğrudan bir üretim faktörü olarak değil, ara bir mal olarak ele alınmıştır. Bu doğrultuda, klasik iktisatçılar öncelikle ekonomiyi tarım ve sanayi olmak üzere iki ana sektöre ayırmıştır. Klasiklere göre toprak, tarım sektöründe emek ile işlerken, sanayi sektöründe hiçbir öneme sahip değildir, önemli olan emektir. Buna ek olarak klasikler, toprak miktarının sabit olduğunu, ancak kalitesinin değişkenlik gösterebileceğini, toprak miktarının sabit olmasının ise emek ve sermayenin tarım sektöründe azalan getiri eğilimine yol açacağını ileri sürmüştür. Klasiklere göre azalan bu verimlilik toprağın ekonomi üzerine koymuş olduğu sınırlamayı göstermektedir. Klasik iktisatçılar doğadaki bir takım maddelerin içinde barındırdığı kimyasallar ve ısı, ışık, rüzgâr gibi doğal kaynakların, bir başka deyişler enerjinin varlığı sayesinde doğal kaynak sağlanabileceği konusunda görüş belirtmiştir. (Alam, 2006:5-6).

Neo-Klasik Büyüme Teorisi

19. yy'ın sonlarında ortaya çıkan Neo-klasik büyüme yaklaşımında iktisatçılar ekonomik büyümeyi insan sermayesi, iş gücü ve dış teknoloji ile ilişkilendirirken, enerji ile ekonomik büyüme arasındaki ilişkiyi göz ardı ederek enerjiyi dolaylı olarak ele almıştır. Bunun başlıca nedeni toprak arzının kıt olması sebebiyle toprağı üretim faktörü olarak kabul etmemelerinden kaynaklanmaktadır. Bir başka deyişle neo-klasikler toprak ile ekonomi arasındaki ilişkiyi reddetmiştir. (Alam, 2006:6).

Bu yaklaşım, ekonomiyi malların sermaye ve iş gücü girdileri ile üretildiği ve sonrasında ürünlerin tüketici ve firmalar ile değiş-tokuş edildiği kapalı bir sistem olarak görmektedir. İş gücü ya da insan sermayesi girdilerini artırarak ekonomide büyümeyi sağlamak mümkündür. Buna ek olarak, teknolojik gelişimler ya da iş gücü ve sermaye girdilerinin kalitesi artırarak da büyümeye destek verilir. Neo-Klasik yaklaşımda, yenilenebilir ve yenilenemez olmak üzere iki ayrı gruba ayrılan doğal kaynakların ekonomik büyüme üzerindeki etkisi de ilerleyen dönemde dikkate alınmaya başlanmış ve bu kaynaklar ayrılmıştır (Ockwell, 2008).

Neo-klasik büyüme modeli üç ana akım modeli altında kategorize edilmiştir. Bunlardan ilki Solow (1956) büyüme modelidir. Büyüme, bir ülkenin durağan hale doğru hareket ettiği geçiş aşamasıdır. Çalışan başına düşük sermayeli az gelişmiş bir ülke, bir yandan sermaye birikimini oluştururken bir yandan da hızlı bir büyüme sergileyebilir. Buna karşılık, tasarruf oranları sabit kalır ise tüm ekonomiler zamanla sıfır büyümenin olduğu denge noktasına ulaşır. Hiçbir ülkenin sadece sermaye birikimi yaparak sonsuz bir büyüme elde etmesi mümkün değildir. Tasarruf oranları artar ise yeni bir denge noktasına ulaşılana kadarki süreçte büyüme meydana gelecek olsa da, yüksek tasarruf oranları düşük hayat standardına yol açacaktır. Neo-klasik büyüme teorisi kapsamında, devam eden ekonomik büyüme yalnızca teknolojik gelişim ile sağlanabilir (Stern ve Cleveland, 2004).

Diğer bir ifade ile neo-klasik yaklaşım büyümenin tek kaynağının teknolojik gelişme olduğunu ileri sürmektedir. Tüm ekonomiler belli bir denge noktasına gelene kadar büyür, bu nokta ise ilave yatırımın mümkün olmadığı durumdur. Denge noktasının ötesinde bir büyüme, bir başka deyişle devam eden bir ekonomik büyüme için teknolojik gelişim şarttır, sadece teknolojideki gelişimler ile birlikte mevcut sermaye getirileri artırmak mümkündür (Solow, 1956; Ockwell;2008).

İkinci büyüme modeli sürdürülebilir ekonomik büyümeyi sağlamada doğal sermaye tüketimine odaklıdır. Diğer bir ifade ile doğal kaynaklar büyümenin kaynağı olarak ele alınmaktadır. Bu modele göre, hidrojen, güneş ışığı gibi kaynakların miktarı fazla olsa da tüm doğal kaynakların miktarı sınırlıdır ve de bazı çevresel kaynakların yenilenmesi mümkün değildir. Bu durum da sürdürülebilir ekonomik büyüme ve kalkınma problemine yol açmaktadır. Sermaye ve doğal kaynaklar gibi birden fazla girdinin olduğu durumlar sürdürülebilir ekonomik büyümeye olumlu yönde etki ederken, tek bir girdiye olan bağımlılık bu durumun tam tersine yol açacaktır. Neo-klasik literatürde, ekonomik büyümenin ana odak noktası hangi şartlarda sürdürülebilir bir büyüme sağlanacağıdır. Büyümenin devamlı olup olmayacağını, başka bir ifade ile azalmayan tüketim durumunu teknik ve kurumsal koşullar belirlemektedir. Teknik koşullar yenilenebilir ve yenilenemez kaynakların karışımını, sermaye ve doğal kaynakların başlangıç donatımlarını ve de girdiler arasındaki ikame kolaylığını kapsarken, kurumsal koşullar pazar yapısını, mülkiyet hakları sistemini ve de gelecek nesillerin refahına yönelik sistemleri kapsamaktadır. Doğal kaynaklar tükendiğinde, üretim için ikameleri ya da eş değerdeki yapay sermaye ile yer değişecektir. Neo-klasikler sürdürülebilir ekonomik büyümeyi hangi kurumsal düzenlemelerin sağlayacağı ile ilgilenirken teknik düzenlemeleri ihmal etmektedir. Bunun nedeni ise sürdürülebilir büyümenin teknik olarak mümkün olduğunu varsaymalarıdır (Stern ve Cleveland, 2004).

Üçüncü ve son büyüme modelinde ise ekonomik büyümeyi sağlamada hem doğal kaynaklar hem de teknolojik değişimler ele alınmıştır. Bu modelde kaynaklar için sermaye ikamesine ek olarak teknolojinin de büyümeyi sağlayacağı ya da en azından kaynakların sınırlı olduğu durumlar için sabit tüketim sağlayacağı görüşü hâkimdir. Bu görüşte; toplam faktör verimliliğinin artması ekonominin sürdürülebilirliğini teknik olarak kolaylaştırırken ikame esnekliği birden az da olsa sürdürülebilirlik mümkün olmaktadır. Öte yandan, teknik geçerlilik olması sürdürülebilirlik olacağı anlamını taşımamaktadır. Teknolojik gelişmeler, her biri girdi için çıktı miktarının artacağı anlamına gelmektedir (Smulders, 2004; Stern ve Cleveland, 2004).

Yukarıda açıklanan bu üç geleneksel ekonomik büyüme modelinde, enerjinin ekonomik aktivitelere katkısı yalnızca üretim içerisindeki maliyetine ilişkin dikkate alınmaktadır. Ekonomik açıdan, bu modeller enerjiyi üretimde "esas girdi" yerine "ara mal" olarak ele almaktadır. Bu bağlamda, enerji kullanımından kaynaklanan ekonomik büyümeyi ayrıştırmak kabul edilebilir bir olasılıktır (Ockwell, 2008).

Ekolojik Büyüme Modeli

N. Georgescu-Roegen (1976) ekonomik teoride enerjiye yer verilmemesini ilk eleştiren yazarlardan birisidir. Yazar, fon-akışı modelinde üretimi madde, enerji ve bilgi akışının insan emeği ve üretilmiş sermaye ile dönüştürüldüğü dönüşüm süreci olarak ele almaktadır. Georgescu-Roegen'a göre çıktı artışının doğaya verdiği zarar dikkate alınmamakta, bu durum da enerji kaynaklarını yeniden üretilebilir olmamaları nedeni ile yok etmektedir.

