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GROWTH–MAXIMIZING GOVERNMENT SIZE: EVIDENCE FROM TURKEY

DOCTORAL THESIS

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PLAGIARISM

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. Date (17.02.2020)

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To my beloved parents, Neriman and Erhan

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ABSTRACT

Growth–Maximizing Government Size:
Evidence from Turkey

The aim of this thesis is to examine the relationship between government size and economic growth, which has been one of the most controversial issues in both theory and practice in economics/public finance literature. Our main objective is to test whether the inverted U-shaped relationship between the government size and economic growth is valid for Turkey for the period 1974–2016 by using various proxy measures for government size. In the thesis, using the ARDL bound test model, firstly the relationship between government size and economic growth is tested whether there exist inversed U-shaped and then optimal government size ratios are calculated. Empirical findings of the thesis provide strong and robust evidence for the existence of an inversed U-shaped long-run relationship between government size and economic growth, confirming the validity of the BARS curve. Additionally, the empirical results of the thesis revealed that all proxy measures for government size except the total central government budget expenditures and defense expenditures, are above the rate of optimal government size for the period examined. Therefore, it is expected that a decrease in the government size except these two indicators would increase the economic growth.

Keywords: ARDL bound test, Economic Growth, Government Size, Turkey

ÖZET

Büyümeyi Maksimize Eden Kamu Kesimi Büyüklüğü:
Türkiye'den Bulgular

Bu tez çalışmasıyla amaçlanan iktisat/maliye literatürünün teoride ve pratikte eskiden beri en tartışmalı konularından biri olan kamu kesimi büyüklüğü – ekonomik büyüme ilişkisinin incelenmesi ve Türkiye için çeşitli kamu kesimi büyüklüğü göstergeleri bazında 1974–2016 dönemi için optimal kamu kesimi büyüklüğü tahmininin yapılmasıdır. Bu doğrultuda çalışmada ARDL sınır testi modelinden faydalanılarak öncelikle ekonomik büyüme ve kamu kesimi büyüklüğü arasındaki ilişkinin "ters U" şeklinde olup olmadığı test edilmekte ve daha sonra optimal kamu kesimi büyüklüğü oranları hesaplanmaktadır. Tezin ampirik bulguları, Türkiye'de kamu kesimi büyüklüğü ile ekonomik büyüme arasında uzun dönemli bir "ters U" ilişkisinin varlığına dair güçlü ve sağlam kanıtlar sunarak BARS eğrisinin geçerliliğini teyit etmektedir. Ayrıca, tezin ampirik sonuçları, merkezi yönetim bütçe harcamaları ve savunma harcamaları hariç tüm göstergelerin incelenen dönem için optimal kamu kesimi büyüklüğü oranının üstünde olduğunu ortaya koymaktadır. Bu nedenle bu iki kamu kesimi büyüklüğü göstergesi dışındaki kamu kesimi büyüklüğü göstergelerinde optimal orana kadar yapılacak bir azalışın ekonomik büyüme oranını artırması beklenmektedir.

Anahtar Kelimeler: ARDL sınır testi, Ekonomik Büyüme, Kamu Kesimi Büyüklüğü, Türkiye

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LIST OF ABBREVIATIONS

ADF	: Augmented Dickey-Fuller
AIC	: Akaike Information Criteria
ARCH	: Autoregressive Conditional Heteroscedastic
ARDL	: Autoregressive Distributed Lag
CPI	: Consumer Price Index
CUSUM	: Cumulative Sum of Recursive Residuals
CUSUMQ	: Cumulative Square Sum of Recursive Residuals
ECT	: Error Correction Term
EU	: European Union
GDP	: Gross Domestic Product
GNP	: Gross National Product
GLS	: Generalized Least Squares
GMM	: Generalized Method of Moments
HAC	: Heteroskedasticity and Autocorrelation Consistent
NATO	: North Atlantic Treaty Organisation
OECD	: Organisation for Economic Cooperation and Development
OLS	: Ordinary Least Squares
PP	: Phillips-Perron
PSTR	: Panel Smooth Transition Regression
R&D	: Research and Development
SOEs	: State-Owned Enterprises
TAR	: Threshold Autoregressive
VAT	: Value Added Taxes
WGI	: Worldwide Governance Indicators

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1. INTRODUCTION

The first chapter of the thesis comprises of motivation, research questions, statement of the research problem, and contribution of the thesis to the available literature.

1.1. Motivation

Although the relationship between government size and economic growth has been discussed for a long time in the economics and public finance literature, there is still no consensus on whether such a relationship exists, if there is a relationship, whether this relationship is linear, and whether this relationship is positive or negative. Perhaps mainly for this reason, the relationship between government size and economic growth has received great interest from both academic and policy-making circles. However, although it has been discussed so much, there is no consensus on what the size of the government that maximizes economic growth should be. To shed light on this topic, the present thesis undertakes an empirical investigation.

Properly determination of the relationship between government size and economic growth is an important topic for rational sharing of tasks between public and private sectors. Furthermore, the estimation of optimal government size is not only important for maximizing growth, but also it is crucial for effective public policy making with regard to public expenditures and taxes.

To choose appropriate proxy measure for government size, having knowledge about the ratio of government size that maximizes economic growth is critically important. The main criterion in the selection of such proxy measure or measures would be a rational assessment of the specific characteristics of countries in order for obtaining reliable results. Because, if the proxy for government size is not chosen correctly, the results would be misleading, and the policy proposals will be far from being aimed at achieving economic growth. In that sense, the appropriate government size for economic growth maximization as well as the justification for what is taken as the basis of government size indicator has caused intense debate in the literature.

Therefore, it can be said that, this thesis does not only focus on the relationship between government size and economic growth, but it also examines optimal government size for Turkey for the period 1974–2016. In order to conduct and conclude this search in the best possible way, all the basic indicators and their sub-components of which their data can be accessed are used in the thesis.

1.2. Research Questions

The main research question of the thesis is “what is the optimal government size based on alternative proxy measures for Turkey? How close is Turkey to this optimal government size? To what extent is it below or above this level?”. Some other potential research questions that the thesis aims to answer can be itemized as follows:

i. What is the role and size of the government in the economy and what should it be ideally?

ii. How should the size of the government be measured and what should be the ideal measure?

iii. Does the size of the government have a significant impact on the economic growth in Turkey? If so, is this impact inversed U-shaped or not?

iv. What kind of policy changes should be made in the sub-components of government expenditures and revenues to achieve optimal government size?

1.3. Statement of the Research Problem

As mentioned above, the aim of the thesis is to examine the existence of a possible non-linear relationship between government size and economic growth, which has been one of the most controversial issues in economics and public finance literature. The main objective of the present thesis is to test whether there is a long-run inverted U-shaped relationship between government size and economic growth for Turkey during the period 1974–2016. For this purpose, the potential proxy measures for government size at aggregate and disaggregate level had been used for the analysis as below:

- central government budget expenditures
- central government education expenditures
- central government health expenditures
- central government total health and education expenditures
- central government defense expenditures
- central government final consumption expenditures
- central government investment expenditures
- central government total and real expenditures
- central government budget revenues
- central government non-tax revenues
- central government direct tax revenues
- central government indirect tax revenues

In addition, the thesis aims to estimate the optimal size of government based on the same proxy measures as mentioned above if there exists such a relationship.

1.4. Contribution of the Thesis to the Literature

The current empirical literature reports inconclusive findings about the relationship between government size and economic growth. The main reason for this is the lack of consensus on the variable/variables used as a proxy measure/proxy measures for the government size. In this context, the thesis employs tax and government expenditures-based proxy measures for government size and their compositions, including the 12 different proxy measures in total, for the government size. After detecting the nexus between alternative government size measures for Turkey, we intended to find out possible existence of a government size that maximize economic growth. Based on the results of the analysis obtained, we have made a comparison between the actual rates based on 2016 figures in Turkey and optimal ratios estimated.

Moreover, in the thesis, the use of variables based on government expenditures and revenues as proxy measures for government size is critically important in order to allow comparison with other countries. Because the sub-components of government revenues vary much less between countries compared to the components of government expenditures. This makes it possible to make more accurate comparisons among countries. By the way, it would be worth mentioning that the data set created for the analysis in this thesis is another contribution of the thesis to the existing empirical literature.

Meanwhile, of course, this thesis has some limitations. In general terms, some of these that we see at first glance may be expressed as follows: First and foremost, this thesis focused on central government expenditures and revenues and their main sub-components. However, it should not be forgotten that these sub-components also have further sub-components. And these sub-components may be examined in more detail in future researches. Then, the data set was limited to 1974–2016, since the longer-term data were not available for the variables used in the thesis. If the quarterly data was used, the results might be different. Similarly, if the non-linear specification was used, the results might be different. This is to say that, data and/or model specification, even country specification, can make the results different.

The rest of the thesis proceeds as follows: Chapter 2 provides the conceptual and theoretical framework about the relationship between government size and economic growth, while Chapter 3 presents a comprehensive review of the empirical literature for not only developed countries but also emerging market and developing countries that shed light on the case country; that is Turkey. Chapter 4 explains the econometric framework of the thesis as Chapter 5 reports and discusses the econometric estimation results. Chapter 6 provides a robustness check. And the final chapter, Chapter 7, summarizes and concludes.

2. THE CONCEPTUAL AND THEORETICAL FRAMEWORK

This chapter presents a conceptual and theoretical framework about the relationship between government size and economic growth.

2.1. Conceptual Framework

This sub-section starts by defining and stating the differences of three main relevant institutions, the government, the state, and the public sector. Then, a conceptual framework is drawn by mentioning the role of the government in the national economy, measurement of the government size and the government in endogenous growth models.

2.1.1. What is the Difference between Government, State, and Public Sector? A Clarification

Although there is a great difference between the two, the term "government" is often used interchangeably with the term "state". The term "state" has a broader meaning, including components like population, territory, government, and sovereignty (Robinson, 2013; Marume et al., 2016). As can be seen, the government is one of these components.

The government is competent of the state which governs a country. State refers to an organized political community. The main difference between the state and the government is that although the government is temporary, the immaterial and nonphysical state is permanent. Basically, government gives the power to state.

Flint and Taylor (2007) explain the difference between state and government as follows:

"Government can be interpreted as the major agent of the state and exists to carry out the day-to-day business of the state. Governments are short-term mechanisms for administering the long-term purposes of the state. Hence every state is served by a continuous succession of governments. But governments only represent the state; they cannot replace it" (p. 137).

Robinson (2013) makes the following statements regarding a possible confusion between the state and the government: “The confusion between state and government might stem from the relationship that some governments have with states. …the government…speaks on the state’s behalf. …[governmental] institutions in which state power lies and it is through them that this power is wielded in its different manifestations by the people who occupy the leading positions in each of these institutions…. …[as seen], governments are not states, but they can represent them” (p. 560).

Now, the meaning of the public sector can be explained. Although there are several different definitions of public sector that change from one country to another, Babihuga (2002) makes the following widely accepted general definition:

“[T]he public sector is an institutional arrangement consisting of all governmental units, the national governments and its subsidiaries whose functions and scope of activities are spelled out by the constitution” (p.14).

In general terms, the public sector covers both the central and the local governments with all publicly controlled or publicly funded agencies, enterprises, and other entities that deliver public programs, goods, or services.

For Turkey, the public sector has a multi-component structure. With the Public Financial Management and Control Law No. 5018, put into practice in January 2006, the public sector was re-organized. Accordingly, the financial structure of the public sector consists of two main parts: (i) general government institutions and (ii) state-owned enterprises (SOEs). The central government institutions, which are composed of general budget institutions, special budget institutions, and regulatory and supervisory agencies are the main components of general government institutions. In addition, social security institutions and local governments are also part of general government institutions. Social Security Institution and the Turkish Employment Agency are the main social security institutions. Local governments comprise of special provincial administrations, municipalities, local administrative unions, municipality affiliated administrations, and villages. In addition, municipalities include metropolitan and metropolitan district municipalities and provincial, district and town municipalities. Apart from this law, it is also a component of the public sector, which is the revolving funds and extra-budgetary funds actually (see Figure 2.1).

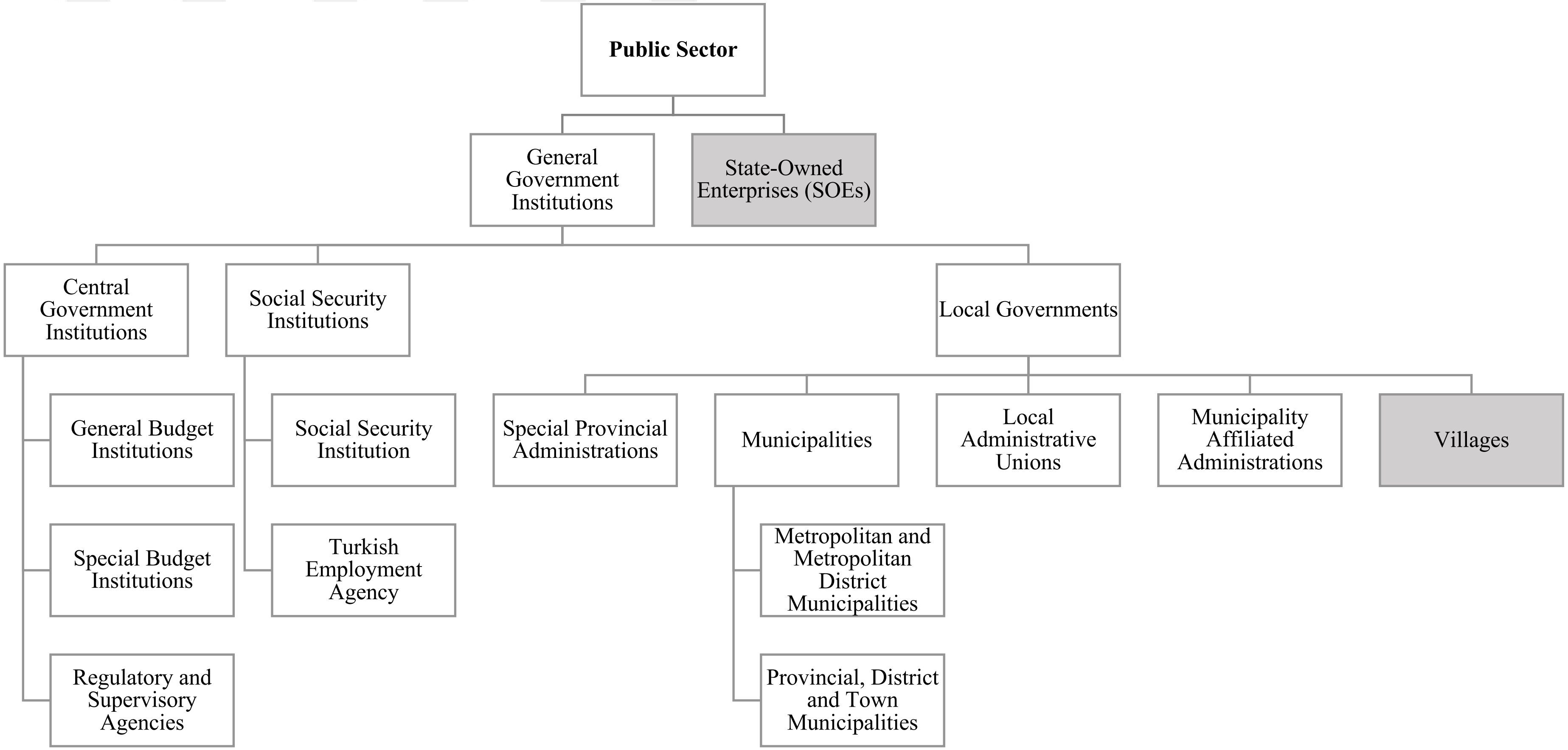

Figure 2.1. The public sector and its main components[1]

Source: Compiled from the Ministry of Treasury and Finance Database

[1] SOEs, villages and local government unions consisting of only villages are excluded from the scope of the Public Financial Management and Control Law No. 5018.

2.1.2. The Role of the Government in the National Economy

A country's national economy is made up of two sectors: (i) public sector and (ii) private sector. Both sectors contribute to a country's national economy. However, the levels of the contributions of these two sectors to the economy have long been debated in theoretical and empirical literature, but no consensus has been reached yet. Therefore, this issue is a hot topic in the literature.

Discussions concerning the government size go back to Thomas Hobbes (Şen, 2008). In his influential (1993[1651]) work named as "Leviathan", which forms the basis of classical economic thought, Hobbes argued that an overwhelmingly large public sector should be limited and reduced (Buchanan, 1975). In his opus, the Leviathan, which is also mentioned in the Torah and the Gospel and is likened to a single-headed water monster oppressed under its greatness, is used to describe a sovereign state with absolute power and authority. In this context, the Leviathan state affects economic growth and development negatively by restricting individual freedoms and causing economic inefficiencies called as government failure. Therefore, it should be limited and reduced (Buchanan, 1975; Aktan, 1995).

Moreover, Leviathan (1993[1651]) has also been an inspiration for economic thoughts that examine the role of the state in the economy. For example, James M. Buchanan, Gordon Tullock, and other representatives of public choice theory brought up the concept of "Leviathan state" again together with the problems that emerged in the economy in the 1970s together with the start of the questioned policies proposed by Keynesian economists in order to draw attention to the damages of the extremely large public sector. Starting from the differences between the interests of the state and the interests of individuals, Buchanan (1993) and other representatives of the public choice theory have described the state as a growing monster, referring to the Leviathan concept, on the grounds of three fundamental principles: (i) methodological individualism, (ii) rationality and maximand, and (iii) catallaxy (Buchanan, 1993: 387). According to the advocators of the public choice theory, the extremely large public sector has a cumbersome structure that restricts individual and economic freedoms, leads to economic and political degeneration, and causes regression on economic growth by means of bribery, nepotism, political advocacy, lobbying and rent-seeking (Aktan, 1995: 61; Aktan, 2011: 38).

On the other hand, there are some scholars who argue against the basic assumptions of the leading representatives of the public choice theory. Musgrave (1959) is a typical example of them. He advocates the growth of the public sector and expresses his opposing views to the theory of public choice, describes the three objectives of the state as followings: (i) providing and maintaining macroeconomic stability, (ii) enhancing efficiency in resource distribution, (iii) ensuring more equal redistribution of income plus wealth. Needless to say, these objectives attributed to the state by Musgrave are known as the Musgravian objectives of state (Şen and Kaya, 2019).

In the light of the above information, it can be said that, in addition to demonstrating macroeconomic stability as the main reason for the state intervention of Keynes to the economy, Musgrave introduced two other more justification for government intervention to the economy as followings: (i) enhancing efficiency in resource distribution, and (ii) ensuring more equal redistribution of income plus wealth to the literature as reasons of state intervention in the economy.

In other words, while Keynes acknowledged that the chief reason for the state's intervention to the economy is to ensure macroeconomic stability, Musgrave that besides enhancing efficiency in resource allocation and ensuring a better income and wealth distribution is among the reasons for state intervention in the economy. In short, the basic economic functions of the state systematically formulated in 1959 by Musgrave under the heading of the Musgravian objectives of the state in "The Theory of Public Finance: A Study in Public Economy" are prioritized by Lerner (1941, 1943).

Abba Lerner, the founder of Functional Finance, argued that providing the state with an even more interventionist share in the economic order, ensuring full employment, ensuring price stability and increasing the welfare of society are among the basic duties of the state (Lerner, 1941; Lerner, 1943). Moreover, Lerner classified the economic functions of the state in the order of priority basic functions and sub-functions. The basic functions of the state according to their priorities are the following: (i) enhancing efficiency in resource allocation, (ii) ensuring more equal redistribution of income and wealth, (iii) providing and maintaining economic stability. The below are sub-functions of the state: (i) ensuring price stability and full employment, (ii) achieving a higher sustainable growth rate, (iii) providing a balance of payments balance (Şen and Kaya, 2015).

In other words, Lerner rejected the classics' neutral finance approach, arguing that the main task of the state in the economic sense is to ensure full employment and emphasized that the state should be given a more active role in the economy than what Keynes suggested (Lerner, 1943: 41). In the epitome, according to the functional finance approach, income distribution cannot be improved, and macroeconomic stability cannot be achieved without efficiency in resource allocation. The most important feature of the functional finance approach is that the state makes a priority ranking among the economic functions of the state (Şen and Kaya, 2015).

2.1.3. The Appropriate Measurement of the Government Size

The functions of the government and thereby the size of it changes from country to country and/or from time to time, not only because of differences in the political structure of the countries, economic order, historical background of the country, social structure, but also due to differences in the phases of economic development. A country's being more depend on the centralized provision or decentralized provision makes also an important difference. These distinctions will continue to occur as long as countries have distinctive political structures, due to social structures and differences in income and wealth, and because people differ in their preferences for publicly provided goods and services.

Turning to measurement, how to measure the optimal government size is more problematic than defining it. The basic criterion in the selection of indicators for measuring the optimal government size should base on the rational evaluation of the specific characteristics of the countries for the estimates to produce reasonable results. For example, if the proxy measure for government size is not chosen carefully, the results will yield misleading policy recommendations concerning economic growth.

For this reason, the optimal government size for economic growth and the appropriate basis of the government size indicator have caused intense debate in the literature. For instance, some studies, such as Fölster and Henrekson (2001), Agell et al. (2006), Colombier (2009) take into account the share of total tax revenues and total government expenditures in GDP as a proxy measure for government size, while others like Afonso and Furceri (2010), Bergh and Karlsson (2010) use total public revenues and expenditures over GDP as the measure of the government size. Landau (1983, 1986), Barro (1991), Yamamura (2011), take government consumption over GDP as the proxy measure for government size, while others like Hsieh and Lai (1994), Chao and Grubel (1998), Dar and AmirKhalkhali (2002), and Chen and Lee (2005) take the share of total or central government expenditures in GDP at aggregate level. In addition to these, de Mendonça and Cacicedo (2015), consider the central government or general government tax revenues as a proportion of GDP (Afonso et al., 2018: 3).

The ratio of government expenditures to national income represents the share of government expenditures in the nation's economy. This ratio roughly gives an idea about the government size in the economy. In practice, it is the most commonly used ratio for measuring the size of the government. In addition to this ratio, other indicators such as the share of employed persons in the public sector, the share of government investments in total investments, the share of collected tax revenues in national income, and the intensity of the legal arrangements made by the public sector should also be taken into consideration if one wishes to make a proper measurement of government size. Judging the size of the government by looking only at the share of government expenditures in GDP would lead to misleading results. For example, in a country with a budget balance surplus, looking at the share of government expenditures over GDP will produce the result that the state appears to be smaller than it should be. Another example, in countries where transfer expenditures, subsidies and government investments hold a large part in government expenditures, taking government consumption expenditures as an indicator of government size will cause the public sector to appear less than it is. In such a case, the way to judge the size of the government is to look at the following proxy measures and make a decision accordingly (Şen and Öz, 2017: 32).

1. Total tax revenues, in % of GDP
2. Public employment, in % of total employment
3. Public sector investment, in % of total investments
4. The degree of density of public sector legal arrangements and regulations

However, the share of employed persons in the public sector is insufficient to fully and accurately demonstrate the effects of the public sector on resource allocation. However, the impact of the public sector on resource allocation is extremely important and should not be ignored because the changes in public employment are not a reason but a result in terms of government size. The public sector can produce as well as deliver goods and services by controlling a larger proportion of national resources with fewer employees employed. This may lead to problems such as productivity and efficiency (Şen and Kaya, 2019: 57).

On the other hand, the intensity of the legal arrangements made by the public sector is also very important for the accurate determination of the size of the government. However, it is not measurable and cannot be used in empirical studies. The most important indices developed in this field in recent years is the Worldwide Governance Indicators (WGI) index. However, there is no possibility to use this index due to the unavailability of data for a longer time span for gauging.

To sum up, there is yet no consensus on the ideal measure to be used as a proxy for the government size for the economy. However, in the light of the available literature that we have already reviewed, it can be said that the ratio of government expenditures to GDP is more widely used proxy measure, amid its deficiencies. This is because it is thought that government spending is traditionally higher than the revenues in most countries regardless of their development level and therefore this proxy measure represents well the size of government in relation to its rivals.

It is important to note here that the components of government expenditures vary much more across countries compared to the components of government revenues. Therefore, one should also consider the ratio of government revenues to GDP as proxy measures of the size of government. This is done in the thesis as well.

2.2. Theoretical Framework

In this part of the thesis, firstly the issue of government policies in endogenous growth models is discussed, then theoretical arguments about the relationship between government size and economic growth and the theoretical arguments about optimal government size are reviewed.

2.2.1. The Government Policies in Endogenous Growth Models: Barro's (1990) Model

The theoretical literature on economic growth shows that the government plays an important role in the economic growth process, albeit in different ways (Romer 1986, Lucas 1988, Barro 1990, Rebelo 1991). Especially, the two ground-breaking studies by Romer (1986) and Lucas (1988) led to the development of endogenous growth theory (Snowdon and Vane, 2005: 598).

Romer (1986) is the first study that introduced the first endogenous growth model [Research and Development (R&D)] by accepting the idea of learning proposed by Arrow (1962) (Kar and Taban, 2003). Later, with the emergence of Lucas's (1988) human capital model and Barro's (1990) public policy model, endogenous growth models continued to remain on the agenda. These models are called endogenous growth models because they claim that explanatory variables of economic growth should be thought as the country's own internal dynamics. In endogenous growth models, the main ingredients of economic growth are: (i) knowledge, (ii) human capital, (iii) learning by doing, (iv) creativity, (v) innovation, (vi) research and development, (vii) technological development and technological infrastructure, (viii) positive economies of scale, (ix) externalities, (x) division of labor and specialization, and xi) public policies.[2]

Barro (1996) defines endogenous growth models as,

"…the long-term growth rate depends on governmental actions, such as taxation, maintenance of law and order, provision of infrastructure services, protection of intellectual property rights, and regulations of international trade, financial markets, and other aspects of the economy. The government, therefore, has great potential for good or ill through its influence on the long-term rate of growth" (p. 8).

Indeed, endogenous growth models try to explain that the policies of the decision-making units in the economy are at the basis of economic growth and what kind of policies these units' implement will ensure long-run growth.

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[2] See, Arrow 1962, Romer 1986, Lucas 1988, Barro 1990, Rebelo 1991, Kerr 1993, Peon 2003, Skott and Paul 1995, among others.

In short, in endogenous growth models, technology is internalized and the mechanisms of public policies affecting economic growth are emphasized. For example, Romer (1986) argues that R&D studies, Lucas (1998) human capital, Rebelo (1991) cumulative capital, and Barro (1990) government expenditures will provide economic growth.

In this context, the basis of Barro’s (1990) public policy model is made of the opinions based on the importance of government expenditures in the economic growth process. These views, pioneered by Barro (1990) in an article he wrote about the role of government expenditures in economic growth in 1990, focused on the importance of the government in the process of growth and development.

The role of the state in the public policy model is not the same as that of the welfare state. While the Keynesian state in the concept of the welfare state has a substituting character as an entrepreneur and investor, the state in the public policy model is a complementary state that works in support of the private sector. In the public policy model, the state follows policies that will pave the way for private enterprise. For example, government infrastructure investments increase the efficiency of the private sector. Public support of the R&D sector will also positively affect economic growth. According to this model, tax-funded government expenditures increase economic growth to a certain level of productivity. However, after that point, with the introduction of the law of diminishing returns begins to reduce economic growth.

In Barro’s (1990) model, public policies are clearly regarded as a production input. In other leading endogenous growth models, public policies are not used as a variable; however, it is seen that government intervention is necessary to ensure optimality in model solutions. This is because private and social costs and returns are different in these models. Government intervention in a situation where the social return of a project is higher than its private return is necessary to achieve optimality (Yülek, 1997: 2).

In the light of the above information, we safely argue that public policy model proposed by Barro (1990) serves best for the purpose of the present thesis. So, the analysis of the thesis built on this public policy model that distinguishes itself from any other endogenous growth model by accepting public policies as a direct production input.

2.2.2. Theoretical Arguments about the Relationship between Government Size and Economic Growth

The old Keynesian insight views insufficient aggregate demand as the main reason for the 1929 great depression. Increases in government expenditures—that is a widely used proxy measure for the government size—push up the total demand, and by implication increases in total demand stimulate output and enhance the employment potential of the economy. The early Keynesian views argue that increases in government size will affect economic growth positively.

This view suggests that the increase in the size of the public sector stimulates economic growth through the Keynesian multiplier mechanism. Because the public sector has an important role in preventing conflict between individual and social interests in an economy, it has the potential to increase and direct productive investments. According to this approach, the public sector is also capable of providing the most suitable investment climate for economic growth. If the government establishes a legal system that will allow the private sector for production and get money from this production, the growth of the public sector increases the growth in the economy (Sala-i-Martin, 2002: 70). At this point, increasing government expenditures will serve as insurance for private property and will affect economic growth positively by encouraging private investments. In other words, the public sector will provide infrastructure investments that will enable superstructure investments to be realized by private sector. These investments have a potential of creating crowding in effect as long as the public sector is in a complementary relationship with private sector, but not in a competition relationship. This means an increase in economic growth. Additionally, the growth of the public sector can contribute to economic growth by means of regulations for the protection of property rights, infrastructure services and the provision of standardization in these services, and provision of basic public services (Şen and Kaya, 2019: 50-51). However, if it cannot establish the legal system above or protect its property rights, the growth in the economy will be lower (Sala-i-Martin, 2002: 70). What is more, in countries that defined by the the existence of monopolies, the absence of fully developed markets of capital, insurance, and information, it is widely accepted that public sector investment can make factor and product markets work more efficiently and create considerable spillover effects for the private sector (Ghali, 1998: 975-976).

Another view (Neo-classical view), provides different perspectives from what Keynes argues. They put forward that the larger government size will have a negative impact on economic growth as a result of the crowding-out effect. This view goes on saying that the persistent increases in government expenditures will ultimately affect the economic growth negatively by causing inefficiency in resource allocation. Increases in government expenditures are met by increasing taxes or domestic borrowing, or both. These increases in government expenditures, ceteris paribus, reveal the disincentive effect of taxes in case of when is met with an increase in taxes. On the other hand, when it is met with domestic borrowing from outside the central bank, it hinders the productivity of the private sector investments by creating a crowding-out effect on the private sector. Otherwise, according to Sala-i-Martin (2002), the composition of expenditures can also be important, because some types of expenditures are productive, others are not. For instance, public investment is conceivably better for economic growth than social security transfers to the elderly. In addition, the type of taxes imposed may also affect the growth rate.

On the other hand, the lack of public sector's intervention to the economy can lead to problems such as distrust, lawlessness, and instability. However, the existence of a limited public sector will contribute to the increase of community welfare through the rule of law and the protection of property rights. As the welfare of the individuals of the society increases, the government expenditures will increase due to the increase in the demands of the median voters such as better health, education and social security. The tax burden paid to finance these expenditures will also increase. In this context, it is obvious that the estimation of the optimal government size, in the long run, is a seminal indicator for policymakers.

2.2.3. Theoretical Arguments about Optimal Government Size

In theory, the relationship between government size and economic growth is controversial. As the government size continues to grow, it implies that more resources begin to be allocated to the public sector. The government becomes the most powerful economic agent in an economy and its action becomes to be very important for growth (Sala-i-Martin, 2002: 70).

There are three main mechanisms which show that the positive effects of the increase of government size on economic growth are gradually diminishing and eventually turning into negative effects (Gwartney et al., 1998: 3): First, raising taxes and/or borrowing to finance increased government expenditures has a negative impact on the economy. As government taxes increase, the motivation of the private sector to invest and to increase productivity decreases. Thus, even if the efficiency of government expenditures does not diminish, the disincentive effects of taxation and the crowding-out effect of domestic borrowing will have a negative impact on economic growth, as resources are shifted from the private sector to the public sector.

Second, as the public sector grows more than the private sector, the diminishing returns law becomes more important. When the public sector focuses on its basic functions such as protection of property rights, the provision of an impartial legal system, the development of a stable monetary framework and the provision of national defense and when this performs the basic functions in the best way, it is expected that it provides an infrastructure for the efficient operation of the private sector and thus increases economic growth. However, if the public sector continues to grow, government expenditures will be directed towards increasingly less productive activities, resulting in diminishing returns and slowing economic growth.

Lastly, the public sector is much less dynamic than the private sector and changes in the public sector take place much more slowly. Compared to the private sector, the time required to identify problems and the time to adapt to changing conditions and new knowledge and technologies is longer. This means missing opportunities for better and more efficient production. Therefore, an increase in the size of government slows down economic growth after a threshold point.

Barro's (1990) influential paper explains the impact of the government size on economic growth through the public policy model. According to Barro (1990), who accepts public policies as an input of production, government expenditures financed by taxes have a positive effect on economic growth up to a certain level of efficiency. However, after this effect exceeds the optimal level, it starts to show negative effects on growth and leads to reversed U-shaped in the relationship between government size and economic growth. The curve corresponding to this process is called Barro Curve in the literature and has an important place in the literature in terms of determining the optimal government size. According to Barro (1990), the increase in government expenditures financed by taxes will have a negative impact on economic growth after a certain level.

Another study that draws attention to the relationship between government size and economic growth belongs to Armey (1995). In his study, the author described an inversed U-shaped non-linear curve to reveal what should be the optimal government size magnitude with a quadratic function developed. This curve has been named as Armey Curve in the literature.

From the growth-oriented studies, it is observed that the effects of public policies on economic growth are neglected in neoclassical growth models such as the Solow-Swan model (Solow, 1956; Swan, 1956). Neo-classical growth models basically assume that all the determinants of growth are external and that the implemented public policies have not any influence on economic growth. For example, if the savings rate and investment share increase, the level of long-run productivity increases, but the long-run growth rate ultimately reflects only technical progress (Stiroh, 2001: 39).

Accordingly, models based on Neo-classical growth theory assert that public policies would not influence the steady-state growth rates of a nation. These models accept that government policies may have a temporary role in the transition to a steady-state, but that the steady-state is ultimately dependent on technological progress. "James Meade, in his book on neoclassical economic growth, repeatedly refers to the paradoxical fact that the proportion of income saved affects the stock of capital, but not the rate of capital accumulation, in a state of steady economic growth." (Meade, 1962: 8, quoted in Cesaratto, 1999: 776). As previously said, technological progress is considered as an exogenous variable in these models. As a result, the long-run effect of government policies on economic growth has not been examined in such models. Indeed, there is no difference between neoclassical growth theory and endogenous growth theory that economic growth is sustainable through technological development. Both theories recognize that technological progress is the main driving source of economic growth (Sala-i-Martin, 2002). The difference between these two basic growth theories is where technological development originates.

In endogenous growth models developed by a number of studies, including Barro (1990), King and Rebelo (1990), Futagami et al. (1993), Jones et al. (1993), Stokey and

Rebelo (1995), Devarajan et al. (1996), Mendoza et al. (1997), Ghosh and Mourmouras (2002), fiscal policy instruments (i.e. taxes and government expenditures) are encompassed in the growth model, assuming that the policies implemented by the public sector are one of the key drivers of economic growth. Within the above contributions, Barro's (1990) work is the most basic study that examines the relationship between government size and economic growth within the framework of endogenous growth model and leading many studies. The author used a growth model that includes the government expenditures variable and finds evidence of an inversed U-shaped non-linear relationship between government size and economic growth in the long run.

Barro (1990) inspired many researchers in this field with his study of the relationship between government size and economic growth within the framework of the endogenous growth model and contributed significantly to the emergence of wide-ranging literature on this subject. One of these works is Armey (1995).

Armey (1995), following Barro (1990), reiterated the existence of an inversed U-shaped; that is, a non-linear relationship between government size and economic growth. This non-linear relationship, which is named as what is so-called Armey Curve in the public finance literature, indicates that the increase in government expenditures will increase economic growth to a certain point; after this point, however, it will reduce economic growth. The increase in government expenditures, which has increased to the point where Armey claims to show the optimal size of the government that maximizes economic growth, is also due to the growth-enhancing/productive government expenditures. However, the continued increase in government expenditures after this point will lead to the law of diminishing returns and have negative consequences on economic growth. Shortly after Armey's work (1995), studies were carried out that further advanced the literature on the relationship between government size and economic growth.

Rahn and Fox (1996) and Scully (1998, 2003) came up with new studies, following Barro (1990) and Armey's (1995) pioneering work in the field of the relationship between government size and economic growth. Thus, this subject has never lost its popularity and the curve has taken its place in the literature as the BARS curve––that represents the initial letters of the surnames of **B**arro, **A**rmey, **R**ahn, and Fox, and **S**cully. The horizontal axis of this curve represents the Government Expenditures/GDP ratio, which is found as the government size indicator, while the vertical axis represents the real GDP growth rate.

In sum, the BARS curve has great importance in terms of determining the share of the public and private sectors in a national economy and rational policies in this direction through the estimation of the optimal government size that maximizes economic growth.

3. A COMPREHENSIVE REVIEW OF THE EMPIRICAL LITERATURE

This chapter is designed to provide a comprehensive review of the empirical literature. The first part of this chapter comprises empirical studies on the relationship between government size and economic growth, while the second part of this chapter contains empirical studies on optimal (growth-maximizing) government size.

3.1. Empirical Studies on the Relationship between Government Size and Economic Growth

One of the most important issues in public finance is the role of government size in economic growth. The empirical literature on the relationship between government size and economic growth is quite rich as listed in Appendix A. Accordingly, in this part of the thesis, empirical studies based on the relationship between government size and economic growth are divided into two as single-country studies and multiple-country studies. In the current literature, single-country studies are less than multiple-country studies.

3.1.1. Single-Country Studies

In following, first single-country studies are examined separately for emerging market and developing countries, and then developed countries.

3.1.1.1. Emerging Market and Developing Country Case

There are different results about the impact of government size on economic growth in the literature. For example, the studies of Holmes and Hutton (1990), and de Mendonça and Cacicedo (2015) found a positive impact of government size on economic growth, while Loto (2011) found just the opposite. On the other hand, Herath (2012), and Şen and Kaya (2019) stated that the relationship between government size and economic growth is not linear, that government size will increase economic growth to a certain point (the growth-maximizing level of government size); however, after that point, economic growth would begin to reduce.

Below is given a summary of the impact of government size on economic growth for emerging market and developing countries.

Correspondingly, Holmes and Hutton (1990) implemented different econometric tests such as Granger Causality, The Multiple Rank F-test, Autoregressive conditional heteroscedastic (ARCH), Engle test, Goldfeld-Quandt test, Glejser test for India during the period 1950‒1981, and concluded that the Wagnerian hypothesis, supported by conventional parametric analysis, is rejected and the conventional Keynesian theory is accepted. Additionally, the study of de Mendonça and Cacicedo (2015) applied the OLS and generalized method of moments (GMM) tests of Brazil for the period 2000‒2013. They reached that an increase in the size of government contributes to economic growth positively and that the optimal size for the Brazilian government would be roughly 22% of GDP.

As opposed to the above studies, Loto (2011) investigated the impact of government expenditures on economic growth over the period 1980‒2008 in Nigeria. The five sub-sectors of the economy comprising security, health, transportation, communication, and agriculture were used for the analysis. The findings indicated that government expenditures had a negative impact on economic growth.

On the other hand, Herath (2012) used the OLS technique for Sri Lanka during the period 1959‒2009, and he concluded the relationship between government size and economic growth is non-linear.

A recent study by Şen and Kaya (2019) obtained threshold values by utilizing the threshold autoregressive (TAR) model for the period 2006:1‒2016:2 in Turkey to estimate empirically the optimal government size on the basis of different proxy measures. The findings of their study show that the optimal government size varies with the proxy measure considered for government size. For instance, as a proxy of government size, government consumption expenditures, direct taxes and indirect taxes are above their optimal level, but government investment expenditures, defense expenditures, the education and health expenditures are below its optimal level in Turkey. This influential study includes and compares all possible expenditures and tax-oriented alternative indicators used in estimating the government size in the analysis. For this reason, come to the fore differentiate from other studies in the literature for Turkey.

3.1.1.2. Developed Country Case

Another part of the single-country studies includes studies examining the relationship between government size and economic growth for developed countries. A summary of these studies is given below.

Facchini and Melki (2013) investigated the relationship between government size and economic growth in France for the period of 1896−2008 and concluded that this relationship was positive. Contrary to the results of Facchini and Melki (2013), the results of Gwartney et al. (1998) reveal that the relationship between government size and economic growth is negative for the USA, which was also a developed country−−in the 1960−1990 period.