Ekolojik iktisatçılar neo-klasik görüşü ekonomik aktiviteleri fiziksel gerçekliliği dikkate almadan konumlandırmakla eleştirmektedir. Ekonomiyi küresel ekosistemin açık bir alt-sistemi olarak görmenin daha gerçekçi bir bakış açısı olduğunu savunmaktadır. Bu yaklaşıma göre, Neo-Klasik sistemin, Ekolojik sistemin içinde yer alan bir alt sistem olduğu görülmektedir. Ekolojik görüşü savunan iktisatçıların neo-klasik iktisatçılara yönelttiği eleştiride neo-klasik modelin doğal kaynakları ve atıkları içermemesidir. Neo-klasik model enerji ve hammaddeyi dışarıdan alır, atık ısı ve indirgenmiş hammadde olarak dışarı atar. İndirgenmiş hammaddeler geri dönüştürülerek tekrar hammadde olarak sisteme dâhil edilebilir. Enerji için ise böyle bir durum söz konusu değildir. Başka bir ifade ile enerjinin tekrar kullanılması mümkün değildir. Ekolojik model, diğer adıyla biyofiziksel üretim modeli enerjiyi üretim faktörü olarak ele almaktadır.

Yeniden üretilebilirlik, üretim ekonomisinde anahtar kavramlardan biridir. Üretimdeki b azı girdiler yeniden üretilemezken, bazılarının belli bir maliyet karşılığında üretimi mümkündür. Sermaye, emek ve uzun dönemde doğal kaynaklar yeniden üretilebilen üretim faktörleri iken, enerji yeniden üretilemeyen bir üretim faktörüdür (Stern,1999). Bu bağlamda, enerjinin üretim ekonomisindeki rolü ve mevcudiyeti birçok bilim adamı ve ekolojik iktisatçı tarafından konu edilmiştir.

Birinci termodinamik kanunu (koruma kanunu) herhangi bir dönüşüm sürecinde enerji girdileri ile enerji çıktılarının birbirine eşit olması gerektiğini vurgulamaktadır (Ayres, 1998). Bu kanun kütle-denge ilkesini ele almaktadır. Belirli bir madde çıktısı sağlanabilmesi için daha fazla ya da eşit miktarlarda maddenin girdi, kalanın da atık madde olarak kullanılması gerekmektedir. Bu nedenle, maddi çıktı üreten herhangi bir üretim sürecinde asgari düzeyde girdi gereksinimi bulunmaktadır. İkinci termodinamik kanunu (verimlilik kanunu) ise maddenin dönüşümü için asgari düzeyde enerjiye ihtiyaç olduğunu belirtmektedir. Her bir üretim, maddenin dönüşümünü ya da hareketini içermektedir. Belirli elementler ve kimyasalların ikamesi mümkün olsa da, maddenin bazı türlerinin hareketinin sağlanması ya da dönüştürülebilmesi gerekmektedir ve bunun için de enerjiye gereksinim vardır. Tüm ekonomik süreçler enerjiye ihtiyaç duymakta, bu nedenle de enerji, üretim faktörünün vazgeçilmez bir parçası olmaktadır (Stern 1997; Stern ve Cleveland, 2004). Entropi kanunu olarak da adlandırılan ikinci termodinamik kanununa göre bir maddeyi başka bir maddeye dönüştürmek için ilave enerji gerekmektedir. Bu durum da enerjinin diğer üretim faktörleri ile olan ikame ilişkisini yok saymaktadır (Ockwell, 2008).

Bazı yazarlar, yeniden üretilemeyen üretim faktörleri arasında tıpkı enerji gibi bilginin de olduğuna inanmaktadır (eg. Spreng, 1993; Chen, 1994; Stern, 1994; Ruth, 1995). Bu yazarlara göre bilgi elde edilebilmesi için enerji gerekmektedir. Aklı olmayan canlılar bile enerjiyi kullanabilmek için bilgiye ihtiyaç duymaktadır. Sermaye ve emeğin ölçülmesi bilginin ölçülmesinden daha kolay olsa da enerji ile kıyaslandığında bilginin miktarı ölçülememektedir (Stern, 1999).

Biyofiziksel üretim modeline göre temel üretim faktörü enerjidir, sermaye ve emek ise gömülü enerjidir. Ürün ve hizmetlerin fiyatları onlarla ilişkili olan gömülü enerji kullanımının maliyetine göre belirlenmektedir (Hannon, 1973). Gömülü enerji girdilerinin miktarı artarsa, ürün ve hizmetlerin fiyatı artacaktır. Bu yaklaşıma göre, üretim fazlalığının dağılımı sermaye, emek ve arsa sahipleri gibi farklı sosyal sınıfların pazarlık gücüne dayanmaktadır (Kaufmann, 1987).

Enerji Piyasaları İle Finansal Ve Ekonomik Değişkenler Arasındaki Teorik Yaklaşımlar

Petrol fiyatlarında oluşan keskin yükselişler hem ekonomik faaliyetler hem de makroekonomik politikalar üzerinde önemli etkilere sahiptir. Dünya petrol piyasalarında gerçekleşen yükselişler, birçok gelişmiş ülke ekonomisinde yavaşlama oluşabileceği kaygısını yaratmaktadır. Bu bağlamda, petrol fiyatı şoklarının ekonomik değişkenleri hangi kanallar yolu ile etkilediği birçok araştırmaya konu olmuştur. Birçok ekonomist, petrol fiyatlarındaki değişim ile ekonomik faaliyetlerin derecesi arasındaki ters ilişkiyi açıklamak için çeşitli teorik açıklamalarda bulunmuştur. Bunlardan birincisi klasik arz-yanlı yaklaşımdır. Bu durum, yükselen petrol fiyatlarının üretim için girdi ulaşılabilirliğini azalttığını ifade etmektedir ve bu nedenle potansiyel üretimde düşüş meydana gelmektedir. Buna bağlı olarak, üretim maliyetlerinde artış elde edilirken, üretim ve verimliliğin büyümesinde yavaşlama gözlemlenir. Verimlilik büyümesindeki bu azalış ise reel ücretleri ve istihdamı olumsuz yönde etkilemektedir. Yüksek enerji maliyetleri, firmaların kârlılığını azalttığından yeni sermaye mallarının satın alımına olan istediği de azaltmaktadır; ancak enerji fiyatlarındaki artış kalıcı olacağına dair işaret veriyorsa, firmalar sermaye harcamalarındaki düşüşü azaltmak için enerji tasarruflu sermayeye daha çok yatırım yapmayı tercih edebilir. Bu nedenle uzun vadede, yüksek enerji maliyetleri firmaları yeni sermaye yatırımlarını azaltmaları yönünde teşvik edebilir veya mevcut sermaye hisselerinin ekonomik ve teknik olarak modasının geçmesine neden olabilir. Dolayısı ile sanayileşmiş ülke ekonomilerinin üretim kapasitelerinde azalma meydana gelebilir. Buna ek olarak, tüketiciler tarafından enerji fiyatlarında geçici bir yükseliş bekleniyorsa, tüketicilerin tercihi daha az biriktirerek veya daha çok borçlanma yolunu tercih ederek reel balansların düşmesine ve ilerleyen süreçte fiyat seviyelerinin yükselişine neden olabilir (Kumar, 2005, Cologni ve Manera, 2008).

Petrol fiyat şoklarının ekonomik faaliyetleri etkilediği diğer bir kanal ise, petrol ithal eden ülkelerde firma ve hane halkının satın alma gücündeki azalışın petrol ihraç eden ülkelerdeki artıştan daha fazla olmasıyla petrol ithal eden ülkelerden petrol ihraç eden ülkelere servet aktarımı gerçekleşmesidir. Yükselen petrol fiyatları, petrol ihraç eden ülkelerin petrol ithal eden ülkelerden aldığı vergi olarak düşünülebilir. Uzun vadede, her ne kadar yurtiçi talepteki azalışın bir kısmı gelir transferindeki yabancı alıcıların ihraç talebi ile dengelense de petrol ihraç eden ülkelerin tüketici talepleri üzerinde negatif bir etki söz konusu olacaktır. Diğer yandan, tüketiciler kısa vadede kendilerini harcama yapmak yerine tasarruf etmeye yönelteceği için enerji maliyetinin daha az yansıdığı harcamalarını alıştıkları seviyenin altına taşımaya isteksiz kalabilir (Kumar, 2005, Cologni ve Manera, 2008).

Bir diğer yaklaşım reel balans etkisi kavramı ile ilgilidir. Petrol fiyatlarındaki artış sadece ekonomik büyümeyi yavaşlatmamakta, aynı zamanda enflasyonun artmasına da neden olmaktadır. Bu durumun yaratacağı dolaylı etki ise fiyat-ücret döngüsündeki artıştır. Yüksek ham petrol fiyatlarını akabinde tüketicilerin kullandığı gazolin ve ısıtma yağı gibi petrol ürünlerindeki artış izlemektedir. Buna ek olarak, petrol diğer enerji ürünleri ile ikame etmeye çalışıldıkça ilgili alternatif enerji kaynaklarının fiyatları da artış gösterebilir. Enflasyon üzerindeki bu doğrudan etkinin yanı sıra, firma ve çalışanların davranışsal yanıtlarından kaynaklı dolaylı etki de söz konusu olabilir (ikinci tur etkileri). Üretim maliyetlerindeki artışın enerji maliyetlerinin daha az yansıdığı ürün ve hizmetlerin daha yüksek fiyatlanmasına neden olması durumu yüksek ücret talebi ile birlikte yaşam maliyetlerini artırabilir. Böyle bir durumda, reel para balanslarındaki azalışın hane halkı servetine ve bunun sonucu olarak tüketim ve çıktıya negatif yönde etki etmesi beklenebilir. Bunlara ilaveten, tüketiciler portföylerini likiditeye karşı yeniden dengeleme eğiliminde olduğu müddetçe "likidite tercihi" etkisi ortaya çıkacaktır. Para politikası düzenleyicilerinin büyüyen para talebini artan para arzı ile karşılayamaması durumunda, reel balanslarda düşme meydana gelirken faiz oranları yükselecektir (Cologni ve Manera, 2008).

Bir sonraki yaklaşımda petrol fiyatlarındaki artışın tüketim, yatırım ve hisse senedi fiyatları üzerinde yaratacağı negatif etki söz konusudur. Tüketim, firma maliyetlerindeki artış ile birlikte harcanabilir gelir ve yatırımlar ile olan pozitif ilişkisi nedeni ile etkilenir. Petrol fiyatlarındaki artışın uzun sürmesi durumu ise üretim yapısında değişikliğe yol açabilmekte ve işsizlik seviyesini etkileyebilmektedir. Buna ek olarak, petrol fiyatlarındaki artış enerji yoğun sektörlerin kârlılığını azaltabilir bu nedenle de firmaları daha az enerji girdisi kullanan yeni üretim yöntemleri inşa etmeye teşvik edebilir. Sermaye ve emek esneksizliği koşullarında, petrol fiyatlarındaki değişiklik ilgili ürün ve hizmet maliyetlerini etkileyecek, böylelikle talep değişecek ve bu durumdan en çok etkilenen sektörlerde işsizlik seviyesini artıracaktır. Buna ek olarak, petrol fiyat seviyelerinin yanı sıra, petrol fiyatlarındaki oynaklık servet ve yatırımları azaltıcı yönde belirsizliğe yol açacaktır (Kumar, 2005).

Likidite ile emtia fiyatları arasındaki teorik ilişki kapsamında ise likidite değişkeninin emtia fiyatlarını etkilediği çeşitli kanallar olduğu gözlemlenmektedir. (Frankel 1984; Ratti ve Vespiagi, 2014) para stokundaki artışların kısa vadede emtia fiyatlarını etkileyeceğini belirtmiştir. Buna neden olarak da kısa vadede diğer birçok ürün fiyatının esnek olmayışını ve aynı zamanda faiz oranlarının bu durumdan etkileneceğini göstermiştir. Frankel (1986) daha sonraki çalışmasında, diğer ürünlerde fiyat yapışkanlığı durumu söz konusu iken, para arzındaki düşüşü kısa vadede tarım ürünleri reel fiyatındaki azalış ile reel faiz oranlarındaki artışın takip edeceğini belirtmiştir. Teorik olarak, likidite göstergesi olan M2 düzeyindeki artış, emtia fiyatları dâhil olmak üzere birçok varlığın fiyatını yükselten toplam talepteki artış ile ilişkili olmaya meyillidir. Para politikaları daha yüksek büyüme beklentisi ve enflasyon kanalı ile emtia fiyatlarını etkilemektedir. Ek olarak düşük faiz oranları durumu yatırımcıları petrol gibi varlıklara yatırım yapmaya teşvik edecektir (Barsky ve Kilian 2004, Alquist ve Kilian, 2010; Ratti ve Vespiagi, 2014).

Finansal Gelişme Ve Ekonomik Büyüme Arasındaki Teorik Yaklaşımlar

Schumpeter finansal aracıların ekonomik büyüme üzerinde pozitif etkiye sahip olduğunu belirten ilk yazardır. Schumpeter (1911) finansal aracıların sağladığı tasarrufları hareketlendirme, projelerin değerlendirilmesi, risk yönetimi, yöneticilerin kontrolü ve işlemlerin gerçekleştirilmesi gibi hizmetlerin teknolojik gelişme ve ekonomik büyüme için en önemli faktörler olduğunu vurgulamıştır. Schumpeter'in finans sektörünün ekonomik büyüme üzerindeki önemini vurgulaması, birçok araştırmacıyı finans ve ekonomik büyüme ilişkisini incelemeye yöneltmiştir. Diğer taraftan Robinson (1952) finansal gelişmenin ekonomik büyümeyi takip ettiğini belirtmiştir. Gurley ve Shaw (1955) ekonomik gelişmenin genellikle zenginlik, emek gücü, çıktı ve gelir kapsamında tartışıldığını, ülkelerin ekonomik performansları arasındaki farkın ilgili ülkelerdeki finansal sistemin farklılığından kaynaklandığını, diğer bir ifade ile gelişmiş ülkeleri gelişmekte olan ülkelerden ayrıştıran farklardan birinin de gelişmiş ülkelerdeki finansal piyasaların daha güçlü olması olarak ortaya koymuştur. Öte yandan Lucas (1988), finans ve ekonomik gelişme arasındaki ilişkinin fazla abartıldığını belirtmiştir.

Greenwood ve Jovanovic (1990) finansal gelişme, ekonomik büyüme ve gelir dağılımı arasındaki ilişkiyi araştırmıştır. Yazarlara göre, gelir seviyesi arttıkça finansal yapı daha kapsamlı hale gelirken, ekonomik büyüme hız kazanacak ve zengin ile fakir arasındaki gelir eşitsizliği daralacaktır. Çalışmada düşük riskli ve düşük getirili teknoloji ile yüksek riskli ve yüksek getirili teknoloji olmak üzere iki farklı üretim teknolojisi modeli uygulanmıştır. Riskli teknoloji iki ayrı problemi ortaya çıkartmaktadır: toplam ve projeye özel şoklar. Finansal aracılar, çoklu projelerde eşzamanlı oluşan problemleri portföy yönetimi ile fark ederek toplam şoku tanımlayabilmekte, böylece projeye özel şokları diğerlerinden ayırt edebilmektedir. Bu nedenle, finansal aracılar kaynaklarını en yüksek getiriyi sağlayan projelere dağıtırken, finansal aracıların olmadığı durumlarda ise bireyler olası şokları fark edebilecekleri uygun teknolojiyi seçemez. Buna ek olarak, birikim sahipleri finansal aracılara daha fazla güven duyduğundan birikimlerinin büyük bir bölümünü finansal aracılar ile paylaşmaya meyilli olur (Kapusuzoğlu, 2013).

Romer (1986), Lucas (1988) ve Rebelo (1991) finansal fonksiyonların ekonomik büyümeyi etkileyebileceği iki farklı kanaldan bahsetmiştir. Bunlardan birincisi olan sermaye birikimi, sermaye dışsallığını veya yatırım mallarını kullanan büyüme modeli uygulamaktadır. Finansal sistemler tarafından gerçekleştirilen fonksiyonlar bu modellerdeki sermaye bilgisini tesir ederek durağan büyüme etki etmektedir. İkinci kanal ise, finansal sistemlerin tasarruf oranını değiştirerek veya tasarrufların sermaye yaratan farklı teknolojiler aracılığı ile yeniden dağıtılmasını sağlayarak sermaye birikimini etkileyen teknolojik gelişmelerdir. Diamond ve Dybvig (1983) ise likidite riskine karşılık finansal piyasalara olan ihtiyacı modelleyerek ekonomik büyümenin ilgili finansal piyasalardan nasıl etkilendiğini araştırmıştır. Çalışmada ortaya konulan likidite modeline göre tasarruf sahiplerinden bazıları likiditesi düşük, yüksek getirili projeler ile likiditesi yüksek, düşük getirili projeler arasında seçim yaptıktan sonra şok uğramaktadır. Şok uğrayan yatırımcılar düşük likiditesi olan proje sonuçlanmadan önce tasarruflarına ulaşmak istemektedir (Kapusuzoğlu, 2013).