On the other hand, Peden (1991) analyzed the relationship between government size and economic growth by using non-linear least-squares technique for the USA during the period 1929−1986 and found that this relationship is non-linear. Like Peden (1991), Chao and Grubel (1998) explored the government size-economic growth relationship by using OLS and non-linear regression for Canada in the period 1929−1996 and found this relationship is non-linear, too. Another study, Vedder and Gallaway (1998) performed a study analyzing the relationship between government size and economic growth by using the OLS technique for the USA during the period 1947−1997, and they found that this relationship is non-linear, like Peden (1991). Mavrov (2007) examined the same relationship by using the OLS technique for Bulgaria during the period 1990−2004 and showed that this relationship is non-linear, as previous three studies.

A more recent study, Forte and Magazzino (2016), empirically analyzed the relationship between government size and economic growth in Italy, using a very long-term data set from 1861 to 2008, and found a non-linear relationship between government size and economic growth.

3.1.2. Multiple-Country Studies

There is a large body of empirical studies on the impact of government size on economic growth in the context of multiple-country studies. Among these types of studies, the studies of Rubinson (1977), Ram (1986), Grossman (1990), Wu et al. (2010), and Ghose and Das (2013) found a positive impact of government size on economic growth, while others, such as Gemmell (1983), Saunders (1985), Barth and Bradley (1988), Grier and Tullock (1989), Barro (1991), Borcherding et al. (2003), Yamamura (2011), Altunc and Aydın (2013) found the opposite, which was that the effect of government size on economic growth was negative. Some studies, such as Gupta (1998), Asimakopoulos and Karavias (2016), Kim et al. (2018) showed that the effect of government size on economic growth varies according to the group of countries examined. In what follows we summarize the available literature on the impact of government size on economic growth for developed and developing countries.

A very early study on the government size-economic growth nexus belongs to Rubinson (1977). Accordingly, Rubinson (1977) applied the panel regression analysis for 39 developed and 45 underdeveloped countries during the 1955−1970 period, and concluded that government revenues positively affects GNP during 1955−1970 period in both rich and poor countries, but that its impact in poorer countries is quite big, while in richer countries it is small. On the other hand, Ram (1986) in his study on 115 countries revealed that the government size had a statistically significant and positive effect on economic growth. In addition to this study, a study by Grossman (1990) used an OLS and Chow test for 18 developed and 30 developing countries for the period 1970−1983 and found government size does have a significant positive effect on whole economic growth. A study by Wu et al. (2010) examined the relationship between government size and economic growth by employing the Granger causality test and using a panel data set which includes 182 developed and developing countries over the period 1950–2004. The findings of this study show that the impact of government size on economic growth is robustly positive.

Another more recent study, Ghose and Das (2013) implemented three different econometrical methods including panel unit-root test, panel co-integration test, and dynamic OLS for 19 developed and developing countries (emerging market economies) for the 1970–2006 period. Based on their empirical findings, they argued that economic growth is positively and significantly influenced by government size. Unlike the studies above, Gemmell (1983) used the cross-country comparisons for 14 developed and 13 less developed countries for the period 1960−1970 and reached that the impact of government size on economic growth is negative. Another study, Saunders (1985) investigated the effects of total government expenditures (as an indicator of government size) on growth for 21 OECD countries[i] for the period 1960−1981 and concluded that this effect was negative. Like Saunders (1985), Barth and Bradley's 1988 study found that government consumption expenditures for 16 OECD countries had a negative impact on economic growth in the period 1971−1983. Grier and Tullock (1989) applied pooled cross-section, time-series analyses instead of simple cross-country regressions for the OECD countries[ii] for different periods such as 1960−1990, 1970−1990, and 1951−1980. The results of the analyses show a negative effect of the change in government consumption spending on economic growth.

Another outstanding study, Barro (1991), used cross-sectional data for 98 countries[iii] over the period 1960-1985 and he found that a significant negative effect of government consumption expenditures on economic growth, but no significant effect of government investment expenditures. Borcherding et al. (2003) estimated the effect of the government size on economic growth for 20 OECD countries[iv] for the period 1970–1997, they found that the government size had a statistically significant and negative effect on economic growth. In a similar vein, a more recent study by Yamamura (2011) concluded that the government size has a negative effect on economic growth for the period 1965 to 1980 in 57 countries. However, Yamamura (2011) indicates that the results change if countries are analyzed on the basis of dual classification as an OECD member and non-OECD member. Accordingly, the government size in non-OECD member countries has a negative impact on capital accumulation and economic growth, but not for OECD member countries. Also, Altunç and Aydın (2013) used an Autoregressive Distributed Lag (ARDL) bound test technique for three southeastern countries—Turkey, Romania, and Bulgaria—covering the period 1995−2011 and revealed that the share of present government expenditures in GDP exceeds the optimal level of the government expenditures for the above countries and the impact of government size on economic growth is negative.

A study by Gupta (1998) applied the OLS technique together with Chow test for 19 developed and 28 developing countries during the period 1950−1977 and found that the impact of government size on economic growth is positive for the developing countries, but negative for the developed ones. Kormendi and Meguire (1985) performed a study considering 47 developed and developing countries for the period 1950−1977 by using cross-section regressions. In contrast to the above study, they found no impact of the change in the government consumption spending ratio on the average GDP growth rate.

Furthermore, a more recent study by Asimakopoulos and Karavias (2016) implemented three different econometrical methods including non-linear panel, GMM, and dynamic panel threshold estimation for 129 developed and developing countries for the period 1980–2009. The author observed that the negative effect on economic growth is more pronounced for governments of sizes above optimal than those of sizes below the optimal size in the case of developing countries. For the developed countries, as the government size increases, its positive effect on the economic growth becomes stronger as long as the government size is below its optimal size. Based on their empirical findings, they showed that an asymmetric impact of government size on economic growth in both developed and developing countries around the forecasted threshold. They found that the optimal level of government size is different for developed and developing countries, they estimated that the optimal level of the government size that maximizes economic growth is 19.12% for developing, 17.96% for developed, and 18.04% for the whole countries.

Another study that belongs to Kim et al. (2018) on government size on developed and developing countries used a panel smooth transition regression (PSTR) for 47 countries during 1984–2012 period and concluded that better governance helps government size raise productivity and hence output economic growth, and bigger government size helps governance increase productivity and then output economic growth; but then, government size turns harmful to growth above some threshold level of government size. They reached the positive and negative impacts of government size on economic growth for different threshold levels for multiple developed and developing countries.

On the other hand, empirical literature concentrates also some multiple developed countries. For example, a distinguished study by Ghali (1998), using data from developed countries, found a positive impact of government size on economic growth. On the contrary, others, such as Alexander (1990), Gwartney et al. (1998), Fölster and Henrekson (2001), Dar and AmirKhalkhali (2002), and Bergh and Karlsson (2010), found opposite results. Third-party studies, such as Hansson and Henrekson (1994), Romero-Avila and Strauch (2008) documented that the effect of government size on economic growth varies in accordance with the type of expenditures and/or revenues considered for the proxy of government size. The existing literature contains on government size-growth nexus also some other studies, but their number is limited, such as Hsieh and Lai (1994), Agell et al. (1997), and Vedder and Gallaway (1998), found negative or positive relationship depending on the countries examined or the time period examined situation or there is no statistically significant relationship between government size and economic growth.

A short summary of the impact of government size on economic growth for multiple developed countries is given below.

In an early study, Ghali (1998) implemented multivariate cointegration techniques including unit Roots, cointegration, and Granger-causality to a quarterly data set of 10 OECD countries[v] spanning from 1970: q1 − 1994: q3. He reached that government size Granger-causes economic growth in the countries studied with some inequalities concerning the amount by which government size contributes to explaining future changes in the growth rates. An innovation shock at the growth rate of government size creates a permanent impact on the growth rate of GDP that, for some countries, reaches from 26% to 60% of the total change in growth. Although they studied the same period and developed OECD countries, the studies of Fölster and Henrekson (2001) and Bergh and Karlsson (2010) showed quite different results from Ghali (1998). Fölster and Henrekson's 2001 study revealed a strong and significant negative relationship between government size and economic growth in the selected 22−29 rich countries between 1970 and 1995. Bergh and Karlsson (2010), using the ordinary least squares (OLS) and Bayesian algorithm approach with a panel dataset, investigated the relationship between government size and economic growth in 29 rich OECD countries between 1970−1995 and 1970−2005. The results of the study, like the Fölster and Henrekson (2001) study, show the negative impact of government size on economic growth.

Alexander (1990) employed an OLS procedure for 17 OECD countries[vi] during the 1959−1984 period. His findings indicated that the growth rate of government expenditures to GDP ratio, the growth rate of the money supply to GDP and inflation are significantly and negatively associated with the growth rate of real GDP per capita, while the growth rate of the deficit to GDP ratio is not a significant factor. Gwartney et al. (1998), in their studies on 23 OECD member countries[vii] for the period 1960−1996, concluded that all government size indicators (total government expenditures and non-investment expenditures) would adversely affect economic growth.

Dar and AmirKhalkhali (2002) implemented random coefficients model and generalized least squares (GLS) for 19 industrialized OECD countries[viii] during the period 1971−1999 and concluded that, on average, total factor productivity increase, as well as the productivity of capital, are weaker in countries in which government size is bigger. That is to say that they found that the impact of government size on economic growth is negative.

As for Hansson and Henrekson (1994), they applied the F-test for 14 OECD countries[ix] for the period 1970−1987 and came to the conclusion that while government consumption spending is growth-retarding, spending on education has a positive effect on growth. Romero-Avila and Strauch (2008) used a distributed lag model for the period 1960−2001 based on annual time series data in 15 EU countries[x]. They concluded that total expenditures, total income, government consumption, transfers, and direct taxes had a negative and significant impact on economic growth. On the other hand, they found that government investments had a positive and significant effect on economic growth, but indirect taxes and social security contributions had no significant effect on economic growth.

Hsieh and Lai (1994) examined the relationship between government expenditures and economic growth by using a multivariate time series analysis and impulse-response function in the context of vector autoregressions for the G-7 Countries over different periods, such as Canada (1926−1987), France (1950−1987), Germany (1950−1987), Italy (1885−1987), Japan (1952−1987), the UK (1885−1987), and the USA (1889−1987). The empirical findings of the study show that "the relationship between government spending and growth can vary significantly across time as well as across the major industrialized countries that presumably belong to the same 'growth club'. …Most importantly, no consistent evidence is found that government spending can increase per capita output growth. …Besides, for most of the countries under study, public spending is found to contribute at best a small proportion to the growth of an economy" (Hsieh and Lai, 1994: 542).

Agell et al. (1997) investigated the relationship between government size (the average size of tax revenues as a share of GDP) and economic growth (the average annual growth rate in terms of GDP per capita) for the period 1970−1990 in 23 developed OECD countries and they found that no conclusion on whether the relation is positive, negative or non-existent. As with Hsieh and Lai (1994) and Agell et al. (1997), Vedder and Gallaway (1998) did not find a causal relationship between government size and economic growth. Vedder and Gallaway (1998) found a causal relationship between government size and economic growth only for the USA in their study for a group of developed countries consisting of the USA, Canada, Denmark, Italy, Sweden, and the UK for the period 1947−1997.

On the other hand, among empirical literature that directs at multiple developing country studies we can count Landau (1983, 1986), Devarajan et al. (1996), Guseh (1997), Günalp and Gür (2002), and Cooray (2008) at first glance. For example, the studies of Günalp and Gür (2002), and Cooray (2008) found a positive impact of government size on economic growth, while others, such as Landau (1983, 1986), Devarajan et al. (1996), and Guseh (1997) found the opposite, which was that the effect of government size on economic growth was negative for developing countries.

The study applied to panel data techniques for 34 developing countries over the period 1979−1997 belongs to Günalp and Gür (2002). Based on their empirical findings, they showed that government size is positively related to economic growth as well as economic performance in developing countries. Their findings revealed that the total impact of government size on economic growth is positive and quite big. Additionally, Cooray (2008) employed the OLS for a sample of 51 developing countries for the period 1996−2003 and concluded that government size has a positive but insignificant impact on economic growth.

As opposed to the above studies, two subsequent works by Landau (1983, 1986) used an OLS for 104 developing countries for the period 1961−1976 and then for 27 developing countries for the period of 1960−1980. He obtained the same result that a negative relationship between the share of government consumption expenditures in GDP and the growth of per capita, and also his all the regressions presented a strong negative relationship between the level of per capita product and the growth rate-a catch-up effect.

In addition to these two previous studies, Devarajan et al. (1996) used an OLS for 43 developing countries for the 1970−1990 period and their findings revealed that the impact of government size on economic growth is positive for the developed countries and negative for the developing ones. On the other hand, Guseh (1997) implemented fixed-effects model for 59 middle-income developing countries for the period 1960−1985, and his findings show that economic growth and development should include a reduction in government size.

What we see from the empirical literature available reviewed above is that there has not been a consensus on neither proxy measure used for government size nor the impact of government size on economic growth. And also, empirical studies have reached conflicting results. While some studies found the impact of government size on economic growth is positive, the other studies concluded either negative or no significant relation.

3.2. Empirical Studies on Optimal (Growth-Maximizing) Government Size

The growth-maximizing level of government size is a long disputable issue that has attracted the attention of large circles ranging from academicians, economists, and politicians, to special interest groups. That is why the empirical literature on the growth-maximizing government size is quite rich and still expanding. Appendix B presents available empirical studies on the government size-economic growth linkage in the literature. Accordingly, in this part of the thesis, empirical studies based on optimal government size are divided into two as single-country studies and multiple-country studies.

3.2.1. Single-Country Studies

As in the previous section (3.1.1), single-country studies are handled separately as the case of emerging markets and developing countries and developed countries.

3.2.1.1. Emerging Market and Developing Country Case

As we highlighted earlier, although a vast number of empirical studies have been conducted up to now, it seems that there is no consensus on the impact of government size on economic growth. However, empirical literature highlights some single-country studies which include emerging market and developing countries. Among these types of studies, we can count Rezk (2005), Herath (2009), Abounoori and Nademi (2010), Alimi (2014), de Mendonça and Cacicedo (2015), and Şen and Kaya (2019) that explored the optimal government size for emerging market and developing countries. A short summary of optimal government size for emerging market and developing countries are given below.

Rezk (2005) explored the growth-maximizing level of government size for Argentina for the period 1993−2003, and he found that this ratio is as high as 30%. Herath (2009) carried out a study analyzing the optimal government size for Sri Lanka for the period 1959−2003, and he estimated as this ratio 27%. Abounoori and Nademi (2010) investigated the optimal government size for Iran during the period 1956−2006. They estimated this ratio should be 34.7%. Alimi (2014) researched the optimal government size for Nigeria during the period 1970−2012, and he indicated that growth maximizing the level of government size should be 19.81% for Nigeria.

Using quarterly data for Brazil from 2000: 1 to 2013: 3, a relatively more recent study by de Mendonça and Cacicedo (2015) examined the growth-maximizing level of government size. The authors indicated that this ratio is around 22%. A very recent case study by Şen and Kaya (2019) on Turkey estimated empirically the optimal government size by using 14 different proxy measures for government size for the period 2006: 1 − 2016: 2. Their study showed that the optimal government size varies with the proxy measure used for government size. For example, as a proxy of government size, government consumption expenditures, direct taxes and indirect taxes as were estimated at 19%, 5%, 9% respectively, while government investment expenditures, defense expenditures, the education and health expenditures were estimated at 8%, 4%, 4%, 3% respectively. In addition to these, general government expenditures, general government noninterest expenditures, and central government expenditures were estimated at 25%, 22%, 23% respectively. On the other hand, general government revenues and non-tax revenues were estimated at 15%, 2% respectively.

In summary, the determination of government size is an up to date problem in the global scale. Moreover, the relationship between government size and economic growth is important for countries when determining their macroeconomic policies. In this context, the main objective of this thesis is to estimate the optimal government size in ensuring economic growth for Turkey. To realize this, drawing on Şen and Kaya's 2019 study, various measures related to the government budget's expenditures and revenues side have been used. However, in contrast to this study, I use annual time series data for a larger time span together with different econometric models.

3.2.1.2. Developed Country Case

As stated earlier, empirical literature focuses also some single-country studies which include developed countries. Among these types of studies, we can count Grossman (1987), Peden (1991), Scully (1994), Gwartney et al. (1998), Chao and Grubel (1998), Vedder and Gallaway (1998), Mittnik and Neumann (2003), Mavrov (2007), Scully (2008), and Facchini and Melki (2013) that examine the optimal government size for developed countries. A summary of optimal government size for developed countries is given below.

Grossman (1987) explored the optimal government size for the USA during the period 1929−1982 and concluded that this ratio is around 19%. On the other hand, Peden (1991) analyzed the growth-maximizing level of government size for the same country for the 1929−1986 period and found that this ratio is in the range of 17−20% of GNP. Scully (1994) asserted that this ratio should be 21.5% and 22.9% of GNP for the USA. Likewise, Gwartney et al. (1998) explored the growth-maximizing level of government size for the USA during the 1960−1990 period and concluded this ratio is lower than 20% of GDP.

Chao and Grubel (1998) examined the growth-maximizing level of government size for Canada for the 1929−1996 period and found the related ratio for Canada is equal to about 34% of national income. Vedder and Gallaway (1998) performed a study analyzing the growth-maximizing government size for the USA during the period 1947−1997, and they found that growth-maximizing government size ratio is 28.87% of GDP. Another study of Mittnik and Neumann (2003) examined the optimal government size for West Germany for the period 1968−1994, and they reached that this ratio should be 20%. The study belongs to Mavrov (2007) examined the optimal government size for Bulgaria for the 1990–2004 period, and he reached that this ratio should be 21.4%. Scully (2008) explored the growth-maximizing level of government size for the USA during the 1960−1990 period, and he concluded this ratio should be 19.3% of GDP. For France, Facchini and Melki (2013) carried out a study analyzing the growth maximizing level of government size for the period 1896–2008. They estimated this ratio should be around 30% of GDP.

3.2.2. Multiple-Country Studies

Academic circles have also attempted to estimate the optimal government size in multiple countries. The studies by Karras (1996), Karras (1997), Afonso et al. (2003), Pevcin (2004), Gunalp and Dincer (2005), Chobanov and Mladenova (2009), Forte and Magazzino (2011), Christie (2012), Hok et al. (2014) are among multiple-country studies that investigate the optimal government size for multiple countries. Below these studies are reviewed in detail.

Karras (1996) examined the optimal government size for 118 countries during the period 1960–1985. He reached that this ratio should be 23%. Karras (1997) studied the growth-maximizing level of government size for 20 European countries for 1950–1990 period, and he found that this ratio is roughly 16% of GDP (+/-3%).

Afonso et al. (2003) investigated the optimal government size for 23 OECD countries for the period 1990–2000, and they concluded this ratio should be 35%. Pevcin (2004) carried out a study analyzing the growth-maximizing level of government size for 12 European countries during the period 1950–1996, and he found that this ratio should be approximately between 36% and 42% of GDP.

On the other hand, Günalp and Dinçer (2005) searched the growth-maximizing level of government size for 20 transition countries during the period 1990–2000, and they estimated as this ratio 17.3% (+/-3%). Chobanov and Mladenova (2009) explored that optimal government size for 28 EU countries during the period 1970–2009, and they reached that this ratio should be 25%.

Forte and Magazzino (2011) explored the optimal government size for 27 EU countries during the 1970–2009 period. They indicated that this ratio should be between 35.39% and 43.50%. Christie (2012) examined the optimal government size for 136 countries for the 1971–2005 period and concluded that this ratio should be 35% of GDP.

For 8 Asian countries, Hok et al. (2014) explored the optimal government size for the period 1995–2011, and they reached that this ratio should be 28.50% of GDP.

4. ECONOMETRIC FRAMEWORK

This part of the thesis contains econometric methodology, data set and variables, and model specification.

4.1. Econometric Methodology

The main objective of this thesis is to investigate the long-run relationship between government size and economic growth in Turkey for the period 1974–2016 and then, if there exists such a relationship, to estimate the optimal size of government for Turkey.

For this purpose, firstly, Augmented Dickey-Fuller (ADF) test developed by Dickey and Fuller (1979) and Phillips-Perron (PP) test developed by Phillips and Perron (1988) are used to determine the appropriate estimation technique. The reason for using these types of unit root tests is to examine the stationarity properties of the level and first difference of the variables. Secondly, the cointegration relationship among the variables is estimated by ARDL bound test (Pesaran et al., 2001) by using the quadratic equation method.