Bilgi maliyeti modeline göre, bir başka yatırımcının şok uğrayıp uğramadığını tespit etmek oldukça maliyetlidir ve bu modelin varsayımları sigorta sözleşmelerini dikkate almayarak finans piyasalarının gelişimini teşvik etmektedir. Bu koşullar altında, bankalar tasarruf sahiplerine likit mevduatlar, buna ek olarak mevduatlardaki talebi karşılamak adına likit ve düşük getirili yatırımlar ile likit olmayan yüksek getirili yatırımlardan oluşan portföyler sunar. Bu kapsamda bankalar, tasarruf sahiplerine vadesiz mevduat hesabı ile uygun likit ve likit olmayan yatırımlar sunarak likidite riskine karşı güvence sağlarken aynı zamanda büyümeyi özendiren ve hızlandıran yüksek getirili projelerde uzun vadeli yatırım olanağı sunar (Jacklin 1987; Kapusuzoğlu, 2013).

Finansal gelişme ile ekonomik büyüme arasında çeşitli çalışmalar bulunsa da ilgili değişkenlerin aralarındaki ilişkiye veya nedenselliğin yönü kapsamında herhangi bir görüş birliği mevcut değildir. Bu bağlamda dört farklı hipotez ortaya konulmuştur. Arz-öncüllü birinci hipoteze göre finansal gelişme üretim girdisi rolünü üstlenerek ekonomik büyümeyi desteklemektedir. Bu görüşe önemli katkıları bulunan Schumpeter (1934) finansal aracıların sağladığı hizmetlerin teknik yenilikleri ve ekonomik büyümeyi teşvik ettiğini belirtmiştir. McKinnon (1973) ve Shaw (1973) ise faiz oranı tavanı, yüksek rezerv gereksinimleri ve kontrollü kredi programları gibi finansal kısıtlamalardan bağımsız bir banka sisteminin önemini ilk vurgulayanlar olmuştur. Bu tür politikaların her ne kadar tüm ülkelerde yaygın olsalar da özellikle gelişmekte olan ülkelerde ön plana çıktığı vurgulanmıştır. Yazarların argümanına göre finansal baskı hem tasarrufları hem de yatırımları olumsuz yönde etkilemektedir. Diğer yandan, finansal sistemin liberalleşmesi, ekonomik büyümeyi destekleyen finansal derinleşmeyi ve finans sektöründe rekabetin artmasını sağlayacaktır. İkinci olan talep-takipli hipotez kapsamında Robinson (1952) finansal gelişmenin ekonomik büyümeyi takip etmesinin bir göstergesi olarak, bir ekonominin geliştikçe finansal hizmetlere olan talebin artacağını ve bunun sonucunda piyasada daha fazla finansal kurucu, finansal araç ve hizmet oluşacağını belirtmiştir. Benzer bir görüş Kuznets (1955) tarafından ortaya konularak ekonomideki reel tarafın genişlemesi ve büyümenin ara seviyeye ulaşması ile finansal hizmetlere olan talebin artmaya başlayacağı, dolayısı ile finansal gelişmenin ekonomik gelişme seviyesine bağlı olacağı vurgulanmıştır. Üçüncü hipotez, finansal gelişme ile ekonomik büyüme arasında karşılıklı veya çift yönlü nedensellik ilişkisini ortaya koymaktadır. Bu görüşü ilk öne çıkaran Patrick (1966) finans sektörünün ekonomik büyümenin bir çıktısı olduğunu, bu durumun da büyüme faktörü olarak geri döneceğini belirtmiştir. Son olarak dördüncü hipotez ise, finansal gelişme ile ekonomik büyüme arasında nedensellik ilişkisi bulunmadığını; diğer bir ifade ile finansal gelişmenin ekonomik büyümeye, ekonomik büyümenin de finansal gelişmeye neden olmadığı savunmaktadır. Bu görüşü ilk olarak ortaya koyan Lucas (1988) ve onu destekleyen Stern (1989) ekonomistlerin finansal etkenlerin ekonomik büyüme içerisindeki rolü üzerinde gereğinden fazla durulduğunu vurgulamıştır.(Samargandi vd. 2014).

Çalışmada çeşitli veriler ve bu verileri elde etmek için çeşitli kaynaklardan faydalanılmıştır. Doğalgaz ve petrol tüketimi ile ilgili yıllık bazdaki verilere Energy Information Administration (EIA) aracılığı ile ulaşılırken, aylık bazda uluslararası petrol ve doğal gaz fiyatları International Monetary Fund (IMF) veri ekranından elde edilmiştir. Dünya petrol fiyatları için benchmark olarak nitelendirilen Brent pertol, WTI ve Dubai petrol fiyatları ele alınırken, doğalgaz fiyatlarında HH, Japonya ve Rusya fiyat endeksleri esas alınmıştır. Çalışma kapsamındaki ülkelerin finansal ve makroekonomik verilerine ulaşma sürecinde ise; ekonomik büyüme göstergesi olan GSYH değeri (yıllık bazda) ve sanayi üretim değerleri (aylık bazda) Dünya Bankası veri havuzundan (www.worldbank.org), hisse senedi fiyat endeksleri (aylık baza çevrilmek üzere günlük bazda) ve likidite seviye göstergeleri (aylık bazda M2 değerleri) Trading Economics veri tabanından (www.tradingeconomics.com) elde edilmiştir. Analiz sürecinin gerçekleştirilmesi aşamasında, Eviews 7.0 ekonometrik yazılımı ile SPSS 22.0 istatistiksel yazılımından faydalanılacaktır.

Analizin ilk aşamasında her bir ülkeye ait ilgili değişkenlerin analize uygunluğunun değerlendirilmesi amacıyla ADF, PP ve KPSS birim kök testleri uygulanmıştır. Bu değişkenler; enerji tüketimi-ekonomik büyüme, doğal gaz tüketimi-ekonomik büyüme, petrol tüketimi-ekonomik büyüme, enerji fiyatları-M2, enerji fiyatları-borsa endeksi, enerji fiyatları-sanayi üretimi ve borsa endeksi-sanayi üretiminden oluşmaktadır. İlgili değişkenlere ait serilerin seviyede durağan olmadıkları ancak birinci farkları alındığında durağan hale geldikleri diğer bir ifadeyle serilerin birim kök içermedikleri görülmüştür. Birim kök testlerinden elde edilen sonuçlar doğrultusunda gecikme uzunluklarını hesaplamak için Akaike bilgi kriteri (Akaike Information Criterion) kullanılmıştır. Elde edilen optimum gecikme uzunluklarının otokorelasyon problemine yol açıp açmadığı test edilmiştir. Değişkenlere ait serilerin aynı seviyede durağan olmaları sonucu, aralarındaki uzun dönemli ilişkiyi incelemek amacıyla Johansen eşbütünleşme testi gerçekleştirilmiştir. Değişkenler arasında uzun dönemli ilişki (eşbütünleşme vektörü) bulunması durumunda Vector Error Correction Model (VECM), bulunmaması durumunda ise Vector Autoregression Model (VAR) uygulanarak kısa dönemli nedensellik ilişkisi araştırılması amacıyla Granger nedensellik testi uygulanmıştır. VECM modelinin gerçekleştirildiği durumlarda ilgili ülkelerin incelenen değişkenler arasında uzun dönemli bir nedensellik ilişkisinin var olup olmadığına da bakılmıştır.

Elde edilen OECD grubu bulgularına göre; enerji tüketimi ve ekonomik büyüme arasında uzun dönemli ilişki bulunan ülkeler Danimarka, Estonya, İtalya, Lüksemburg, Slovakya ve Slovenya'dır. Doğal gaz tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki bulunan ülkeler Avusturya, Çek Cumhuriyeti, İtalya, Meksika, Polonya, Slovakya, İsviçre ve Türkiye'dir. Petrol tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki bulunan ülkeler Fransa, Yunanistan, Macaristan, İtalya, Japonya, Kore, Polonya ve Portekiz'dir. İtalya ülkesi sonuçlarına göre her üç ilişki kapsamında uzun dönemli ilişki olduğu gözlemlenmiştir. Elde edilen GCC ve OPEC kapsamındaki ortak ülke grubu bulgularına göre; Iran, Katar, Suudi Arabistan ve BAE ülkelerinde enerji tüketimi ve ekonomik büyüme arasında uzun dönemli ilişki mevcuttur. Bunlardan Iran ülkesinde petrol tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki tespit edilirken, doğal gaz tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki bulunmadığı gözlemlenmiştir. Bu durum Iran ülkesinin doğal gazdan ziyade petrol kaynaklı bir gelişim içerisinde olduğunu desteklemektedir. Suudi Arabistan ülkesinde ise doğal gaz tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki tespit edilirken, petrol tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki tespit edilememiştir. Bulgulara göre Suudi Arabistan petrolden ziyade doğal gaz kaynaklı bir gelişim içerisinde olmaya meyillidir. Katar ülkesi ise her üç ilişki kapsamında uzun dönemli ilişkiye sahiptir. GCC ülkelerinden Bahreyn ve Umman, OPEC ülkelerinden Angola ve Ekvator ülkelerinde enerji tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki mevcut değildir. Elde edilen OPEC grubu bulgularına göre Nijerya ülkesinde enerji tüketimi ile ekonomik büyüme arasında uzun dönemli ilişkiye rastlanılmıştır. Ekvator ülkesinde petrol tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki bulunurken doğal gaz tüketimi ve ekonomik büyüme arasında uzun dönemli ilişki mevcut değildir. Venezuela ülkesinde ise doğal gaz tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki bulunurken, petrol tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki bulunmamaktadır.

Petrol fiyatları (Brent, WTI, Dubai) ve M2 arasında uzun dönemli ilişki tespit edilen OECD ülkeleri; Avusturya, Kanada, Şili, Çek Cumhuriyeti, Danimarka, Estonya, Finlandiya, Fransa, Almanya, Macaristan, İzlanda, İrlanda, Meksika, Hollanda, Polonya, Portekiz, Slovenya, İspanya, İsveç ve İngiltere; GCC ve OPEC kapsamındaki ortak ülkeler

Irak, Kuveyt ve BAE; GCC ülkeleri Bahreyn ve Umman; OPEC ülkesi ise Nijerya'dır. Doğal gaz fiyatları (HH, LNG ve Rusya) ve M2 arasında uzun dönemli ilişki tespit edilen OECD ülkeleri; Kanada, Şili, Çek Cumhuriyeti, Danimarka, Estonya, Fransa, Almanya, Macaristan, Hollanda, Polonya, Slovenya ve İngiltere; GCC ve OPEC kapsamındaki ortak ülkeler Irak ve Suudi Arabistan; GCC ülkesi Umman; OPEC ülkesi ise Nijerya'dır.

Diğer bir ifade ile hem petrol fiyatları (Brent, WTI, Dubai) hem de doğal gaz fiyatları (HH, LNG ve Rusya) ile M2 değişkeni arasında uzun dönemli ilişki tespit edilen OECD ülkeleri Kanada, Şili, Çek Cumhuriyeti, Danimarka, Estonya, Fransa, Almanya, Macaristan, Hollanda, Polonya, Slovenya, İngiltere; GCC ve OPEC kapsamındaki ortak ülke Irak; GCC ülkesi Umman; OPEC ülkesi ise Nijerya'dır.

Petrol fiyatları (Brent, WTI, Dubai) ve borsa endeksi arasındaki ilişki incelendiğinde OECD kapsamındaki 34 ülkeden 25'inde uzun dönemli ilişki olmadığı tespit edilmiştir. Bu ülkeler; Avusturalya, Avusturya, Belçika, Çek Cumhuriyeti, Danimarka, Estonya, Finlandiya, Fransa, Almanya, Yunanistan, İzlanda, İrlanda, İsrail, İtalya, Japonya, Lüksemburg, Hollanda, Yeni Zelanda, Norveç, Portekiz, Slovakya, İspanya, İsviçre, İngiltere ve Amerika'dır. Uzun dönemli ilişki tespit edilemeyen GCC ve OPEC kapsamındaki ortak ülkeler Suudi Arabistan ve BAE iken; GCC kapsamında Umman; OPEC kapsamında Nijerya ve Venezuela'dır. Doğal gaz fiyatları (HH, LNG ve Rusya) ve borsa endeksi arasındaki ilişki incelendiğinde ise 34 OECD ülkesinden 9'unda uzun dönemli ilişkinin varlığına rastlanılmamıştır. Bunlar; Avusturya, Belçika, Çek Cumhuriyeti, Danimarka, Almanya, Slovenya, İsviçre, İngiltere ve Amerika'dır. Uzun dönemli ilişki tespit edilemeyen GCC ve OPEC kapsamındaki ortak ülkeler Suudi Arabistan ve BAE iken; GCC kapsamında Umman; OPEC kapsamında Venezuela'dır.

Diğer bir ifade ile hem petrol fiyatları (Brent, WTI, Dubai) hem de doğal gaz fiyatları (HH, LNG ve Rusya) ile borsa endeksi arasında uzun dönemli ilişki bulunmayan OECD ülkeleri Avusturya, Belçika, Çek Cumhuriyeti, Danimarka, Almanya, İsviçre, İngiltere ve Amerika; GCC ve OPEC kapsamındaki ortak ülkeler Suudi Arabistan ve BAE; GCC kapsamında Umman ve OPEC kapsamında Venezuela'dır.

Petrol fiyatları (Brent, WTI, Dubai) ve sanayi üretimi arasındaki ilişki incelendiğinde OECD kapsamındaki 34 ülkeden 18'inde uzun dönemli ilişki olmadığı tespit edilmiştir. Bu ülkeler; Avusturalya, Danimarka, Estonya, Finlandiya, Fransa, Almanya, Yunanistan, Lüksemburg, Meksika, Yeni Zelanda, Norveç, Portekiz, Slovenya, İspanya, İsveç, İsviçre, İngiltere Ve Amerika'dır. Uzun dönemli ilişki tespit edilemeyen GCC ve OPEC kapsamındaki ortak ülkeler Katar ve Suudi Arabistan iken; GCC kapsamında Umman; OPEC kapsamında Ekvator'dur. Doğal gaz fiyatları (HH, LNG ve Rusya) ve sanayi üretimi arasındaki ilişki incelendiğinde ise 34 OECD ülkesinden 9'unda uzun dönemli ilişkinin varlığına rastlanılmamıştır. Bunlar; Avusturya, Belçika, Çek Cumhuriyeti, Danimarka, Almanya, Slovenya, İsviçre, İngiltere Ve Amerika'dır. Uzun dönemli ilişki tespit edilemeyen GCC ve OPEC kapsamındaki ortak ülkeler Suudi Arabistan ve BAE iken; GCC kapsamında Umman'dır.

Diğer bir ifade ile hem petrol fiyatları (Brent, WTI, Dubai) hem de doğal gaz fiyatları (HH, LNG ve Rusya) ile sanayi üretimi arasında uzun dönemli ilişki bulunmayan OECD ülkeleri Avusturya, Belçika, Çek Cumhuriyeti, Danimarka, Almanya, İsviçre, İngiltere Ve Amerika; GCC ve OPEC kapsamındaki ortak ülkeler Suudi Arabistan ve BAE; GCC kapsamında Umman ve OPEC kapsamında Venezuela; GCC ve OPEC kapsamındaki ortak ülke Suudi Arabistan; GCC kapsamında Umman'dır.

Analiz sürecinin bir sonraki aşamasında VAR ve VEC modelleri üzerinden Granger nedensellik testleri uygulanmıştır.

OECD ülke grubunda toplam enerji tüketimi ile ekonomik büyüme arasında nedensellik ilişkisi bulunmayan ülkeler; Avusturalya, Şile, Estonya, Fransa, Macaristan, İtalya, Lüksemburg, Yeni Zelanda, İsveç, İsviçre ve Türkiye; doğal gaz tüketimi ile ekonomik büyüme arasında nedensellik ilişkisi bulunmayan ülkeler; Avusturya, Çek, Finlandiya, Macaristan, Japonya, Yeni Zelanda, Slovakya, İsviçre ve Türkiye; petrol tüketimi ile ekonomik büyüme arasında nedensellik ilişkisi bulunmayan ülkeler; Avusturya, Belçika, Kanada, Çek, İsrail, Japonya, Kore, İspanya, İsveç ve Türkiye'dir. Granger nedensellik testinin bulgularına göre, OECD ülkelerinin genelinde ekonomik büyüme ile toplam enerji tüketimi, doğal gaz tüketimi ve petrol tüketimi arasında nedensellik ilişkisine rastlanılmamıştır.