4.2. Data Set and Variables

In the thesis, the annual time series data for Turkey spanning from 1974 to 2016, which comprises 43 observations is used. This is the longest possible time span when the available data set is considered.

The data on central government final consumption expenditures, financial sector development, consumer price index (CPI) inflation, and foreign direct investment are retrieved from the World Bank's official web site (www.worldbank.org) whereas the data on central government budget expenditures, central government investment expenditures, central government budget revenues, central government non-tax revenues, central government direct tax revenues, central government indirect tax revenues are taken from the General Directorate of Budget and Fiscal Control (see for details its official website at www.bumko.gov.tr).

It is worthy to note here that the data for the period 1974–1983 is calculated by the author by using the "Realizations of Government Expenditures and Revenues (1924–1995)—that is, Bütçe Gider ve Gelir Gerçekleşmeleri (1924-1995) in Turkish", a statistical report published by the Ministry of Treasury and Finance, and the data for the period 1983–2016 is taken from annually budget justifications; the data on real GDP growth rates are from the Presidency of Turkey, Strategy and Budget Office's official web site (www.sbb.gov.tr), and finally the data on employment are obtained from the data set provided by Bulutay (1995).

In this thesis, eight variables are used in total. These variables are the real GDP growth rate (as the dependent variable), financial sector development, CPI inflation, foreign direct investment, employment participation rate, crisis dummy, government size and, finally the squared term of the government size as the two main explanatory variables.

We consider using eight expenditure-related and four income-related variables, in total twelve, as the proxy measures of government size (see Table 4.1). Expenditure-related government size measures cover central government budget expenditures[3], central government education expenditures, central government health expenditures, central government total health and education expenditures, central government defense expenditures, central government final consumption expenditures, central government investment expenditures, central government total, and real expenditures. As for revenue-related government size measures, they are central government budget revenues, central government non-tax revenues, central government direct tax revenues, central government indirect tax revenues.

[3] Central government budget expenditures consist of the sum of personnel expenditures, other current expenditures, investment expenditures, and transfer expenditures.

Table 4.1. Definition of variables and data sources

<table>
<tr><th colspan="2">Variable</th><th>Abbrev.</th><th>Definition/Measurement</th><th>Data Source</th></tr>
<tr><td colspan="2">Dependent Variable</td><td>RGdpG</td><td>Annual Percent Change in real GDP over the previous year *</td><td>Presidency of Strategy and Budget Office</td></tr>
<tr><td rowspan="17">Independent Variables</td><td rowspan="12">Alternative Interest Variables (Alternative Proxy Variables for Government Size)</td><td>ECenGov</td><td>Share of Central Government Budget Expenditures in GDP**</td><td>General Directorate of Budget and Fiscal Control</td></tr>
<tr><td>EE</td><td>Share of Central Government Education Expenditures in GDP***</td><td>General Directorate of Budget and Fiscal Control</td></tr>
<tr><td>HE</td><td>Share of Central Government Health Expenditures in GDP***</td><td>General Directorate of Budget and Fiscal Control</td></tr>
<tr><td>EHE</td><td>Share of Central Government Total Health and Education Expenditures in GDP***</td><td>General Directorate of Budget and Fiscal Control</td></tr>
<tr><td>DE</td><td>Share of Central Government Defense Expenditures in GDP***</td><td>General Directorate of Budget and Fiscal Control</td></tr>
<tr><td>CE</td><td>The Share of Central Government Final Consumption Expenditures in GDP</td><td>World Bank</td></tr>
<tr><td>IE</td><td>The Share of Central Government Investment Expenditures in GDP</td><td>General Directorate of Budget and Fiscal Control</td></tr>
<tr><td>CIE</td><td>The Share of Central Government Total and Real Expenditures in GDP***</td><td>World Bank, General Directorate of Budget and Fiscal Control</td></tr>
<tr><td>RCenGov</td><td>The Share of Central Government Budget Revenues in GDP</td><td>General Directorate of Budget and Fiscal Control</td></tr>
<tr><td>RNonT</td><td>The Share of Central Government Non-Tax Revenues in GDP</td><td>General Directorate of Budget and Fiscal Control</td></tr>
<tr><td>RDirT</td><td>The Share of Central Government Direct Tax Revenues in GDP</td><td>General Directorate of Budget and Fiscal Control</td></tr>
<tr><td>RIndT</td><td>The Share of Central Government Indirect Tax Revenues in GDP</td><td>General Directorate of Budget and Fiscal Control</td></tr>
<tr><td rowspan="4">Control Variables</td><td>DCPS</td><td>Domestic Credit to Private Sector as a percentage of GDP is accepted as the proxy of financial sector development</td><td>World Bank</td></tr>
<tr><td>INF</td><td>Inflation Rate
Change in consumer price index (CPI, %)</td><td>World Bank</td></tr>
<tr><td>FDI</td><td>Foreign Direct Investment (Inflows) GDP (%)</td><td>World Bank</td></tr>
<tr><td>EMP</td><td>Employment Participation Rate (%) (15+)</td><td>Bulutay (1995)</td></tr>
<tr><td>Dummy Variable</td><td>CD</td><td>Crisis dummy for economic crises in the years 1980, 1994, 1999, 2001, 2009.</td><td></td></tr>
</table>

* http://www.sbb.gov.tr/ekonomik-veriler/#1540461995857-3570233a-09e6
** http://www.bumko.gov.tr/TR,4461/butce-gider-gelir-gerceklesmeleri-1924-2016.html
*** Data for 1974-1983 is calculated by author by using the "Realizations of Government Expenditures and Revenues (1924-1995)", Revised 2nd Edition and data for 1983-2016 is taken from annually budget justifications.

In line with the purpose of this thesis, the variables related to expenditures used in the econometric section of the thesis are chosen on the basis of the functional classification of government expenditures. Under the functional classification of government expenditures, it is possible to analyze as well as evaluate the expenditures according to their functions (Sağbaş and Ciğerci, 2019: 11). This is because functional classification of government expenditures refers to grouping of government expenditures according to government services. As is known, the aim of this classification is to determine the benefit of the services provided by the state and the cost that these services bring to the state.

Before delving into the econometric estimation, it would be better to look at the descriptive statistics of the variables under consideration. This is important because these statistics summarize the statistical properties of the series in the model such that some explanations about the behavior of the series can be offered briefly.

Descriptive statistics and correlations of main variables and visual representations of the series are presented in Tables 4.2 and 4.3, and Figure 4.1, respectively. All the variables we used are expressed as a percentage of GDP. Additionally, central government data are used throughout the thesis, because most of the government expenditures and revenues are carried out by the central government in Turkey. The justification of the variables we used is presented in Section 4.3.

Table 4.2. Descriptive statistics

	RGdpG	CE	IE	CIE	DE	EE	HE	EHE	ECenGov	RCenGov	RNonT	RDirT	RIndT	INF	FDI	DCPS	EMP
Mean	4.54	11.80	2.59	14.40	1.99	2.75	0.78	3.54	19.11	16.19	1.60	5.39	7.68	40.95	0.80	25.73	54.99
Median	5.59	12.23	2.72	14.66	2.01	2.70	0.66	3.32	17.35	14.77	1.64	5.38	6.79	37.61	0.45	18.48	53.70
Maximum	11.11	15.77	4.40	18.91	3.01	4.60	1.60	5.80	33.54	24.28	5.15	7.22	12.77	105.21	3.65	69.85	67.50
Minimum	-5.96	7.52	0.98	9.70	1.20	1.39	0.31	1.72	11.88	9.65	0.46	3.86	3.34	6.25	0.01	13.58	46.20
Std. Dev.	4.30	2.07	0.78	2.38	0.52	0.88	0.38	1.23	5.65	4.44	0.97	0.76	3.45	29.48	0.89	15.64	6.42
Skewness	-0.88	-0.49	-0.14	-0.11	0.01	0.31	0.63	0.30	0.66	0.12	1.53	0.22	0.28	0.38	1.53	1.72	0.47
Kurtosis	3.10	2.67	2.30	2.33	1.84	2.14	2.10	1.90	2.79	1.61	5.98	2.52	1.37	1.92	4.72	4.62	2.13
Jarque-Bera	5.58	1.96	1.03	0.89	2.38	2.04	4.31	2.83	3.22	3.53	32.83	0.75	5.29	3.11	22.14	26.01	2.94
Probability	0.06	0.37	0.59	0.63	0.30	0.35	0.11	0.24	0.19	0.17	0.00	0.68	0.07	0.21	0.00	0.00	0.22
Sum	195.43	507.71	111.75	619.50	85.91	118.66	33.78	152.44	821.74	696.40	69.15	232.06	330.61	1761.11	34.66	1106.68	2364.90
Sum Sq. Dev.	777.03	181.53	25.58	238.81	11.53	32.74	6.20	64.20	1343.93	829.49	39.91	24.69	501.30	36512.5	33.61	10285.21	1733.85
Observations	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43

Source: Author’s computations

We provide basic descriptive statistics from our data in Table 4.2, above. The table displays the mean, median, maximum, minimum, standard deviation, skewness, and kurtosis for each variable. As shown from the table, the average rate of real GDP growth as 4.54% and the standard deviation of real GDP growth as 4.30%, which indicates that for this variable the values scattered widely about the mean.

The means of CE, IE, CIE, DE, EE, HE, EHE, and ECenGov are 11.80%, 2.59%, 14.40%, 1.99%, 2.75%, 0.78%, 3.54%, and 19.11%, respectively. However, from the standard deviations (2.07, 0.78, 2.38, 0.52, 0.88, 0.38, 1.23, and 5.65) we see that the values concentrated near the means excluding CE, CIE, and ECenGov.

On the other hand, the means of RCenGov, RNonT, RDirT, and RIndT are 16.19%, 1.60%, 5.39%, and 7.68%, respectively. The standard deviations (4.44, 0.97, 0.76, and 3.45) show that the values scattered widely about the mean for RCenGov and RIndT whereas the values concentrated near the means for RNonT and RDirT.

Finally, the means of INF, FDI, DCPS, and EMP are 40.95%, 0.80%, 25.73%, and 54.99%, respectively. However, from the standard deviations (29.48, 0.89, 15.64, and 6.42) what we also see is that there are wide disparities among the observations in the sample excluding FDI. Especially, the inflation rate (INF) in Turkey over the relevant years ranged widely, between 6.25% and 105.21%. Similarly, domestic credit to private sector rates ranged widely, changing between 13.58−69.85%.

Table 4.3. Correlation matrix of the variables

	RGdpG	CE	IE	CIE	DE	EE	HE	EHE	ECen Gov	RCen Gov	RNonT	TDir	TInd	INF	FDI	DCPS	EMP
RGdpG	1																
CE	-0.08	1															
IE	0.08	0.23	1														
CIE	-0.04	0.94	0.52	1													
DE	-0.22	-0.24	-0.22	-0.28	1												
EE	0.06	0.89	0.24	0.85	-0.41	1											
HE	0.05	0.83	0.28	0.82	-0.52	0.88	1										
EHE	0.06	0.89	0.26	0.86	-0.46	0.98	0.94	1									
ECenGov	-0.07	0.68	-0.09	0.56	-0.05	0.68	0.67	0.70	1								
RCenGov	0.02	0.75	0.18	0.71	-0.18	0.82	0.84	0.85	0.88	1							
RNonT	-0.01	0.39	0.07	0.36	0.10	0.52	0.57	0.55	0.65	0.79	1						
TDir	-0.40	0.30	0.20	0.33	0.56	0.16	0.10	0.14	0.38	0.38	0.42	1					
TInd	0.16	0.77	0.17	0.73	-0.43	0.86	0.89	0.89	0.82	0.92	0.60	0.13	1				
INF	-0.36	-0.38	-0.63	-0.54	0.44	-0.52	-0.59	-0.55	-0.32	-0.55	-0.35	-0.04	-0.64	1			
FDI	0.04	0.57	0.21	0.56	-0.60	0.60	0.78	0.67	0.47	0.66	0.41	-0.02	0.75	-0.54	1		
DCPS	0.17	0.58	0.47	0.66	-0.72	0.73	0.65	0.72	0.29	0.46	0.07	-0.11	0.65	-0.58	0.52	1	
EMP	-0.09	-0.53	0.27	-0.37	0.49	-0.64	-0.74	-0.69	-0.73	-0.73	-0.48	0.09	-0.78	0.29	-0.69	-0.37	1

Source: Author’s computations

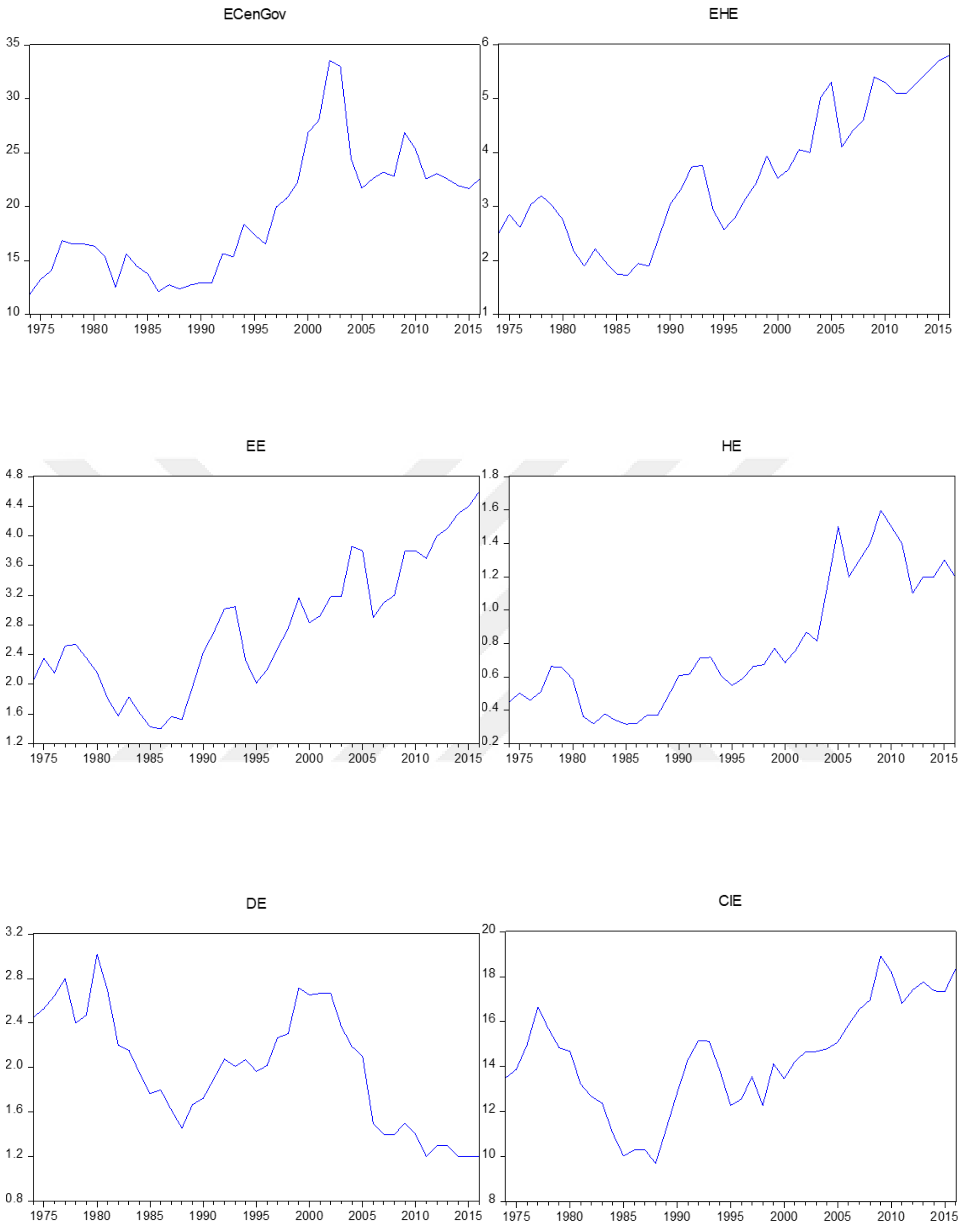


Figure 4.1. Visual representation of the series, 1974-2016
Source: Author's computations

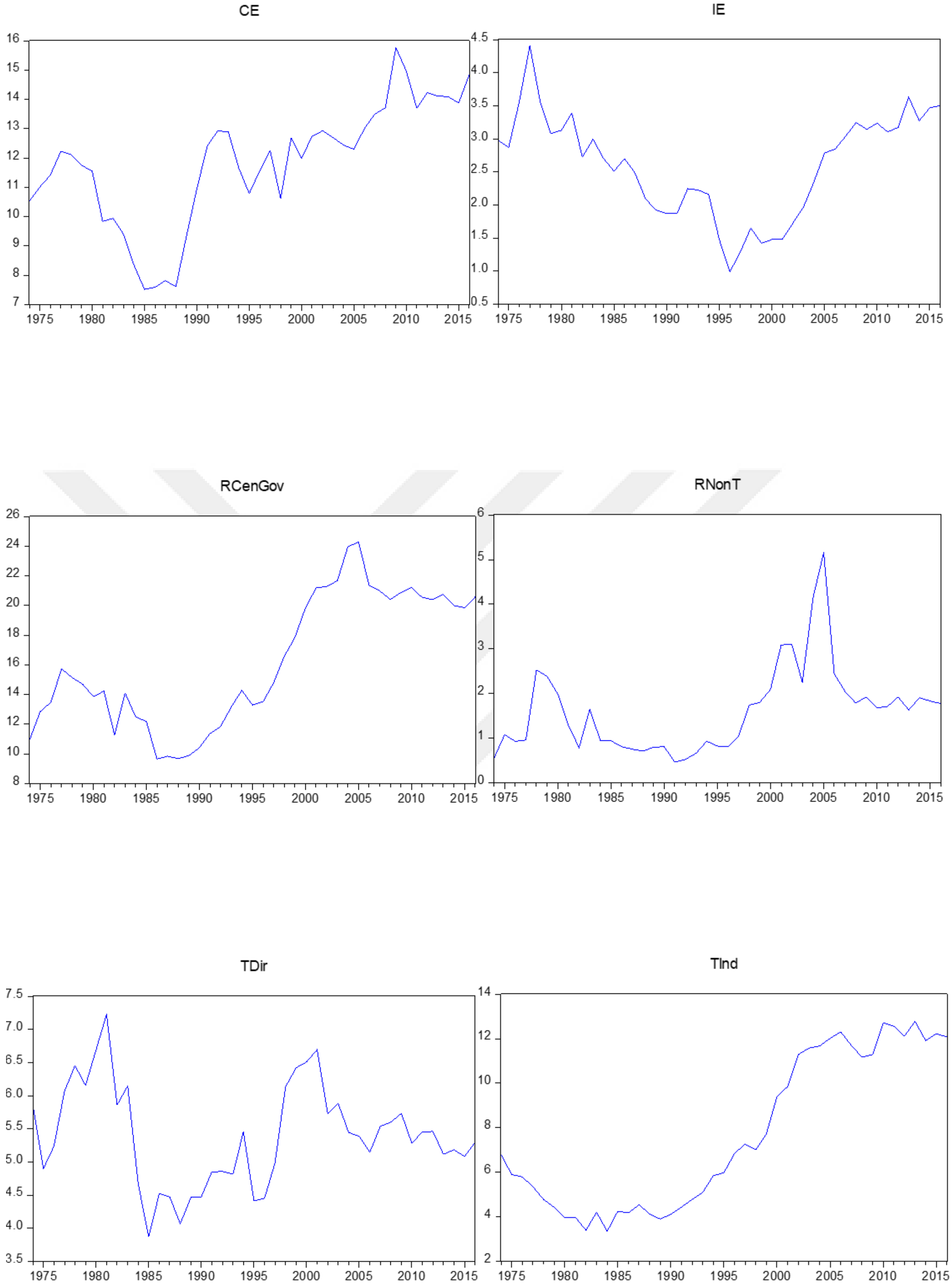


Figure 4.1. (continued)