OECD ülkelerinin petrol fiyatları ile likidite seviyeleri arasındaki nedensellik ilişkisi incelendiğinde; ülke grubunun genelinde Brent petrol fiyatından M2 değişkenine (Avusturya, Kanada, Çek, Danimarka, Finlandiya, Macaristan, İzlanda, İsrail, Kore, Lüksemburg, Meksika, Polonya, Slovakya, İsviçre ve Türkiye) ve Dubai petrol fiyatından

M2 değişkenine (Avusturya, Kanada, Çek, Danimarka, Finlandiya, İzlanda, İsrail, Kore, Lüksemburg, Meksika, Polonya, Slovakya, İsviçre ve Türkiye) doğru tek yönlü nedensellik ilişkisi tespit edilmiştir. Buna ek olarak, birçok OECD ülkesinde WTI petrol fiyatından M2 değişkenine (Avusturya, Kanada, Çek, Finlandiya, İzlanda, İsrail, Meksika, Polonya, Slovakya, İspanya ve ABD) doğru tek yönlü nedensellik ilişkisi mevcuttur. Diğer taraftan; birçok OECD ülkesi için Brent petrol fiyatı ile M2 değişkeni arasında (Şili, Almanya, Yunanistan, İrlanda, İtalya, Japonya, Hollanda, Portekiz, Slovenya, İspanya ve Türkiye), Dubai petrol fiyat ile M2 değişkeni arasında (Şili, Estonya, Almanya, Yunanistan, Macaristan, İrlanda, Japonya, Hollanda, Slovenya ve İspanya) nedensellik ilişkisine rastlanmazken, OECD ülkelerinin genelinde WTI petrol fiyatı ile M2 değişkeni arasında nedensellik ilişkisi tespit edilememiştir (Belçika, Şili, Danimarka, Almanya, Yunanistan, Macaristan, İrlanda, İtalya, Japonya, Kore, Lüksemburg, Hollanda, Norveç, Portekiz, Slovenya ve Türkiye).

OECD ülkelerinin doğal gaz fiyatları ile likidite seviyeleri arasındaki nedensellik ilişkisi incelendiğinde; ülke grubunun genelinde HH fiyatı ile M2 arasında (Avusturya, Belçika, Kanada, Şili, Estonya, Finlandiya, Fransa, Almanya, İzlanda, İsrail, İtalya, Japonya, Kore, Meksika, Norveç, Portekiz, Slovakya, Slovenya, İsveç, İsviçre ve Türkiye), LNG fiyatı ile M2 arasında (Şili, Estonya, Fransa, Almanya, Yunanistan, Macaristan, İrlanda, İsrail, İtalya, Hollanda, Norveç, Polonya, Portekiz ve Slovenya) ve Rusya fiyatı ile M2 arasında (Avusturya, Belçika, Kanada, Çek, Danimarka, Estonya, Finlandiya, Yunanistan, Macaristan, İzlanda, İrlanda, İtalya, Lüksemburg, Hollanda, Yeni Zelanda, Polonya, Portekiz, Slovenya, İspanya, İsveç ve Türkiye) nedensellik ilişkisine rastlanılmamıştır.

Granger nedensellik testinin bulgularına göre, OECD ülkelerinin genelinde petrol fiyatlarından (Brent, WTI ve Dubai) likiditeye doğru tek yönlü nedensellik ilişki tespit edilirken doğal gaz fiyatları (HH, LNG ve Rusya) ile likidite değişkeni arasında nedensellik ilişkisine rastlanılmamıştır.

OECD ülkelerinin petrol fiyatları ile hisse senedi endeksi arasındaki nedensellik ilişkisi incelendiğinde; ülke grubunun genelinde hisse senedi endeksinden sırası ile Brent petrol fiyatına (Avustralya, Avusturya, Belçika, Kanada, Çek, Estonya, Fransa, Almanya, Yunanistan, İrlanda, İsrail, İtalya, Japonya, Lüksemburg, Hollanda, Polonya, Portekiz, İspanya, İsviçre, İngiltere ve ABD); WTI petrol fiyatına (Avustralya, Avusturya, Belçika, Kanada, Çek, Danimarka, Estonya, Fransa, Yunanistan, İtalya, Lüksemburg, Hollanda, Portekiz, İspanya, İsviçre, İngiltere ve ABD) ve Dubai petrol fiyatına (Avustralya, Avusturya, Belçika, Kanada, Estonya, Fransa, Almanya, Yunanistan, Macaristan, İtalya, Japonya, Lüksemburg, Hollanda, Polonya, Portekiz, İspanya, İsviçre, İngiltere ve ABD) doğru tek yönlü nedensellik ilişkisi tespit edilmiştir.

OECD ülkelerinin doğal gaz fiyatları ile hisse senedi endeksi arasındaki nedensellik ilişkisi incelendiğinde; ülke grubunun genelinde HH fiyatı ile hisse senedi endeksi arasında (Avustralya, Avusturya, Kanada, Şili, Çek, Danimarka, Estonya, Finlandiya, Fransa, Almanya, Yunanistan, Macaristan, İrlanda, İsrail, İtalya, Japonya, Kore, Lüksemburg, Meksika, Hollanda, Yeni Zelanda, Norveç, Polonya, Portekiz, İspanya, İsviçre, Türkiye, İngiltere ve ABD) nedensellik ilişkisine rastlanılmamıştır. Diğer yandan, OECD ülkelerinin genelinde hisse senedi endeksinden sırası ile LNG fiyatına (Avustralya, Avusturya, Kanada, Çek, Estonya, Fransa, Almanya, Yunanistan, İsrail, İtalya, Japonya Lüksemburg, Meksika, Hollanda, Yeni Zelanda, Norveç, Polonya, Portekiz, İspanya, İsviçre, İngiltere ve ABD) ve Rusya fiyatına (Avusturya, Belçika, Kanada, Finlandiya, İzlanda, İrlanda, İsrail, İtalya, Lüksemburg, Hollanda, Yeni Zelanda, Norveç, İsviçre, İngiltere ve ABD) doğru tek yönlü nedensellik ilişkisi tespit edilmiştir.

Granger nedensellik testinin bulgularına göre, OECD ülkelerinin genelinde hisse senedi endeksinden petrol ve doğal gaz fiyatlarına doğru tek yönlü nedensellik ilişki mevcuttur.

OECD ülkelerinin petrol fiyatları ile sanayi üretimi arasındaki nedensellik ilişkisi incelendiğinde; ülke grubunun genelinde Brent petrol fiyatından sanayi üretimine (Kanada, Danimarka, Estonya, Finlandiya, Fransa, Almanya, Yunanistan, Macaristan, İzlanda, İtalya, Japonya, Kore, Lüksemburg, Meksika, Portekiz, Slovenya, İspanya, İsveç, İsviçre, Türkiye ve İngiltere); WTI petrol fiyatından sanayi üretimine (Kanada, Danimarka, Estonya, Finlandiya, Fransa, Almanya, Yunanistan, İzlanda, İtalya, Japonya, Kore, Lüksemburg, Meksika, Portekiz, Slovenya, İspanya, İsveç, İsviçre, Türkiye ve İngiltere) ve Dubai petrol fiyatından sanayi üretimine (Avusturya, Kanada, Danimarka, Estonya, Finlandiya, Fransa, Almanya, Yunanistan, Macaristan, Japonya, Kore, Lüksemburg, Meksika, Yeni Zelanda, Polonya, Portekiz, Slovenya, İspanya, İsveç, İsviçre, Türkiye ve İngiltere) doğru tek yönlü nedensellik ilişkisi tespit edilmiştir.

OECD ülkelerinin doğal gaz fiyatları ile sanayi üretimi arasındaki nedensellik ilişkisi incelendiğinde; ülke grubunun genelinde HH fiyatı ile hisse senedi endeksi arasında (Şili, Çek, Danimarka, Finlandiya, Yunanistan, Macaristan, İzlanda, İsrail, Japonya, Kore, Lüksemburg, Meksika, Hollanda, Norveç, Polonya, Slovakya, İsveç, İsviçre, Türkiye, İngiltere ve ABD) nedensellik ilişkisine rastlanılmamıştır. Diğer yandan, OECD ülkelerinin genelinde LNG fiyatından sanayi üretimine (Avustralya, Belçika, Fransa, Macaristan, İzlanda, İsrail, Japonya, Meksika, Portekiz, Slovenya ve İsveç) doğru tek yönlü nedensellik ilişkisine rastlanırken, OECD ülkelerinin genelinde sanayi üretiminden Rusya fiyatına (Kanada, Çek, Estonya, Almanya, Macaristan, Japonya, Kore, Lüksemburg, Yeni Zelanda, Polonya, Slovakya, Slovenya, İsveç ve İngiltere) doğru tek yönlü nedensellik ilişkisine rastlanılmıştır.

Granger nedensellik testinin bulgularına göre, OECD ülkelerinin genelinde petrol fiyatlarından sanayi üretimine doğru tek yönlü nedensellik ilişkisine rastlanırken doğal gaz fiyatları ile sanayi üretimi arasında nedensellik ilişkisi tespit edilememiştir.

Son olarak OECD ülkelerinin hisse senedi endeksi ile sanayi üretimi arasındaki nedensellik ilişkisi incelendiğinde, ülke grubunun genelinde hisse senedi endeksinden sanayi üretimine (Avusturya, Belçika, Kanada, Şili, Çek, Danimarka, Estonya, Finlandiya, Fransa, Almanya, İrlanda, İtalya, Kore, Lüksemburg, Meksika, Portekiz, İspanya ve İsviçre) doğru tek yönlü nedensellik ilişkisinin varlığına rastlanılmıştır.