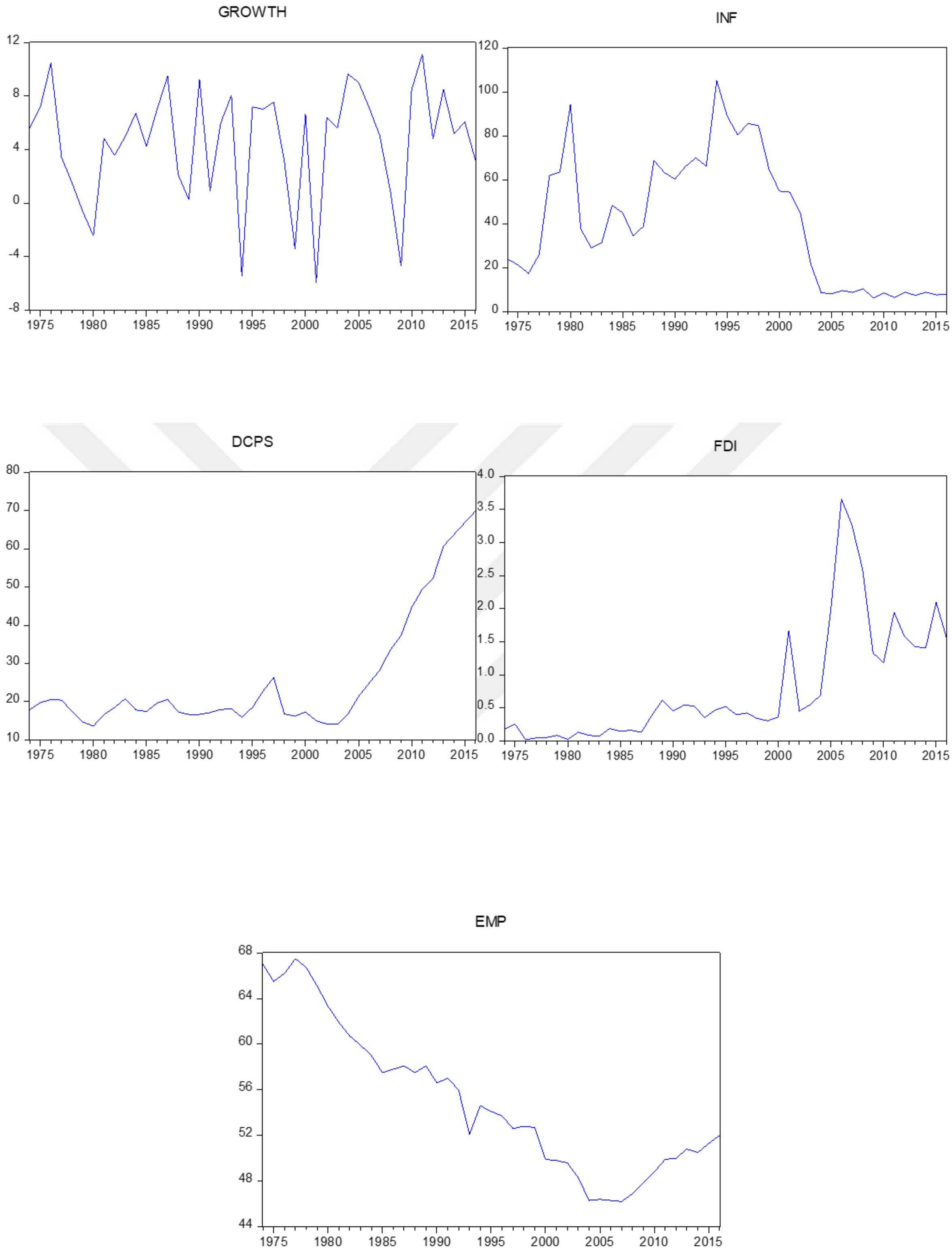


Figure 4.1. (continued)

The visual representation of the series is presented in Figure 4.1, above. The figure plots the evolution of RGdpG, ECenGov, EHE, EE, HE, DE, CIE, CE, IE; and RCenGov, RNonT, RDirT, RIndT from 1974 to 2016. As shown in Figure 4.1, RGdpG is affected negatively especially in the pre-1994 crisis period, 1999 bottleneck, 2001 crisis, and the 2008/09 global crisis and in this times it has faced sharp declines; ECenGov has an increasing trend about until 2002, and it is negatively affected especially by the 2001 crisis. And, an increasing trend from 2005 to 2009; and it is negatively affected by the 2008/09 global crisis. CIE has started to decrease since the early 1980s to the early 1990s due to pursuing liberal policies. And after that, except for the crisis years, it has shown an increasing trend in general terms. EHE has an increasing trend mostly, but it has affected negatively especially by the 1994, 2001 and 2008 crises. DE has started to decrease since the 1980s to the beginning of the 1990s with the participation of the NATO alliance and the start of military aid. But after that from the 1990s to the 2000s, it has an increasing trend due to the increase in terror incidents. And after 2002, it has tended to decrease again.

On the other hand, adhering to Figure 4.1, RCenGov has started to increase since 1985 due to the implementation of Value Added Taxes (VAT), and it peaks up with the contribution of privatization revenues in 2005. After 2005, it has started to decrease until 2008. RNonT faced sharp increases in 2005 because of the privatization of the state-owned economic enterprises, especially Türk Telekom—one of the three giant telecommunication operators operating in Turkey, and Tüpraş—that is, a company that operates four refineries with crude oil in Turkey. After 2005 it has displayed a downward trend. RDirT, the share of direct taxes, decreased with the effect of liberalization movements after 1980. RIndT has started to increase since the beginning of 1990. VAT leads to this increase as with RCenGov.

4.3. Model Specification

Neo-classical growth models developed by Solow-Swan basically assume that economic growth is entirely determined by external factors and therefore, the public policies do not create any effect on the level of economic growth. On the other hand, endogenous growth models are developed by the contribution of several scholars, including, inter alia, King and Rebelo (1990), Futagami et al. (1993), Jones et al. (1993), Stokey and Rebelo (1995), Devarajan et al. (1996), Mendonza et al. (1997), Ghosh and Mourmouras (2002). Furthermore, Barro (1990), attributes a pivotal role to government policies in the growth process. Accordingly, fiscal policy (notably taxes and government expenditures) plays a key role in the economic growth process. Namely, government policies in general, fiscal policy in particular, are one of the prominent determinants of economic growth. The endogenous growth model assumes that the policies implemented by the public sector affect economic growth.

The basic study that examines the relationship between government size and economic growth within the framework of endogenous growth model and leading many studies in this area belongs to Barro (1990). Barro (1990) developed a growth model that includes the government expenditures variable and found evidence of an inversed U-shaped non-linear relationship between government size and economic growth in the long run.

Accordingly, this thesis is built on Barro (1990). In his influencing study, Barro (1990) accepts public policies as a production input, government expenditures financed by taxes have a positive effect on economic growth up to a certain level of efficiency. However, after this effect exceeds the optimal level, it starts to show negative effects on growth and leads to reversed U-shaped in the relationship between government size and economic growth. So, in this thesis, the same manner is followed.

In line with Barro's (1990) study, in the present thesis, we use 12 alternative models based on 12 different explanatory variable sets for our estimation over the period of 1974–2016. In this context, the first eight models (Model 1 through Model 8 that are presented in below) are based on the government expenditures while further four models (Model 9 through Model 12) are based on government revenues.

In other words, by the first eight models, the impact of government size on economic growth in Turkey is examined by using government expenditures-related proxy measures of government size. By using the last four models (Model 9 through Model 12) given below, the same relationship examined in terms of the revenue side. For the first eight models, we use the following variables: RGdpG (as the dependent variable), ECenGov, EE, HE, EHE, DE, CE, IE, CIE. In the last four models, we use the following variables: RGdpG (as the dependent variable), RcenGov, RnonT, RdirT, RindT.

$$RGdpG = f(INF, DCPS, FDI, EMP, CD, EcenGov, EcenGov^2) \quad (1)$$

$$RGdpG = f(INF, DCPS, FDI, EMP, CD, EE, EE^2) \quad (2)$$

$$RGdpG = f(INF, DCPS, FDI, EMP, CD, HE, HE^2) \quad (3)$$

$$RGdpG = f(INF, DCPS, FDI, EMP, CD, EHE, EHE^2) \quad (4)$$

$$RGdpG = f(INF, DCPS, FDI, EMP, CD, DE, DE^2) \quad (5)$$

$$RGdpG = f(INF, DCPS, FDI, EMP, CD, CE, CE^2) \quad (6)$$

$$RGdpG = f(INF, DCPS, FDI, EMP, CD, IE, IE^2) \quad (7)$$

$$RGdpG = f(INF, DCPS, FDI, EMP, CD, CIE, CIE^2) \quad (8)$$

$$RGdpG = f(INF, DCPS, FDI, EMP, CD, RcenGov, RcenGov^2) \quad (9)$$

$$RGdpG = f(INF, DCPS, FDI, EMP, CD, RnonT, RnonT^2) \quad (10)$$

$$RGdpG = f(INF, DCPS, FDI, EMP, CD, RdirT, RdirT^2) \quad (11)$$

$$RGdpG = f(INF, DCPS, FDI, EMP, CD, RindT, RindT^2) \quad (12)$$

In our models: (i) inflation rate, (ii) domestic credit to private sector, (iii) foreign direct investment, (iv) employment participation rate, and (v) dummy variable for the economic and political crisis are considered as control variables. At this point, it is important to emphasize that the main objective of the thesis is to investigate the long-run relationship between government size and economic growth in Turkey and then, if there exists such a relationship, to estimate the optimal size of government for Turkey.

The first control variable of our model that we considered is inflation (INF). Herein, INF refers to the annual changes in consumer price index over the previous year in order to eliminate the possible seasonality problems in prices. In the literature, empirical studies produce mixed results on the relationship between inflation and economic growth.

For example, De Gregorio (1992), Fischer (1993), Barro (1995), Andres and Hernando (1999), Gillman et al. (2002), and Gillman and Harris (2010) found a negative effect of inflation on economic growth, while others, such as Tobin (1965), Kormendi and Meguire (1985), Mallik and Chowdhury (2001), reported an opposite result in the long run. What is more, some papers, including Sidrauski (1967), found no relationship between inflation and economic growth. Based on these studies, we expect that the relationship between economic growth and inflation may be positive, negative or neutral.

Our second variable is domestic credit to the private sector that is accepted as the proxy of financial sector development (DCPS). The DCPS plays a very important role in increasing investment and employment in an economy, providing not only efficiency and productivity but also enhancing economic growth (Begum and Aziz, 2019). Krugman (1990: p.9) states that "productivity is not everything, but in the long run it is almost everything." Patric (1966) explains the importance of the financial sector for the supply of financial resources which are essential for economic growth due to the fact that the developed financial sector can promote economic growth by financing profitable business ventures through the mobilization of domestic savings, more efficient allocation of resources and risk diversification. Bencivenga et al. (1996) concluded that the development of the financial sector, through the increase of liquidity, positively affects economic growth. It can be concluded that a positive relationship between the financial sector development and economic growth may be established dependent on the access of best users to financial resources easier and faster. On the other hand, it is argued that financial sector development is negatively associated with economic growth. For example, Olowofeso et al. (2015: p.82) pointed out that "the efficient provisioning of credit has a positive and significant effect on output and employment opportunities while a low level of financial development and its attendant inefficient private sector credit system distorts economic growth". So, the expected sign of the financial sector development in this thesis is negative due to the fact that Turkey is a developing country. Therefore, we can conclude that, due to the existence of an insufficiently developed and illiquid financial market in Turkey, there are limited opportunities for its significant impact on economic growth.

The third control variable we included in our model is the foreign direct investment (FDI) as a share of GDP. Considering the available literature, we posit that the FDI is negatively or positively associated with economic growth. The literature on the FDI-growth nexus has yielded mixed results. For example, Borensztein et al. (1998) stated that FDI is an important mechanism for the transfer of technology that contributing positively to economic growth more than domestic investment. However, the FDI can stimulate economic growth only when the host country has a minimum threshold stock of human capital. Thus, the FDI contributes to economic growth only when a sufficient absorptive capability of the advanced technologies is available in the host economy. Studies by Borensztein et al. (1998), Bengoa and Sanchez-Robles (2003), and Apergis and Arusha (2017) demonstrated that the host countries require adequate human capital, economic stability and liberalized markets to easily access from long-run capital flows. In addition, Alfaro et al. (2004) found that the FDI promotes economic growth in countries with a sufficient level of development of local financial markets while Balasubramanyam et al. (1996) stressed that trade openness is vital for obtaining the growth-effects of the FDI.

Apart from these, there are some situations in which the FDI may adversely affect the host country's economy. Some sorts of the FDI inflows might be detrimental for the host country's economy in general and its economic growth rates. For instance, the high competitiveness of the investing country can adversely affect the companies in the host country and cause them to lose their existing power in the market (Kahveci and Terzi, 2017).

Li and Liu (2005) stated that there is a significant positive interaction of FDI with human capital while a significant negative interaction of FDI with the technology gap on economic growth in developing countries. Adams (2009) and Ahmad et al. (2017) asserted that the FDI can even have negative effects on the economic growth in an environment of trade limitation. In addition to these, Lamsiraroj (2016) indicated that the effect of domination exercised by the foreign firms can discourage local firms to develop their own rent activities. According to Schoors et al. (2002), at the early stages of economic development, FDI may actually have a negative impact on economic growth. "Additional inflows of FDI in firms may push out of the market other firms without FDI. This fact is referred to as a "market stealing" effect when domestic firms are not so productive compared to foreign ones. Dependence from foreign investors and repatriation of profits are among other factors with negative influence. When the foreign capital leaves the market, domestic firms will not be able to fulfill that gap in the short run" (Miteski and Stefanova, 2017: 6).

In contrast to the studies above, Azman-Saini et al. (2010) revealed that the contribution of FDI to economic growth is non-existent. Carkovic and Levine (2002) asserted that for both developed and developing countries, FDI inflows do not exert an independent influence and a reliable positive impact on economic growth even allowing for the level of education, the level of economic and financial development, and trade openness of the host country.

Briefly, there is not an agreed consensus about the direction of the relationship between FDI and economic growth. However, the type of investment should be taken into account when assessing the impact of FDI on economic growth. FDI can be realized as new investments, acquisitions, and mergers. In the event that FDI is realized as an acquisition or merger, it is not expected that the investments will not create a new production area and will not have any positive effect on economic growth. Hence, there is not an agreed consensus about the sign of this variable. Due to above reasons, FDI enters to the model with a positive or negative sign.

Our fourth control variable is the employment participation rate (EMP). There are few studies in the literature that examine the relationship between employment and economic growth. The existing studies yield mixed results. For example, Saget (2000) found mixed results for different countries. Accordingly, the relationship between employment and economic growth has a positive effect on economic growth for Hungary, Poland, the Czech Republic, Slovakia, and Russia. However, the author found that a negative impact on Romania and no relationship for Bulgaria and Ukraine. On the other hand, Yam et al. (2002) found the relationship to be positive, whereas Abdullah et al. (2011) found that there is no significant relationship between the variables. The results of the Seyfred (2005) showed that although there is a short-run relationship between economic growth and employment, no long-run relationship exists. Therefore, there is no consensus about the sign of employment participation rate variable.

Our fifth control variable is crisis dummy. This dummy variable posits the years with negative economic growth as a crisis year. Accordingly, the crisis years for the Turkish economy are 1980, 1994, 1999, 2001, and 2009. In this way, we aim to remove the effect of the crisis from the impact of government size on economic growth. Thus, the expected sign of the crisis dummy in this thesis is negative.

Our sixth and main variable is government size. In the literature, there are different proxy measures for government size. However, from the literature, it is possible to say that the ratio of government expenditures to GDP is the most commonly used proxy measure. On the other hand, due to the fact that the components of government expenditures vary more from country to country according to the components of government revenues, it is considered that it is more appropriate to use the ratio of government revenues to GDP in studies aiming to make international comparisons. Due to lack of a consensus over the issue, in this thesis, instead of using a single proxy measure, we use a number of proxy measures for government size.

5. EMPIRICAL FINDINGS and DISCUSSION

This part of the thesis comprises of unit root test results and ARDL bound test results.

5.1. Unit Root Test Results

In order to empirically investigate the stationary of all the variables, we employed the ADF and the PP unit root tests. The difference between the PP unit root test and the ADF unit root test is that the lagged values of the dependent variable are not included in any of the alternative forms. The ADF and the PP tests' the null hypothesis of non-stationarity is tested against the alternative of stationary.

The results of the unit root tests of the variables are represented in Table 5.1 and 5.2. Accordingly, EcenGov, EHE, EE, HE, DE, CIE, CE, IE, RcenGov, RnonT, RdirT, RindT are stationary at first difference I(1) for both models which include both constant and constant and trend. However, RGdpG is stationary at level I(0) for both models which include both constant and constant and trend; FDI is stationary at level I(0) for constant and trend model; RdirT is stationary at level I(0) for the constant model. Put it simply, given these results, series are stationary at different orders.

Table 5.1. Unit root test results, 1974-2016

	ADF unit root test						PP unit root test					
Series	**Level Constant**	**Critical Values**		**Level Constant and Trend**	**Critical Values**		**Level Constant**	**Critical Values**		**Level Constant and Trend**	**Critical Values**	
		5%: -2.933	**1%: -3.596**		**5%: -3.520**	**1%: -4.192**		**5%: -2.933**	**1%: -3.596**		**5%: -3.520**	**1%: -4.192**
RGdpG	-6.268(0)***			-6.236(0)***			-6.264***			-6.291***		
CE	-1.102(0)			-2.062(0)			-1.325			-2.302		
IE	-1.287(0)			-1.204(0)			-1.363			-1.102		
CIE	-0.831(0)			-2.032(0)			-1.159			-1.840		
HE	-1.003(0)			-2.198(0)			-0.946			-2.243		
EE	-0.346(0)			-2.816(1)			-0.209			-2.214		
EHE	-0.452(0)			-2.286(0)			-0.196			-2.170		
DE	-1.025(0)			-1.652(0)			-1.207			-1.953		
EcenGov	-1.594(0)			-2.242(1)			-1.667			-2.077		
RcenGov	-1.043(0)			-2.041(2)			-1.120			-1.592		
RnonT	-2.549(0)			-2.640(0)			-2.465			-2.579		
RdirT	-2.524(0)			-2.487(0)			-2.625*			-2.590		
RindT	0.111(0)			-2.823(0)			-0.181			-2.771		
FDI	-1.943(0)			-3.654(1)**			-1.827			-2.698		
DCPS	2.794(0)			0.740(0)			2.412			0.551		
INF	-1.616(0)			-2.185(0)			-1.565			-2.095		
EMP	-2.056(0)			-0.219(0)			-2.030			-0.067		

Note: The number in parentheses indicates the selected lag order of the ADF models. Lags are chosen based on AIC. The critical values are obtained from James G. MacKinnon (1996) for the ADF test. Asterisks (*), (**), (***) denote statistical significance at 10%, 5% and 1%, respectively. E-Views 10 was used for computations. For PP Quadratic Spectral Kernel., Newey-West Bandwith is used.

Table 5.2. Unit root test results, 1974-2016

	ADF unit root test		PP unit root test	
Series	**First Difference Constant** (Critical Values 5%:-2.936, 1%:-3.605)	**First Difference Constant and Trend** (Critical Values 5%:-3.526, 1%:-4.205)	**First Difference Constant** (Critical Values 5%:-2.935, 1%:-3.600)	**First Difference Constant and Trend** (Critical Values 5%:-3.523, 1%:-4.198)
D(RGdpG)	-7.113(1)***	-7.043(1)***	-19.817***	-19.648***
D(CE)	-5.980(0)***	-5.957(0)***	-5.991***	-5.964***
D(IE)	-5.508(1)***	-5.897(1)***	-5.934***	-6.052***
D(CIE)	-5.225(0)***	-5.263(0)***	-5.209***	-5.256***
D(HE)	-6.224(0)***	-6.151(0)***	-6.230***	-6.152***
D(EE)	-5.596(0)***	-4.826(1)***	-5.578***	-6.138***
D(EHE)	-5.819(0)***	-5.114(1)***	-5.885***	-7.346***
D(DE)	-2.816(2)*	-2.745(2)	-5.694***	-5.629***
D(EcenGov)	-5.585(0)***	-5.520(0)***	-5.589***	-5.525***
D(RcenGov)	-6.356(0)***	-6.262(0)***	-6.356***	-6.262***
D(RnonT)	-6.557(1)***	-6.491(1)***	-7.085***	-6.977***
D(RdirT)	-7.006(0)***	-6.920(0)***	-6.990***	-6.906***
D(RindT)	-3.281(1)**	-3.272(1)***	-6.189***	-6.291***
D(FDI)	-5.645(2)***	-5.559(2)***	-10.607***	-10.388***
D(DCPS)	-4.056(0)***	-5.095(0)***	-4.005***	-5.050***
D(INF)	-6.838(0)***	-6.915(0)***	-6.894***	-7.176***
D(EMP)	-6.088(0)***	-6.592(0)***	-6.140***	-6.593***

Note: The number in parentheses indicates the selected lag order of the ADF models. Lags are chosen based on AIC. The critical values are obtained from James G. MacKinnon (1996) for the ADF test. Asterisks (*), (**), (***) denote statistical significance at 10%, 5% and 1%, respectively. E-Views 10 was used for computations. For PP Quadratic Spectral Kernel., Newey-West Bandwith is used. * denote statistical significance at 10% (-3.178578).

Since the variables have different integration orders, we cannot employ Engle-Granger (1987), Johansen and Juselius (1990), and Johansen's (1988) cointegration tests. However, in our case, since there is no I(2) data, we can safely apply the ARDL bound test.

5.2. ARDL Bound Test Results

As stated earlier, the analysis is based on the annual time series data covering the period of 1974–2016 with 43 observations. To be able to determine the appropriate econometric method, two-unit root tests are implemented both on the level and the first differenced forms in the previous subchapter. According to the test results, we have a group of time series, some I(0), other I(1); but no I(2); in this case, as a next step, we investigate the existence of a cointegration relationship among the variables by the bounds test approach developed by Pesaran et al. (2001). The Bound Test approach developed by Pesaran et al. (2001) is based on the ARDL model. To Pesaran et al. (2001), there are some advantages of this model in comparison with other previous cointegration models. One of the advantages of using this model is the Bound Test that could be employed with purely I(0) or purely I(1) data. Furthermore, it could be applied with a combination of I(0) and I(1) data while other previous cointegration models require all variables to be of the same integration order.

In other words, this test has some superiorities over the well-known maximum likelihood-based tests proposed by Johansen and Julius (1990) and Johansen (1992). First, it accepts creating a model covering the variables in which some of them are stationary at level, and the others are stationary at first difference (Pesaran et al., 2001). Also, it gets over the endogeneity problem in the model. Lastly, the long run and the short-run coefficients of the model are estimated easily and simultaneously (Guru-Gharana, 2012). On the other hand, this approach has some weaknesses. First of all, it contains more procedures in relation to other cointegration tests. Secondly, I(2) and more degrees of data are not acceptable to be in the model (Narayan, 2005). Lastly, it is based on the assumption of the presence of one cointegration vector (Dergiades and Tsoulfidis, 2008).

Due to its advantages, the Bound Test is created as a useful tool to demonstrate both the short-run and the long-run relationship between government size and economic growth. According to the quadratic equation method, the presence of an inverted U-shaped relationship between the government size and economic growth is tested through estimating an equation in which the real GDP growth rate is regressed on the government size and the squared term of the government size as the two main explanatory variables. Based on the empirical studies (for example, Chao and Grubel, 1998; Wedder and Gallaway, 1998; Pevcin, 2004; El Husseiny, 2019) that have been reviewed. One can realize the subsequent specification form to be estimated for the Turkey case during the time period of 1974–2016. If the squared coefficient on the proxy measure of government size is negative and statistically significant, it means that economic growth initially increases and eventually decreases with the rise in the government size. The growth-maximizing government size can be formulated as follows:

Govsize∗= $\frac{-\beta_{15}}{2\beta_{16}}$

$$\begin{aligned}\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 &+ \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} \\ &+ \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} \\ &+ \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta \boldsymbol{E}_{\boldsymbol{CenGov}_{t-i}} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta \boldsymbol{E}_{\boldsymbol{CenGov}}{}^{2}{}_{t-i} + \beta_9 \boldsymbol{G}_{\boldsymbol{RGdp}_{t-1}} \\ &+ \beta_{10} Inf_{t-1} + \beta_{11} DCPS_{t-1} + \beta_{12} FDI_{t-1} + \beta_{13} Emp_{t-1} + \beta_{14} CD_{t-1} \\ &+ \beta_{15} \boldsymbol{E}_{\boldsymbol{CenGov}_{t-1}} + \beta_{16} \boldsymbol{E}_{\boldsymbol{CenGov}}{}^{2}{}_{t-1} + \mu_t \qquad (1)\end{aligned}$$

Equation (1) can be further converted to accommodate the one-period lagged error correction term (ECT1) as in equation (1a)[4]:

[4] In this thesis, we do not present the details of error correction model since we only concentrate on the long run dynamics of these models without losing any long run information, i.e. using level data. In the meantime, the error correction models are tested in order to see the stability of the long run relationship and the error correction terms are found statistically significant and negative. Besides, Pesaran et al. (1995, 2001) advised the consistency test of estimated parameters on estimated models of Brown et al. (1975) called as cumulative sum of recursive residuals (CUSUM) and cumulative square sum of recursive residuals (CUSUMSQ). The plots of CUSUM and CUSUMQ tests are applied to confirm the constancy of the estimated models. The test results are presented in Appendix C. All the CUSUM lie within the critical limits at the 5% significance level. Also, except the model 1 and model 11, CUSUMQ lies within the critical limits at the 5% significance level. Thus, the estimated long run models are effective with constant recursive residuals for all models.

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta \boldsymbol{E}_{\boldsymbol{CenGov}_{t-i}} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta {\boldsymbol{E}_{\boldsymbol{CenGov}}}^{2}{}_{t-i} + \lambda EC_{t-1} + \mu_t \qquad (1a)$$

To find cointegration relationship among variables, Equation (2) is constructed as follows:

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta EE_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta EE^2{}_{t-i} + \beta_9 \boldsymbol{G}_{\boldsymbol{RGdp}_{t-1}} + \beta_{10} Inf_{t-1} + \beta_{11} DCPS_{t-1} + \beta_{12} FDI_{t-1} + \beta_{13} Emp_{t-1} + \beta_{14} CD_{t-1} + \beta_{15} EE_{t-1} + \beta_{16} EE^2{}_{t-1} + \mu_t \qquad (2)$$

Equation (2) can be further converted to accommodate the one-period lagged error correction term (ECT1) as in Equation (2a):

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta EE_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta EE^2{}_{t-i} + \lambda EC_{t-1} + \mu_t \qquad (2a)$$

To find cointegration relationship among variables, Equation (3) is constructed as follows:

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i}$$
$$+ \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i}$$
$$+ \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta HE_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta HE^2{}_{t-i} + \beta_9 \boldsymbol{G}_{\boldsymbol{RGdp}_{t-1}} + \beta_{10} Inf_{t-1}$$
$$+ \beta_{11} DCPS_{t-1} + \beta_{12} FDI_{t-1} + \beta_{13} Emp_{t-1} + \beta_{14} CD_{t-1} + \beta_{15} HE_{t-1}$$
$$+ \beta_{16} HE^2{}_{t-1} + \mu_t \qquad (3)$$

Equation (3) can be further converted to accommodate the one-period lagged error correction term (ECT1) as in Equation (3a):

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i}$$
$$+ \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i}$$
$$+ \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta HE_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta HE^2{}_{t-i} + \lambda EC_{t-1} + \mu_t \qquad (3a)$$

To find cointegration relationship among variables, Equation (4) is constructed as follows:

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i}$$
$$+ \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i}$$
$$+ \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta EHE_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta EHE^2{}_{t-i} + \beta_9 \boldsymbol{G}_{\boldsymbol{RGdp}_{t-1}} + \beta_{10} Inf_{t-1}$$
$$+ \beta_{11} DCPS_{t-1} + \beta_{12} FDI_{t-1} + \beta_{13} Emp_{t-1} + \beta_{14} CD_{t-1} + \beta_{15} EHE_{t-1}$$
$$+ \beta_{16} EHE^2{}_{t-1} + \mu_t \qquad (4)$$

Equation (4) can be further converted to accommodate the one-period lagged error correction term (ECT1) as in Equation (4a):

$$\Delta \boldsymbol{G_{RGdp}}_t = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G_{RGdp}}_{t-i} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta EHE_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta EHE^2{}_{t-i} + \lambda EC_{t-1} + \mu_t \quad (4a)$$

To find cointegration relationship among variables, Equation (5) is constructed as follows:

$$\Delta \boldsymbol{G_{RGdp}}_t = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G_{RGdp}}_{t-i} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta DE_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta DE^2{}_{t-i} + \beta_9 \boldsymbol{G_{RGdp}}_{t-1} + \beta_{10} Inf_{t-1} + \beta_{11} DCPS_{t-1} + \beta_{12} FDI_{t-1} + \beta_{13} Emp_{t-1} + \beta_{14} CD_{t-1} + \beta_{15} DE_{t-1} + \beta_{16} DE^2{}_{t-1} + \mu_t \quad (5)$$

Equation (5) can be further converted to accommodate the one-period lagged error correction term (ECT1) as in Equation (5a):

$$\Delta \boldsymbol{G_{RGdp}}_t = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G_{RGdp}}_{t-i} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta DE_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta DE^2{}_{t-i} + \lambda EC_{t-1} + \mu_t \quad (5a)$$

To find cointegration relationship among variables, Equation (6) is constructed as follows:

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta CE_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta {CE^2}_{t-i} + \beta_9 \boldsymbol{G}_{\boldsymbol{RGdp}_{t-1}} + \beta_{10} Inf_{t-1} + \beta_{11} DCPS_{t-1} + \beta_{12} FDI_{t-1} + \beta_{13} Emp_{t-1} + \beta_{14} CD_{t-1} + \beta_{15} CE_{t-1} + \beta_{16} {CE^2}_{t-1} + \mu_t \tag{6}$$

Equation (6) can be further converted to accommodate the one-period lagged error correction term (ECT1) as in Equation (6a):

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta CE_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta {CE^2}_{t-i} + \lambda EC_{t-1} + \mu_t \tag{6a}$$

To find cointegration relationship among variables, Equation (7) is constructed as follows:

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta IE_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta {IE^2}_{t-i} + \beta_9 \boldsymbol{G}_{\boldsymbol{RGdp}_{t-1}} + \beta_{10} Inf_{t-1} + \beta_{11} DCPS_{t-1} + \beta_{12} FDI_{t-1} + \beta_{13} Emp_{t-1} + \beta_{14} CD_{t-1} + \beta_{15} IE_{t-1} + \beta_{16} {IE^2}_{t-1} + \mu_t \tag{7}$$

Equation (7) can be further converted to accommodate the one-period lagged error correction term (ECT1) as in Equation (7a):

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta IE_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta IE^2{}_{t-i} + \lambda EC_{t-1} + \mu_t \qquad (7a)$$

To find cointegration relationship among variables, Equation (8) is constructed as follows:

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta CIE_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta CIE^2{}_{t-i} + \beta_9 \boldsymbol{G}_{\boldsymbol{RGdp}_{t-1}} + \beta_{10} Inf_{t-1} + \beta_{11} DCPS_{t-1} + \beta_{12} FDI_{t-1} + \beta_{13} Emp_{t-1} + \beta_{14} CD_{t-1} + \beta_{15} CIE_{t-1} + \beta_{16} CIE^2{}_{t-1} + \mu_t \qquad (8)$$

Equation (8) can be further converted to accommodate the one-period lagged error correction term (ECT1) as in Equation (8a):

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta CIE_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta CIE^2{}_{t-i} + \lambda EC_{t-1} + \mu_t \qquad (8a)$$

To find cointegration relationship among variables, Equation (9) is constructed as follows:

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta \boldsymbol{R}_{\boldsymbol{CenGov}_{t-i}} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta \boldsymbol{R}_{\boldsymbol{CenGov}}{}^{2}{}_{t-i} + \beta_9 \boldsymbol{G}_{\boldsymbol{RGdp}_{t-1}} + \beta_{10} Inf_{t-1} + \beta_{11} DCPS_{t-1} + \beta_{12} FDI_{t-1} + \beta_{13} Emp_{t-1} + \beta_{14} CD_{t-1} + \beta_{15} \boldsymbol{R}_{\boldsymbol{CenGov}_{t-1}} + \beta_{16} \boldsymbol{R}_{\boldsymbol{CenGov}}{}^{2}{}_{t-1} + \mu_t \quad (9)$$

Equation (9) can be further converted to accommodate the one-period lagged error correction term (ECT1) as in Equation (9a):

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta \boldsymbol{R}_{\boldsymbol{CenGov}_{t-i}} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta \boldsymbol{R}_{\boldsymbol{CenGov}}{}^{2}{}_{t-i} + \lambda EC_{t-1} + \mu_t \quad (9a)$$

To find cointegration relationship among variables, Equation (10) is constructed as follows:

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta \boldsymbol{R}_{\boldsymbol{NonT}_{t-i}} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta \boldsymbol{R}_{\boldsymbol{NonT}}{}^{2}{}_{t-i} + \beta_9 \boldsymbol{G}_{\boldsymbol{RGdp}_{t-1}} + \beta_{10} Inf_{t-1} + \beta_{11} DCPS_{t-1} + \beta_{12} FDI_{t-1} + \beta_{13} Emp_{t-1} + \beta_{14} CD_{t-1} + \beta_{15} \boldsymbol{R}_{\boldsymbol{NonT}_{t-1}} + \beta_{16} \boldsymbol{R}_{\boldsymbol{NonT}}{}^{2}{}_{t-1} + \mu_t \quad (10)$$

Equation (10) can be further converted to accommodate the one-period lagged error correction term (ECT1) as in Equation (10a):

$$\Delta \boldsymbol{G_{RGdp}}_t = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G_{RGdp}}_{t-i} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta \boldsymbol{R_{NonT}}_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta \boldsymbol{R_{NonT}}^2_{t-i} + \lambda EC_{t-1} + \mu_t \quad (10a)$$

To find cointegration relationship among variables, Equation (11) is constructed as follows:

$$\Delta \boldsymbol{G_{RGdp}}_t = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G_{RGdp}}_{t-i} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta \boldsymbol{R_{DirT}}_{t-i} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta \boldsymbol{R_{DirT}}^2_{t-i} + \beta_9 \boldsymbol{G_{RGdp}}_{t-1} + \beta_{10} Inf_{t-1} + \beta_{11} DCPS_{t-1} + \beta_{12} FDI_{t-1} + \beta_{13} Emp_{t-1} + \beta_{14} CD_{t-1} + \beta_{15} \boldsymbol{R_{DirT}}_{t-1} + \beta_{16} \boldsymbol{R_{DirT}}^2_{t-1} + \mu_t \quad (11)$$

Equation (11) can be further converted to accommodate the one-period lagged error correction term (ECT1) as in Equation (11a):

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta \boldsymbol{R}_{\boldsymbol{DirT}_{t-i}} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta {\boldsymbol{R}_{\boldsymbol{DirT}}}^2_{t-i} + \lambda EC_{t-1} + \mu_t \tag{11a}$$

To find cointegration relationship among variables, Equation (12) is constructed as follows:

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta \boldsymbol{R}_{\boldsymbol{IndT}_{t-i}} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta {\boldsymbol{R}_{\boldsymbol{IndT}}}^2_{t-i} + \beta_9 \boldsymbol{G}_{\boldsymbol{RGdp}_{t-1}} + \beta_{10} Inf_{t-1} + \beta_{11} DCPS_{t-1} + \beta_{12} FDI_{t-1} + \beta_{13} Emp_{t-1} + \beta_{14} CD_{t-1} + \beta_{15} \boldsymbol{R}_{\boldsymbol{IndT}_{t-1}} + \beta_{16} {\boldsymbol{R}_{\boldsymbol{IndT}}}^2_{t-1} + \mu_t \tag{12}$$

Equation (12) can be further converted to accommodate the one-period lagged error correction term (ECT1) as in Equation (12a):

$$\Delta \boldsymbol{G}_{\boldsymbol{RGdp}_t} = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \boldsymbol{G}_{\boldsymbol{RGdp}_{t-i}} + \sum_{i=0}^{p_1-1} \beta_{2i}\, \Delta Inf_{t-i} + \sum_{i=0}^{p_2-1} \beta_{3i}\, \Delta DCPS_{t-i} + \sum_{i=0}^{p_3-1} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{p_4-1} \beta_{5i}\, \Delta Emp_{t-i} + \sum_{i=0}^{p_5-1} \beta_{6i}\, \Delta CD_{t-i} + \sum_{i=0}^{p_6-1} \beta_{7i}\, \Delta \boldsymbol{R}_{\boldsymbol{IndT}_{t-i}} + \sum_{i=0}^{p_7-1} \beta_{8i}\, \Delta {\boldsymbol{R}_{\boldsymbol{IndT}}}^2_{t-i} + \lambda EC_{t-1} + \mu_t \tag{12a}$$

where Δ is the first difference operator, β_0 is the intercept component, β's are the coefficients of variables, and μ is the error term called as usual white noise residuals, λ is the speed of adjustment parameter called as error correction coefficient.

The ARDL model estimates the Equations from (1) through (12) to get the optimal lag order for each dependent and independent variable. Optimal lag order selection is based on Akaike Information Criterion (AIC) which has no autocorrelation problem.

After that, the subsequent hypotheses should be tested to determine the presence of a cointegration relationship among variables.

According to Pesaran et al. (2001), the null hypothesis of no cointegration:

$H_0: \begin{bmatrix} \beta_9 \\ \beta_{10} \\ \beta_{11} \\ \beta_{12} \\ \beta_{13} \\ \beta_{14} \\ \beta_{15} \\ \beta_{16} \end{bmatrix} = 0_{8\times 1}$ is tested against the alternative one, that is:

$H_1: \beta_9 \neq 0$ or $H_1: \begin{bmatrix} \beta_{10} \\ \beta_{11} \\ \beta_{12} \\ \beta_{13} \\ \beta_{14} \\ \beta_{15} \\ \beta_{16} \end{bmatrix} \neq 0_{7\times 1}$

The time series are cointegrated if the computed F-statistics is greater than the appropriate upper bound critical values I(1), and not cointegrated if the computed F-statistics is below the lower critical bound I(0) of Pesaran et al. (2001). If, however, the computed F-statistics lies between lower and upper critical bounds, the results are inconclusive.

Equation (1) provides the short-run and long-run effects concurrently after the adjustment is completed. The short-run interactions between the dependent and independent variables are inferred by the size of β_{2i}, β_{3i}, β_{4i}, β_{5i}, β_{6i}, β_{7i}, and β_{8i}. The long-run impacts are inferred by the estimates of β_{10}, β_{11}, β_{12}, β_{13},β_{14}, β_{15} and β_{16} that are normalized on the estimate of β_9.

After obtaining the evidence of the presence of the cointegration among variables, the optimal lag orders of each variable have selected by employing the suitable AIC. According to the empirical literature[5], the maximum lag length is usually taken between 2 and 4 for annual data in order not to lose more degrees of freedom which is very important for the reliability of the results. Maximum 3 lag has employed to find the cointegration relationship among variables because our dataset is relatively large, 43 observations for annual data. Selected ARDL models in Table 5.3 below are revealed as the optimal models for the series of models are used in this thesis.

Table 5.3. Selection of optimal models

	Selected Model
Model 1	ARDL(3, 3, 3, 3, 2, 3, 0, 3)
Model 2	ARDL(3, 3, 3, 3, 3, 3, 3, 3)
Model 3	ARDL(3, 3, 2, 3, 3, 3, 1, 2)
Model 4	ARDL(3, 3, 3, 3, 3, 3, 3, 3)
Model 5	ARDL(1, 1, 3, 2, 0, 2, 2, 2)
Model 6	ARDL(2, 0, 2, 2, 2, 2, 0, 2)
Model 7	ARDL(1, 0, 2, 2, 2, 0, 0, 1)
Model 8	ARDL(1, 0, 0, 2, 2, 0, 0, 0)
Model 9	ARDL(3, 3, 3, 3, 3, 3, 3, 0)
Model 10	ARDL(3, 3, 3, 3, 2, 3, 3, 3)
Model 11	ARDL(2, 0, 2, 2, 0, 0, 2, 1)
Model 12	ARDL(1, 0, 2, 1, 3, 3, 3, 3)

Source: Author's computations.