OECD ülkelerinin genelinde ekonomik büyüme ile sırasıyla toplam enerji tüketimi, doğal gaz tüketimi ve petrol tüketimi arasında; doğal gaz fiyatları ile sırasıyla likidite değişkeni ve sanayi üretimi arasında nedensellik ilişkisine rastlanılmazken, petrol fiyatlarından sırası ile likidite değişkenine ve sanayi üretimine doğru tek yönlü ve hisse senedi endeksinden sırası ile petrol fiyatlarına, doğal gaz fiyatlarına ve sanayi üretimine doğru tek yönlü nedensellik ilişkisi tespit edilmiştir.

GCC ülkelerinin nedensellik testi sonucuna göre, ülke grubunun genelinde toplam enerji tüketimi ile ekonomik büyüme arasında (Katar ve BAE) nedensellik ilişkisine rastlanılmamıştır. Diğer yandan, GCC ülkelerinin petrol ve doğal gaz tüketimleri ile ekonomik büyümeleri arasındaki nedensellik ilişkisi ile ilgili genel bir çıkarımda bulunmak mümkün değildir. Genel olarak GCC ülkelerinde ekonomik büyüme ile toplam enerji tüketimi, doğal gaz tüketimi ve petrol tüketimi arasında nedensellik ilişkisine rastlanılmamıştır.

GCC ülkelerinin üç petrol fiyatı ile likidite değişkeni arasındaki nedensellik ilişkisi incelendiğinde; ülke grubunun geneli hakkında çıkarımda bulunmanın mümkün olmadığı görülmüştür. Diğer yandan GCC ülkelerinin doğal gaz fiyatları ile likidite değişkeni arasındaki nedensellik ilişkisi incelendiğinde, ülke grubunun genelinde doğal gaz fiyatları ile (HH, LNG ve Rusya) M2 değişkeni arasında nedensellik ilişkisi tespit edilememiştir.

GCC ülkelerinde petrol fiyatları (Brent, WTI ve Dubai) ile hisse senedi endeksi arasındaki nedensellik ilişkisinin sonuçları ülkeler ve ilgili petrol fiyatları arasında değişiklik göstermektedir. Sonuçlara göre, GCC ülkelerinin genelinde petrol fiyatlarından hisse senedi endeksine doğru tek yönlü nedensellik ilişkisi mevcuttur. Diğer yandan GCC ülkelerinin ilgili doğal gaz fiyatları (HH, LNG ve Rusya) ile hisse senedi endeksi arasındaki nedensellik ilişkisi incelendiğinde, ülke grubunun genelinde doğal gaz fiyatları ile hisse senedi endeksi arasında nedensellik ilişkisi tespit edilememiştir.

GCC ülkelerinde petrol fiyatları (Brent, WTI ve Dubai) ile sanayi üretimi arasındaki nedensellik ilişkisinin sonuçlarına göre ülke grubunun genelinde ilgili petrol fiyatlarından sanayi üretimine doğru tek yönlü nedensellik ilişkisi mevcuttur. Diğer yandan, GCC ülkelerinin ilgili doğal gaz fiyatları (HH, LNG ve Rusya) ile sanayi üretimi arasındaki nedensellik ilişkisi incelendiğinde, ülke grubunun genelinde ilgili doğal gaz fiyatları ile sanayi üretimi arasında nedensellik ilişkisine rastlanılmamıştır.

Son olarak GCC ülkelerinin hisse senedi endeksi ile sanayi üretimi arasındaki nedensellik ilişkisi incelendiğinde, ülke grubunun genelinde hisse senedi endeksi ile sanayi üretimi arasında nedensellik ilişkisi tespit edilememiştir.

GCC ülkelerinin genelinde ekonomik büyüme ile toplam enerji tüketimi, arasında; doğal gaz fiyatları ile sırasıyla likidite değişkeni, hisse senedi endeksi ve sanayi üretimi ve hisse senedi endeksi ile sanayi üretimi arasında nedensellik ilişkisine rastlanılmazken, petrol fiyatlarından sırası ile hisse senedi endeksi ve sanayi üretimine doğru tek yönlü nedensellik ilişkisi tespit edilmiştir.

OPEC ülke grubunda toplam enerji tüketimi ile ekonomik büyüme arasında nedensellik ilişkisi bulunmayan ülkeler İran, Nijerya, Katar ve Birleşik Arap Emirlikleri; ekonomik büyümeden enerji tüketimine doğru tek yönlü nedensellik ilişkisi tespit edilen ülkeler ise Angola, Ekvator, Irak ve Suudi Arabistan'dır. Doğal gaz tüketimi ile ekonomik büyüme arasında nedensellik ilişkisi bulunmayan OPEC ülkeleri; Cezayir, Ekvator, Katar ve

Venezuela, petrol tüketimi ile ekonomik büyüme arasında nedensellik ilişkisi bulunmayan OPEC ülkeleri Cezayir, Ekvator ve Katar iken ekonomik büyümeden petrol tüketimine doğru tek yönlü nedensellik ilişkisine rastlanan OPEC ülkeleri Iran, Suudi Arabistan ve Venezuela'dır.

OPEC ülkelerinin enerji fiyatları (Brent, WTI, Dubai, HH, LNG ve Rusya) ile likidite seviyeleri arasındaki nedensellik ilişkisi incelendiğinde; ülke grubunun genelinde petrol ve doğal gaz fiyatları ile M2 değişkeni arasında nedensellik ilişkisinin olmadığı tespit edilmiştir.

OPEC ülkelerinin enerji fiyatları (Brent, WTI, Dubai, HH, LNG ve Rusya) ile hisse senedi endeksi arasındaki nedensellik ilişkisi incelendiğinde; ülke grubunun genelinde petrol ve doğal gaz fiyatları ile hisse senedi endeksi değişkeni arasında nedensellik ilişkisinin olmadığı tespit edilmiştir.

OPEC ülkelerinin enerji fiyatları (Brent, WTI, Dubai, HH, LNG ve Rusya) ile sanayi üretimi arasındaki nedensellik ilişkisi incelendiğinde; ülke grubunun genelinde petrol fiyatlarından sanayi üretimine doğru tek yönlü nedensellik ilişkisine rastlanırken doğal gaz fiyatları ile sanayi üretimi arasında nedensellik ilişkisi tespit edilememiştir.

Son olarak OPEC ülkelerinin hisse senedi endeksi ile sanayi üretimi arasındaki nedensellik ilişkisi incelendiğinde, ülke grubunun genelinde hisse senedi endeksi ile sanayi üretimi arasında nedensellik ilişkisinin varlığına rastlanılmamıştır.

OPEC ülkelerinin genelinde ekonomik büyüme ile sırasıyla toplam enerji tüketimi, doğal gaz tüketimi ve petrol tüketimi arasında; likidite değişkeni ile sırasıyla petrol ve doğal gaz fiyatları arasında, hisse senedi endeksi ile sırasıyla petrol ve doğal gaz fiyatları arasında, sanayi üretimi ile doğal gaz fiyatları arasında ve hisse senedi endeksi ile sanayi üretimi arasında nedensellik ilişkisine rastlanılmazken, petrol fiyatlarından sanayi üretimine doğru tek yönlü nedensellik ilişkisi tespit edilmiştir.

Sonuç olarak, bu çalışmada enerji, finansal ve makroekonomik değişkenler arasında kısa ve uzun dönemli olarak çeşitli ilişkilerin varlığı araştırılmıştır. Bu doğrultuda, Ekonomik Kalkınma ve İşbirliği Örgütü (OECD), Körfez Arap Ülkeleri İşbirliği Konseyi (GCC) ve Petrol İhraç Eden Ülkeler Teşkilatı (OPEC) grubunda yer alan ülkelerin toplam enerji, doğalgaz ve petrol tüketimi ile ilgili ülkelerin ekonomik büyümeleri arasındaki ilişkinin var olup olmadığı araştırılmıştır. Çalışmada incelenen diğer bir boyut ise, dünya petrol

(Brent, WTI ve Dubai) ve doğalgaz (Henry Hub, Japonya ve Rusya) fiyatlarındaki değişimin OECD, GCC ve OPEC grubunda yer alan ülkelerin likidite seviyeleri, hisse senedi piyasaları ve sanayi üretimleri üzerinde etkili olup olmadığıdır. Araştırma sürecinde son olarak, çalışma kapsamında yer alan ülkelerinin finansal gelişmeleri ile ekonomik büyümeleri arasında kısa ya da uzun dönemli ilişkinin varlığı incelenmiştir.