Computed F-statistics of the models are summarized in Table 5.4. These computed F-statistic values should be compared with the critical values of Pesaran et al. (2001). The F-statistics for cointegration exceeds upper critical bounds for seven independent variables of Pesaran et al. (2001) at 10%, 5%, and 1% level of statistical significance. Thus, the results clearly indicate that there exist cointegration relationships between independent variables for all models.

[5] See, for example, Pesaran and Shin, 1999; Pesaran et al. 2001.

Table 5.4. F-Bounds test results (Null hypothesis: No levels relationship)

Model 1				
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	**8.006950**	10%	2.03	3.13
k	7	5%	2.32	3.5
		1%	2.96	4.26
Model 2				
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	**6.164484**	10%	2.03	3.13
k	7	5%	2.32	3.5
		1%	2.96	4.26
Model 3				
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	**11.91861**	10%	2.38	3.45
k	7	5%	2.69	3.83
		1%	3.31	4.63
Model 4				
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	**3.495126**	10%	2.03	3.13
k	7	5%	2.32	3.5
		1%	2.96	4.26
Model 5				
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	**14.83204**	10%	1.7	2.83
k	7	5%	1.97	3.18
		1%	2.54	3.91
Model 6				
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	**6.687536**	10%	1.7	2.83
k	7	5%	1.97	3.18
		1%	2.54	3.91

Table 5.4. (continued)

Model 7				
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	**20.03103**	10%	2.03	3.13
k	7	5%	2.32	3.5
		1%	2.96	4.26
Model 8				
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	**25.75045**	10%	2.38	3.45
k	7	5%	2.69	3.83
		1%	3.31	4.63
Model 9				
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	**6.769768**	10%	2.03	3.13
k	7	5%	2.32	3.5
		1%	2.96	4.26
Model 10				
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	**6.782374**	10%	2.03	3.13
k	7	5%	2.32	3.5
		1%	2.96	4.26
Model 11				
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	**23.73239**	10%	1.7	2.83
k	7	5%	1.97	3.18
		1%	2.54	3.91
Model 12				
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	**13.24702**	10%	1.7	2.83
k	7	5%	1.97	3.18
		1%	2.54	3.91

Source: Author's computations

Since all series are cointegrated, we can set up the long-run models in Equations from (1) through (12). These models' optimal lag lengths with a minimum value of AIC are presented in Table 5.5 below.

Table 5.5. Selection of optimal long-run models

	Selected Model
Model 1	ARDL(3, 3, 3, 3, 2, 3, 0, 3)
Model 2	ARDL(3, 3, 3, 3, 3, 3, 3, 3)
Model 3	ARDL(3, 3, 2, 3, 3, 3, 1, 2)
Model 4	ARDL(3, 3, 3, 3, 3, 3, 3, 3)
Model 5	ARDL(1, 1, 3, 2, 0, 2, 2, 2)
Model 6	ARDL(2, 0, 2, 2, 2, 2, 0, 2)
Model 7	ARDL(1, 0, 2, 2, 2, 0, 0, 1)
Model 8	ARDL(1, 0, 0, 2, 2, 0, 0, 0)
Model 9	ARDL(3, 3, 3, 3, 3, 3, 3, 0)
Model 10	ARDL(3, 3, 3, 3, 2, 3, 3, 3)
Model 11	ARDL(2, 0, 2, 2, 0, 0, 2, 1)
Model 12	ARDL(1, 0, 2, 1, 3, 3, 3, 3)

Source: Author's computations

Afterward, the long-run coefficients of the variables are estimated and showed in Tables 5.6 through 5.7. Diagnostic tests for autocorrelation, heteroscedasticity, and normality are conducted and the results have given in Appendix C. Except for Models 6, 8 and 12, the autocorrelation problem was found in all the other models. To solve this problem, we applied Heteroskedasticity and Autocorrelation Consistent (HAC) estimator to Model 1, 2, 3, 4, 5, 7, 9, 10 and 11. Other results provide no evidence of the diagnostic problem in the long run estimation for all models.

One of the main objectives of the thesis is to investigate the existence of the inverted U-shaped relationship between government size and economic growth for Turkey, and if it exists, to find out the current position of Turkey on the curve.

Table 5.6. Long run estimate results for group 1
Dependent Variable: Annual Real GDP Growth Rate

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inflation Rate Change in consumer price index (CPI,%)	-0.039*** (-3.162)	-0.0583*** (-4.670)	-0.016* (-2.663)	-0.055*** (-4.169)	-0.041*** (-4.179)	-0.043** (-2.671)	-0.005 (-0.210)	-0.023 (-1.235)
Domestic Credit to Private Sector as a percentage of GDP	-0.052*** (-4.303)	0.088 (1.665)	0.364*** (5.846)	0.042 (1.248)	0.018 (0.900)	0.001 (0.043)	-0.018 (-0.893)	0.404*** (4.239)
Foreign Direct Investment (Net Inflows)	-4.624*** (-6.084)	-4.766*** (-6.752)	-4.033*** (-5.966)	-3.918*** (-7.015)	-2.870*** (-7.546)	-3.024*** (-3.429)	-3.599*** (-3.715)	-3.966*** (-3.633)
Employment Participation Rate (15+)	-0.345*** (-5.478)	-0.466*** (-7.125)	-1.809*** (-6.660)	-0.424*** (-7.089)	-0.220*** (-5.006)	-0.274*** (-3.522)	-0.224 (-1.002)	-1.977*** (-4.565)
Crisis Dummy	-11.526*** (-7.727)	-15.280*** (-13.299)	-7.040*** (-4.962)	-14.111*** (-13.166)	-7.615*** (-7.298)	-7.915*** (-3.636)	-6.068*** (-4.281)	-6.336*** (-4.495)
EcenGov	0.668*** (3.132)							
EcenGov^2	-0.014** (-2.818)							
EE		11.481** (2.798)						
EE^2		-2.060** (-2.381)						
HE			24.438*** (5.974)					
HE^2			-10.279*** (-4.654)					
EHE				7.457*** (4.032)				
EHE^2				-1.064*** (-3.468)				

DE					20.757*** (10.013)			
DE^2					-5.009*** (-10.799)			
CE						5.063*** (4.654)		
CE^2						-0.246*** (-4.290)		
IE							5.484** (2.061)	
IE^2							-1.065* (-1.726)	
CIE								5.909** (2.292)
CIE^2								-0.196* (-2.025)
Trend			-2.965*** (-4.520)					-1.254*** (-4.323)
Constant	58.219*** (4.768)	50.060*** (3.537)	289.745*** (5.232)	48.873*** (4.044)			14.735 (1.389)	99.071*** (3.358)
Optimal Gov. Size	23.85	2.78	1.18	3.50	2.07	10.29	2.57	15.07
R Squared	0.95	0.97	0.97	0.97	0.93	0.86	0.84	0.82
Adjusted R Squared	0.84	0.88	0.92	0.87	0.86	0.74	0.74	0.74
Number of Observations	40	40	40	40	40	41	41	41

***statistically significant at the 1% level
**statistically significant at the 5% level
*statistically significant at the 10% level
Note: Values in parentheses are t-statistics. The maximum number of lags is set at three. Akaike information criterion (AIC) is used to select the lag length. EcenGov: Central Government Budget Expenditures, EE: Central Government Education Expenditures, HE: Central Government Health Expenditures, EHE: Central Government Total Health and Education Expenditures, DE: Central Government Defense Expenditures, CE: Central Government Final Consumption Expenditures, IE: Central Government Investment Expenditures, CIE: Central Government Total and Real Expenditures.

Table 5.7. Long run estimate results for group 2
Dependent Variable: Annual Real GDP Growth Rate

Variable	**(9)**	**(10)**	**(11)**	**(12)**
Inflation Rate	-0.060***	-0.044**	-0.045***	-0.008
Change in consumer price index (CPI, %)	(-3.670)	(-2.988)	(-3.386)	(-0.423)
Domestic Credit to Private	-0.071***	-0.010	-0.030	0.124**
Sector as a percentage of GDP	(-4.444)	(-0.499)	(-1.611)	(2.134)
Foreign Direct Investment (Net	-5.161***	-4.537***	-3.214***	-1.130
Inflows)	(-8.144)	(-6.389)	(-5.696)	(-1.680)
Employment Participation Rate	-0.508***	-0.327***	-0.183***	-0.096
(15+)	(-6.220)	(-6.803)	(-3.704)	(-1.087)
Crisis Dummy	-11.173***	-10.106***	-4.494***	-25.962***
	(-7.145)	(-4.009)	(-3.150)	(-6.286)
RcenGov	1.847**			
	(3.005)			
RcenGov^2	-0.054**			
	(-2.814)			
RnonT		-1.803		
		(-1.022)		
RnonT^2		0.458		
		(1.194)		
RdirT			8.777***	
			(7.832)	
RdirT^2			-0.936***	
			(-8.615)	
RindT				3.313*
				(2.003)

RindT^2				-0.261* (-2.036)
Constant	56.694*** (5.355)	91.919*** (6.065)		
Optimal Gov. Size	17.10		4.68	6.34
R Squared	0.95	0.96	0.86	0.93
Adjusted R Squared	0.85	0.83	0.78	0.84
Number of Observations	40	40	41	40

***statistically significant at the 1% level
**statistically significant at the 5% level
*statistically significant at the 10% level
Note: Values in parentheses are t-statistics. The maximum number of lags is set at three. Akaike information criterion (AIC) is used to select the lag length. RcenGov: Central Government Budget Revenues, RnonT: Central Government Non-Tax Revenues, RdirT: Central Government Direct Tax Revenues, RindT: Central Government Indirect Tax Revenues.

Table 5.8. Basic statistics on government size

Alternative Proxy Measures for Government Size	Mean	Maximum	2016 Realization Rate	Optimal Rate*	Observations
EcenGov	19.11	33.54	22.55	23.85	40
CIE	14.40	18.91	18.34	15.07	41
CE	11.80	15.77	14.84	10.29	41
IE	2.59	4.40	3.50	2.57	41
EHE	3.54	5.80	5.8	3.50	40
EE	2.75	4.60	4.60	2.78	40
HE	0.78	1.60	1.20	1.18	40
DE	1.99	3.01	1.20	2.07	40
RcenGov	16.19	24.28	20.58	17.10	40
RnonT	1.60	5.15	1.77	-	40
RdirT	5.39	7.22	5.29	4.68	41
RindT	7.68	12.77	12.08	6.34	40

* It covers 1974–2016.
Note: EcenGov: Central Government Budget Expenditures, EE: Central Government Education Expenditures, HE: Central Government Health Expenditures, EHE: Central Government Total Health and Education Expenditures, DE: Central Government Defense Expenditures, CE: Central Government Final Consumption Expenditures, IE: Central Government Investment Expenditures, CIE: Central Government Total and Real Expenditures, RcenGov: Central Government Budget Revenues, RnonT: Central Government Non-Tax Revenues, RdirT: Central Government Direct Tax Revenues, RindT: Central Government Indirect Tax Revenues.

Basic statistics related to proxy measures for government size are presented in Table 5.8. The optimal rates, we obtained from the econometric analysis, are compared with 2016 realizations. Because there is a significant difference between the means of related proxy measures for government size and 2016 realization rates. This difference can also be seen in Table 5.8, above. By doing so, it is thought that more realistic inferences and rational policy proposals can be made for the future.

In this context, the BARS Curve for Turkey by alternative proxy measures of government size is presented in Figure 5.1. In this respect, the central government budget expenditures realization in 2016 is 22.55% of GDP. The optimal ratio—that is growth-maximizing government size—estimated for this expenditure indicator is 23.85%. Based on the findings, it can be argued that this government size indicator is below the optimal ratio.

Besides, central government real expenditures consist of the sum of central government investment and consumption expenditures. The results suggest that the central government's real expenditures should be reduced. However, at this point, it is highly important that which component or components of these expenditures should be decreased. Therefore, we made separate estimations for central government investment and consumption expenditures. While the 2016 realization rate of central government consumption expenditures for the year 2016 is 14.84% of GDP, the optimal size of government is estimated at 10.29%. In addition, the realization rate of central government investment expenditures in 2016 is 3.50% of GDP and the optimal rate is estimated to be 2.57%. The findings above suggest that both central government consumption and investment expenditures should be reduced in order not to affect economic growth negatively.

In addition to these, considering the 2016 realization rates of central government education and health expenditures, these rates are 4.60% and 1.20% of GDP, respectively. The optimal rates are estimated at 2.78% and 1.18% of GDP, respectively. These findings indicate that it is above the optimal ratio for education and health expenditures in Turkey. Although the realization rate for central government education and health expenditures to GDP is well-above the optimal rate, the inability to obtain the desired efficiency from these expenditures shows that these expenditures were not used efficiently and effectively.

On the other hand, the rate of central government defense expenditures in 2016 is 1.20% of GDP. However, the estimated optimal rate for this indicator is 2.07% of GDP. Based on this finding, it can be said that defense expenditures should be increased.

When we examine central government budget revenues as an indicator of government size, it is seen that the ratio of central government budget revenues for the year 2016 is 20.58% of GDP. The estimated optimal ratio for this proxy measure is 17.10%. The results show that the current rate occurs to be above the optimal ratio of central government budget revenues in Turkey.

In the thesis, the central government's direct and indirect tax revenues are estimated separately. While the realization rate of direct tax revenues of the central government in 2016 is 5.29% of GDP, the estimated optimal rate is 4.68% of GDP. The realization rate of the central government's indirect tax revenues in 2016 is 12.08% of GDP and the estimated optimal rate is 6.34% of GDP. These findings demonstrate that it is well above the estimated optimal ratio of the proxy measures—that is, central government direct and indirect tax revenues in Turkey.

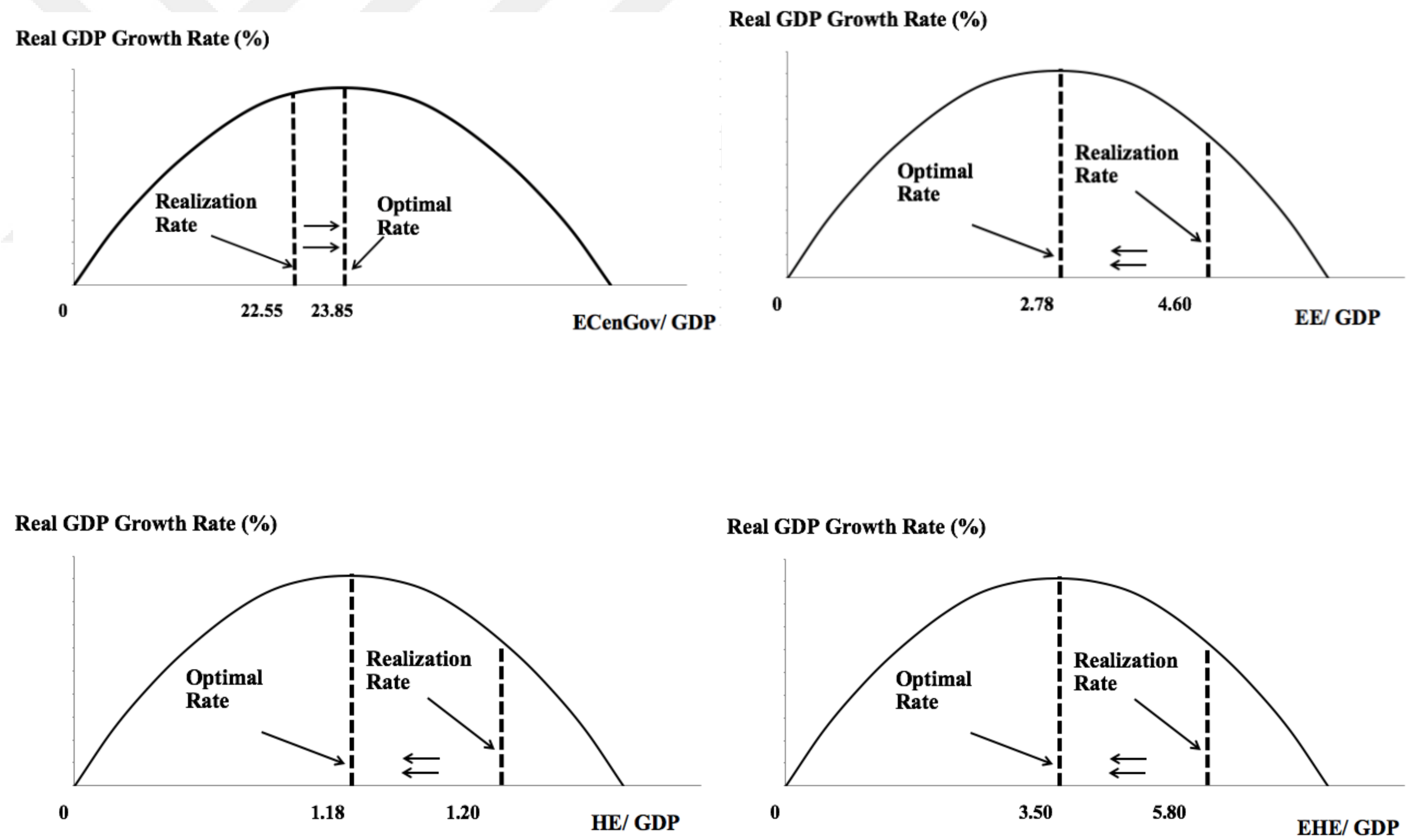


Figure 5.1. The BARS Curves for Turkey by alternative proxy measures of government size
Source: Author's computations

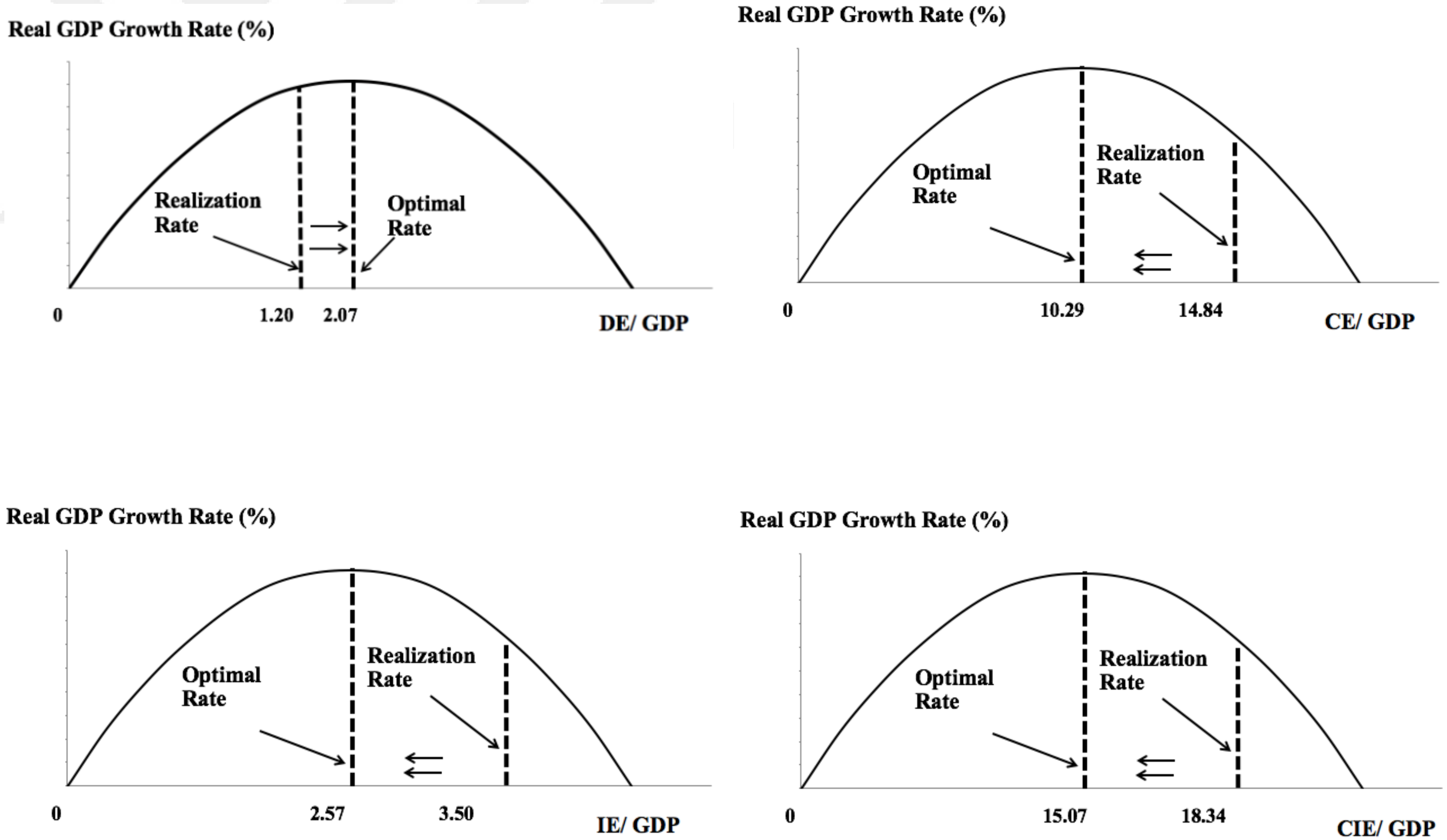


Figure 5.1. (continued)