İlk incelenen ilişki ekonomik büyüme ile sırasıyla toplam enerji tüketimi, doğal gaz tüketimi ve petrol tüketimi arasındaki ilişkidir. OECD ülkelerinin genelinde toplam enerji tüketimi ile ekonomik büyüme ve petrol tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki bulunamazken, doğal gaz tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki bulunmuştur. Diğer yandan, GCC ülkelerinin genelinde toplam enerji ve doğal gaz tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki tespit edilirken, OPEC ülkelerinin genelinde toplam enerji tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki tespit edilmiş; ancak petrol tüketimi ile ekonomik büyüme arasında uzun dönemli ilişki tespit edilememiştir. Bu bulgular; GCC ve OPEC ülkelerinin kendi enerji kaynakları olduğunu ve bu enerji kaynaklarını ekonomik büyümeye katkı sağlamak amacı ile enerji tüketimine yönelttiğine işaret etmektedir. Bunun başlıca nedeni ise bu iki ülke grubunda ekonomik büyümenin en önemli kaynağının enerji tüketimi olmasıdır. Granger nedensellik testinin bulgularına göre, OECD, GCC ve OPEC ülkelerinin genelinde ekonomik büyüme ile toplam enerji tüketimi, doğal gaz tüketimi ve petrol tüketimi arasında nedensellik ilişkisine rastlanılmamıştır. Bu sonuçlara göre; OECD, GCC ve OPEC ülkelerinde enerji kullanımını azaltmaya yönelik uygulanacak politikaların veya küresel ısınmayı azaltmak amacıyla teknolojik gelişmeleri desteklemenin ekonomik büyümeye zarar vermeyeceği öngörülmüştür.

İkinci incelenen ilişki, enerji fiyatları (Brent, WTI, Dubai, HH, LNG ve Rusya) ile likidite değişkeni arasındaki nedensellik ilişkisidir. Buna göre; OECD ülkelerinin genelinde petrol fiyatlarından likiditeye doğru tek yönlü nedensellik ilişkisine rastlanırken GCC ülkelerinde ülke bazlı sonuçlar elde edilmiş, OPEC ülkelerinde ise petrol fiyatları ile likidite arasında nedensellik ilişkisinin olmadığı gözlemlenmiştir. Buna ek olarak, üç ülke grubu genelinde doğal gaz fiyatları ile likidite değişkeni arasında nedensellik ilişkisinin varlığı mevcut değildir. Bu doğrultuda; petrol fiyatlarındaki artış OECD ülkelerinde likiditeye zarar verebilirken OPEC ülkeleri için bu durum geçerli değildir. Doğal gaz fiyatlarındaki oynaklığın ise üç ülke grubuna ait likidite seviyesine etki etmesi beklenmemektedir. Diğer yandan, ekonomik büyümeyi desteklemek amacıyla uygulanabilecek genişleyici para politikalarının OECD ve OPEC ülkelerinde petrol fiyatlarını etkilemesi beklemezken, OECD, GCC ve OPEC ülkelerinde uygulanabilecek genişleyici para politikalarının doğal gaz fiyatlarını etkilemesi beklenmemektedir.

Üçüncü incelenen ilişki, enerji fiyatları (Brent, WTI, Dubai, HH, LNG ve Rusya) ile hisse senedi endeksi arasındaki nedensellik ilişkisidir. Buna göre; OECD ülkelerinin genelinde hisse senedi endeksinden hem petrol fiyatlarına hem de doğal gaz fiyatlarına doğru tek yönlü nedensellik ilişkisi tespit edilmiştir. GCC ülkeleri genelinde petrol fiyatlarından hisse senedi endeksine doğru tek yönlü nedensellik ilişkisine rastlanırken doğal gaz fiyatları ile hisse senedi endeksi arasında nedensellik ilişkisi mevut değildir. OPEC ülkelerinin genelinde ise hem petrol hem de doğal gaz fiyatları ile hisse senedi endeksi arasında nedensellik ilişkisi mevut değildir. Bu doğrultuda; enerji fiyatlarındaki oynaklığın yüksek olduğu dönemlerde, yatırımcılar etkin bir şekilde çeşitlendirilmiş portföy için OECD ve OPEC ülkelerine yatırım yapabilirler; çünkü bu iki ülke grubunun genelinde petrol ve doğal gaz fiyatlarının hisse senedi piyasaları üzerinde bir etkisi bulunmamaktadır. Diğer yandan, petrol talebindeki azalış ya da arz fazlalığı petrol fiyatlarını aşağı çekmekte ve petrol ihraç eden ülkelerin bütçe getirilerini azaltmaktadır. Bu nedenle GCC ülkelerindeki yatırımcılar petroldeki arz/talep belirsizliğinden korunmak için türev ürünler ya da future sözleşmeler kullanabilir. Doğal gaz fiyatları belirsizliğinden kaçınmak için uygulanabilecek politikaların ise üç ülke grubunun da hisse senedi getirilerine etki etmesi beklenmemektedir.

Dördüncü incelenen ilişki enerji fiyatları (Brent, WTI, Dubai, HH, LNG ve Rusya) ile sanayi üretimi arasındaki nedensellik ilişkisidir. Buna göre; OECD, GCC ve OPEC ülkeleri genelinde petrol fiyatlarından sanayi üretimine doğru tek yönlü nedensellik ilişkisine rastlanırken, doğal gaz fiyatları ile sanayi üretimi endeksi arasında nedensellik ilişkisinin varlığına rastlanılmamıştır. Buna göre; üç ülke grubu da petrol fiyatı oynaklığından/belirsizliğinden korunmak için enerji politikaları belirleyebilir çünkü bu üç ülke grubunda petrol fiyatındaki oynaklık sanayi üretimindeki oynaklığın nedenselidir. Örneğin; petrol fiyatlarının oynak olduğu dönemlerde, OECD ülkeleri petrole duyarlı yatırımlarını erteleme politikası izleyebilir; ancak uzun vadeli bir erteleme toplam sanayi üretimi seviyesini düşürür ve bu ülkelerin ekonomik büyümelerine zarar verir. GCC ve OPEC ülkelerinde ise petrol fiyatlarındaki artış ihracat gelirini ve dolayısıyla da sanayi üretimi seviyesini artıracaktır. Buradaki tehlike, petrol fiyatlarının çok fazla yükseldiği ve uzun süre kalıcı olduğu durumda ortaya çıkacaktır. Böyle bir durumda enerjiye olan talep azalacak, piyasada arz fazlalığı oluşacak ve petrol fiyatları düşmeye başlayacaktır. Bu da GCC ve OPEC ülkelerinin bütçesine olumsuz yansıyacaktır. GCC ve OPEC ülkelerinin ekonomileri ağırlıklı olarak petrol ihracatına bağlıdır. Petrol fiyatlarında oluşacak herhangi bir belirsizlik bu ülkelerin gelir seviyesini etkiler. Bu ülkeler petrol fiyatı şoklarından korunmak için gelir kaynaklarını çeşitlendirebilir ya da petrol şoklarının ekonomik büyümeleri üzerindeki etkisini azaltıcı politikalar belirleyebilir. Doğal gaz fiyatlarındaki belirsizliği giderici enerji politikalarının ise üç ülke grubunun sanayi üretimi endeksi üzerinde etki etmesi beklenmemektedir.

Son incelenen ilişki ise hisse senedi endeksi ile sanayi üretimi arasındaki nedensellik ilişkisidir. Buna göre; OECD ülkelerinin genelinde hisse senedi endeksinden sanayi üretimine doğru tek yönlü nedensellik ilişkisine rastlanırken, GCC ve OPEC ülkelerinde ilgili değişkenler arasında nedensellik ilişkisi olmadığı gözlemlenmiştir. Bu doğrultuda; OECD ülkelerinde finansal aracıların desteklenmesi, ekonomik büyümeye katkı sağlaması beklenirken, finansal baskının yatırımlara ve birikimlere negatif yönde etki etmesi beklenmektedir. Bu nedenle OECD ülkelerinde sürdürülebilir bir ekonomik büyüme sağlanabilmesi için liberalleşme gibi finansal reformlara ihtiyaç duyulmaktadır. Finansal liberalleşme: paylaşılan risk artırırken, sermaye maliyetini düşürür, bu da borçlanmayı ve yatırımları teşvik eder, artan yatırımlar enerjiye olan talebi ve ekonomik büyümeyi artırır. GCC ve OPEC ülkelerinde ise ekonomik büyümeyi destekleyici politikaların finans sektörü üzerinde ya da finans sektörünün liberalleştirilmesinin ekonomik büyüme üzerinde herhangi bir etkisi olması beklenmemektedir.