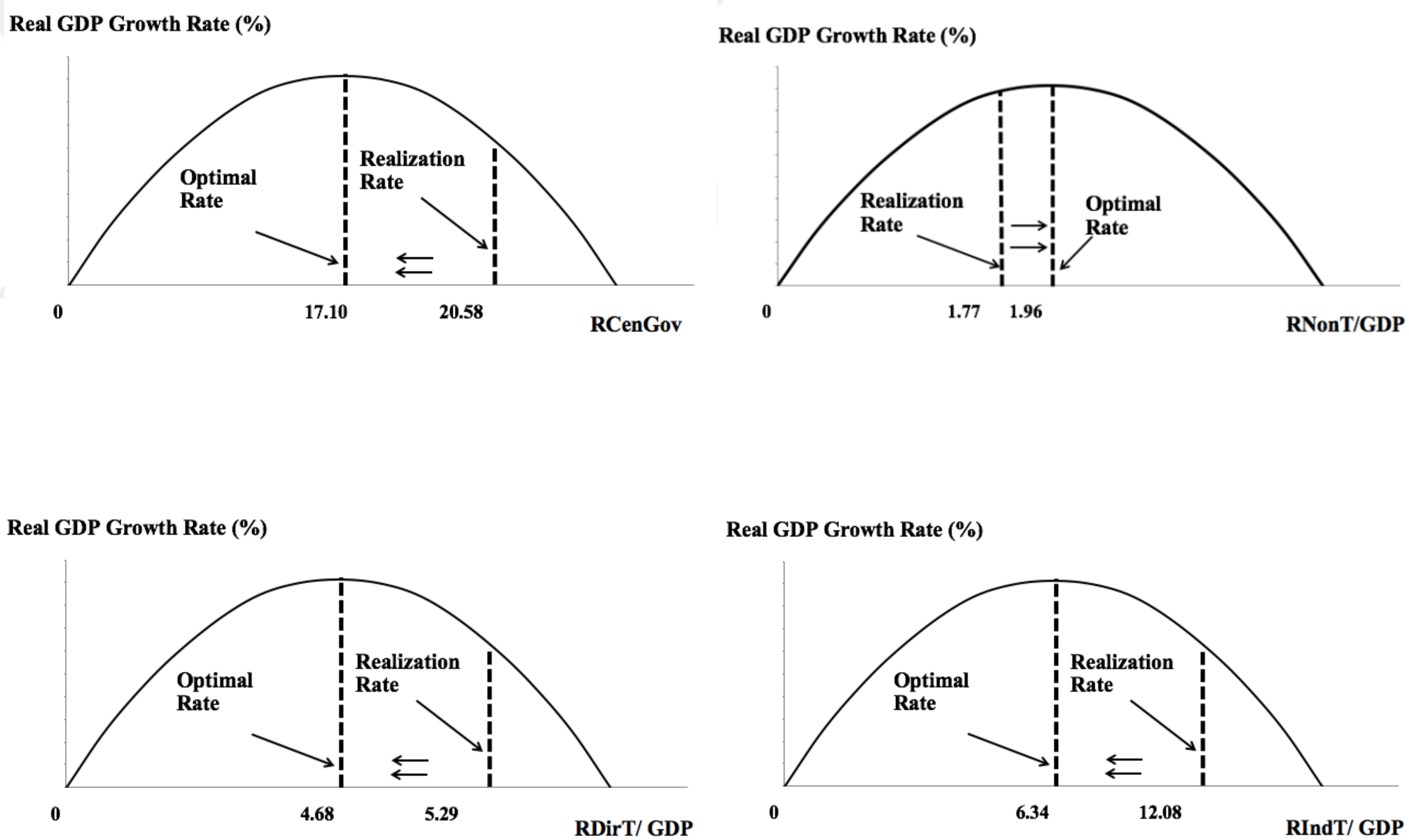


Figure 5.1. (continued)

6. ROBUSTNESS CHECK

In what follows, we provide a robustness check for our empirical estimation results. In this regard, as Kneller et al. (1999) put:

> "[i]f the theory is reasonably clear, however, the empirical evidence is not. As Stokey and Rebelo (1995, p. 519) state, ''recent estimates of the potential growth effects of tax reform vary wildly, ranging from zero to eight percentage points''. In fact, virtually no studies have been designed to test the predictions of endogenous growth models with respect to the structure of both taxation and expenditure in the way that we do here (Devarajan et al. (1996) do so for the expenditure side only). Moreover, few researchers have recognized that partial studies (e.g. those that focus exclusively on one side of the budget and ignore the other) suffer from systematic biases to the parameter estimates associated with the implicit financing assumptions. This point has been demonstrated by Helms (1985), Mofidi and Stone (1990) and Miller and Russek (1993) for various data sets. We explore the implications of this argument for the regression specification and show that, if this point is ignored, the bias to the estimates of the growth impact of fiscal variables can be substantial. This issue assumes greater importance as theory becomes more refined in its predictions of the impact of various sub-divisions of expenditure and taxation on growth." (p. 172)

Our main objective is to test whether the inverted U-shaped relationship between government size and economic growth is valid in the case of Turkey by using various proxy measures of government size. While performing empirical analysis, some strict assumptions may be made, which may affect the results. Therefore, it is necessary to test whether the results of the empirical analysis are robust with different methods or variables. Therefore, a robustness test has been performed and long-run analysis results are verified correctly. For this test, central government budget revenues with one-year lagged are added to the first eight models in which central government budget expenditures and its sub-components are used as proxy measures of government size. Also, central government budget expenditures with one-year lagged are added to the last four models in which the central government budget revenues and its sub-components are used as proxy measures of government size. The purpose of using the aforementioned variables with a one-year lagged is to eliminate the endogeneity problem (Wooldridge, 2012) between the central government budget expenditures and the central government budget revenues.

As shown in Tables 6.1 and 6.2, the long run estimations confirm the validity of the inverted U-shaped relationship between government size and economic growth for Turkey.[6]

[6] Diagnostic tests for autocorrelation, heteroscedasticity and normality are conducted and the results have given in Appendix D.

Table 6.1. Robustness check results for group 1
Dependent Variable: Annual Real GDP Growth Rate

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inflation Rate Change in consumer price index (CPI,%)	-0.083** (-2.582)	-0.020 (-0.699)	-0.005 (-0.484)	-0.004 (-0.273)	-0.041** (-2.686)	-0.045 (-1.503)	0.013 (0.416)	0.006 (0.272)
Domestic Credit to Private Sector as a percentage of GDP	-0.095** (-2.596)	0.114 (1.479)	0.494*** (8.027)	0.429*** (4.103)	-0.008 (-0.284)	0.015 (0.449)	0.012 (0.742)	0.749*** (6.920)
Foreign Direct Investment (Net Inflows)	-3.655*** (-3.883)	-4.529*** (-3.216)	-3.948*** (-8.783)	-4.681*** (-6.580)	-3.137*** (-5.655)	-3.349** (-2.539)	-3.835*** (-4.484)	-8.822*** (-6.585)
Employment Participation Rate (15+)	-0.135** (-2.862)	-0.237** (-2.354)	-2.372*** (-8.331)	-1.955*** (-5.316)	-0.146*** (-3.020)	-0.291** (-2.220)	-0.036 (-0.394)	-3.681*** (-7.648)
Crisis Dummy	-17.393*** (-6.515)	-7.897*** (-4.881)	-5.913*** (-3.732)	-7.216*** (-4.641)	-8.199*** (-9.105)	-8.079*** (-3.207)	-7.299*** (-4.329)	-4.968*** (-4.938)
ECenGov	3.185*** (5.576)							
ECenGov^2	-0.048*** (-4.786)							
EE		12.930** (2.528)						
EE^2		-2.339** (-2.308)						
HE			35.936*** (4.519)					
HE^2			-15.613*** (-3.989)					
EHE				9.891** (2.803)				
EHE^2				-1.167** (-2.286)				
DE					16.836*** (5.540)			

DE^2					-4.318*** (-8.256)			
CE						5.595** (2.787)		
CE^2						-0.278*** (-3.096)		
IE							4.843* (1.821)	
IE^2							-1.301*** (-3.197)	
CIE								6.704*** (3.463)
CIE^2								-0.221** (-3.148)
RCenGov(-1)	-1.278** (-3.260)	0.208 (1.110)	0.004 (0.056)	0.161** (2.316)	0.117 (0.883)	-0.054 (-0.254)	0.355*** (4.136)	0.747*** (5.452)
Trend			-2.802*** (-5.227)	-2.093*** (-3.975)				-2.774*** (-6.990)
Constant			255.056*** (5.957)	193.299*** (4.760)				232.514*** (6.970)
Optimal Gov. Size	33.17	2.76	1.15	4.23	1.94	10.06	1.86	15.16
R Squared	0.97	0.78	0.96	0.94	0.90	0.89	0.94	0.99
Adjusted R Squared	0.84	0.68	0.88	0.84	0.83	0.77	0.82	0.96
Number of Observations	39	40	40	40	41	41	40	40

***statistically significant at the 1% level
**statistically significant at the 5% level
*statistically significant at the 10% level

Note: Values in parentheses are t-statistics. The maximum number of lags is set at three. Akaike information criterion (AIC) is used to select the lag length. ECenGov: Central Government Budget Expenditures, EE: Central Government Education Expenditures, HE: Central Government Health Expenditures, EHE: Central Government Total Health and Education Expenditures, DE: Central Government Defense Expenditures, CE: Central Government Final Consumption Expenditures, IE: Central Government Investment Expenditures, CIE: Central Government Total and Real Expenditures, RCenGov: Central Government Budget Revenues.

Table 6.2. Robustness check results for group 2
Dependent Variable: Annual Real GDP Growth Rate

Variable	(9)	(10)	(11)	(12)
Inflation Rate Change in consumer price index (CPI,%)	-0.021 (-0.932)	0.020 (1.257)	-0.013 (-0.856)	-0.070*** (-5.504)
Domestic Credit to Private Sector as a percentage of GDP	-0.055** (-2.789)	-0.195*** (-3.742)	-0.021 (-0.918)	0.077 (1.049)
Foreign Direct Investment (Net Inflows)	-2.799*** (-3.891)	-3.051*** (-4.170)	-2.108** (-2.636)	-4.967*** (-8.127)
Employment Participation Rate (15+)	-0.141 (-1.587)	0.196 (1.865)	0.040 (0.332)	-0.576*** (-4.926)
Crisis Dummy	-13.349*** (-12.586)	-23.135*** (-7.273)	-4.311*** (-3.984)	-16.502*** (-5.332)
RCenGov	1.577* (1.881)			
RCenGov^2	-0.063* (-2.006)			
RNonT		-0.416 (-0.206)		
RNonT^2		-1.200* (-2.106)		
RDirT			19.556*** (3.064)	
RDirT^2			-1.955*** (-3.36)	
RIndT				7.464*** (6.542)
RIndT^2				-0.472*** (-4.340)

ECenGov(-1)	0.524** (2.321)	1.486*** (4.246)	0.094 (0.894)	-0.210 (-0.718)
Constant		-55.899 (-1.448)	-61.746** (-2.328)	61.825 (1.746)
Optimal Gov. Size	12.51	-	5.00	7.90
R Squared	0.81	0.98	0.89	0.98
Adjusted R Squared	0.68	0.89	0.80	0.92
Number of Observations	41	40	41	39

***statistically significant at the 1% level
**statistically significant at the 5% level
*statistically significant at the 10% level
Note: Values in parentheses are t-statistics. The maximum number of lags is set at three. Akaike information criterion (AIC) is used to select the lag length. ECenGov: Central Government Budget Expenditures, RCenGov: Central Government Budget Revenues, RNonT: Central Government Non-Tax Revenues, RDirT: Central Government Direct Tax Revenues, RIndT: Central Government Indirect Tax Revenues.

7. SUMMARY AND CONCLUSION

Although the share of government expenditures in GDP has been widely used in theoretical and empirical studies, there is no generally accepted ideal proxy measure used for government size. In the thesis, as an indicator of the government size, using the multiple government expenditures- and taxes-based variables the relationship between the government size and economic growth in Turkey has been analyzed empirically.

The thesis examines the long-run relationship between government size and economic growth in Turkey over the period of 1974–2016. Therefore, we have used the ARDL bound test model and quadratic equation techniques. In terms of empirical findings, it is possible to make the following inferences regarding the relationship between government size and economic growth:

- It is seen that studies investigating the relationship between government size and economic growth give quite different results. When the empirical studies in the related literature are examined, it can be said that the main reason for these differences is the main variable or variables used as an indicator of government size. Other possible reasons are the specific characteristics of the country examined, the period examined, and the differences in econometric methods used in the studies.

- When the empirical findings of the thesis are evaluated from the perspective of expenditures, it is shown that there is a need for decreasing government expenditures, except for central government budget expenditures and central government defense expenditures. This is because realization rates of expenditure items other than central government defense expenditures and central government budget expenditures are above the optimal rates. Also, it is expected that a decrease in these expenditures can causes an increase in economic growth rates.

- The empirical findings in Turkey for the maximization of economic growth reveals that central government final consumption expenditures are more than it should be, while central government defense expenditures are less than it should be. In this case, defense expenditures should be increased; however, final consumption expenditures should be reduced. As Şen and Kaya (2019) emphasize, if defense expenditures are made to produce and develop technology and this technology improves the production potential of the country and thus increases its exports, it is expected to have a positive impact on economic growth.

- On the other hand, considering the government size that maximizes economic growth from the perspective of taxes, it can be said that according to the empirical findings of the thesis, the realization rates of both central government indirect tax revenues and central government direct tax revenues are above the optimal rates. In this context, for the maximization of economic growth in Turkey, possible to say that both indirect taxes and direct taxes should be reduced.

- Since it is known that the effect of each expenditure item or tax item on economic growth is different from the others, the sub-components of expenditure and tax items need to be evaluated separately. In this context, in this thesis, 12 different proxy measures for government size have been used in order to differentiate these items by considering that the effect of government expenditures and taxes on economic growth will be different. It is expected that the inclusion of the sub-components of these public policy components in the analyzes will reveal more realistic results in order to determine the correct and purposeful tax and government expenditure policies to be implemented in order to increase the effectiveness of the public policies.

- In fact, considering both government expenditures and taxes, it is not possible to accurately measure the size of the government. Because, contrary to budgetary principles, exclusion of some budget revenues and expenditure items from the scope of the central government budget (for example, tax expenditures on the tax revenues side, semi-financial transactions and conditional liabilities on the government expenditures side) may cause the government size to be perceived as smaller (Şen and Kaya, 2019). Therefore, there may be some margin of error in the estimates made in this thesis.

- Our findings seem to confirm the validity of the BARS curve, establishing a long-run association between government size and economic growth. However, this verification depends on how the government size is measured. As long as the following twelve variables−−ECenGov: Central Government Budget Expenditures, EE: Central

Government Education Expenditures, HE: Central Government Health Expenditures, EHE: Central Government Total Health and Education Expenditures, DE: Central Government Defense Expenditures, CE: Central Government Final Consumption Expenditures, IE: Central Government Investment Expenditures, CIE: Central Government Total and Real Expenditures, RCenGov: Central Government Budget Revenues, RNonT: Central Government Non-Tax Revenues, RDirT: Central Government Direct Tax Revenues, RIndT: Central Government Indirect Tax Revenues––are taken into consideration as the proxy measure of the government size, the results give support to the existence of this relationship. As regards the government size–– economic growth nexus, our results are virtually in line with some studies available in the current literature. These studies are Grossman (1988), Peden (1991), Scully (1994), Karras (1996), Vedder and Gallaway (1998), Chao and Grubel (1998), Afonso et al. (2003), Mittnik and Neumann (2003), Pevcin (2004), Chobanov and Mladenova (2009), Forte and Magazzino (2011), Christie (2014), Asimakopoulos and Karavias (2016), Forte and Magazzino (2016), Şen and Kaya (2019) as in this thesis, found a non-linear relationship between government size and economic growth.

REFERENCES

Abdullah N, Naim ZA, Long Y. (2011). Employment and macroeconomic variables: evidence from Malaysia, Philippines, and Singapore. *International Journal of Economics and Finance*, 3(3), 139-148.

Abounoori E, Nademi Y. (2010). Government size threshold and economic growth in Iran. *International Journal of Business and Development Studies* 2, 95–108.

Adams S. (2009). Foreign direct investment, domestic investment, and economic growth in Sub-Saharan Africa. *Journal of Policy Modeling,* 31: 939–49.

Afonso A, Furceri D. (2010). Government size, composition, volatility, and economic growth. *European Journal of Political Economy*, *26*(4). https://doi.org/10.1016/j.ejpoleco.2010.02.002.

Afonso A, Jalles JT. (2016). Economic performance, government size, and institutional quality. *Empirica*, 43(1), 83–109. https://doi.org/10.1007/s10663-015-9294-2.

Afonso A, Schuknecht L, Tanzi V. (2003). Public sector efficiency: An international comparison. *Working Paper Series 242*. European Central Bank, Frankfurt.

Afonso A, Şen H, Kaya A. (2018). Government size, unemployment, and inflation nexus in eight large emerging market economies. *REM Working Paper*, 038-2018.

Agell J, Lindh T, Ohlsson H. (1997). Growth and the public sector: A critical review essay. *European Journal of Political Economy*, 13(1), 33–52.

Agell J, Ohlsson H, Thoursie PS. (2006). Growth effects of government expenditure and taxation in rich countries: A comment. *European Economic Review,* 50 (1): 211–219.

Ahmad N, Du L, Lu J, Wang J, Li HZ, Hashmi MZ. (2017). Modeling the CO 2 emissions and economic growth in Croatia: Is there an environmental Kuznets curve? *Energy*, 123, 164–172.

Aktan CC. (1995). 21. Yüzyıl için yeni bir devlet modeline doğru: Optimal devlet. İstanbul: TÜSİAD.

Aktan CC. (2011). Devletin büyümesi ve devletin başarısızlığının anatomisi. *Hukuk ve İktisat Araştırmaları Dergisi*. 3(1), 29-49. ISSN: 2146 -0817 (Online).

Alfaro L, Chanda A, Kalemli-Özcan Ş, Sayek S. (2004). FDI and economic growth: The role of local financial markets. *Harvard Business School*. Working Paper 01-083.

Alimi RS. (2014). Does optimal government size exists for developing economies? The case of Nigeria. *AAU Annals of Accounting, Educational & Social Research 1(1), 15-33.*

Altunc OF, Aydın C. (2013). The relationship between optimal size of government and economic growth: Empirical evidence from Turkey, Romania, and Bulgaria. *Procedia - Social and Behavioral Sciences*, 92, 66–75. https://doi.org/10.1016/j.sbspro.2013.08.639.

Andres J, Hernando I. (1999). Does inflation harm economic growth? Evidence from the OECD. *In The costs and benefits of price stability*. *University of Chicago Press*, 315-348.

Arrow KJ. (1962). The economic implications of learning by doing. *The Review of Economic Studies*. 29(3), 155-173.

Asimakopoulos S, Karavias Y. (2016). The impact of government size on economic growth: A threshold analysis. *Economics Letters*, *139*, 65–68. https://doi.org/10.1016/j.econlet.2015.12.010.

Babihuga R. (2002). Estimating the optimal size of public expenditures within the context of an endogenous growth model. Department of Economics, Doctoral Thesis, Worcester, Massachusetts: Clark University.

Balasubramanyam VN, Salisu M, Sapsford D. (1996). Foreign direct investment and growth in EP and IS countries. *Economic Journal*, Royal Economic Society, 106(434), 92-105.

Barro RJ. (1989). A cross-country study of growth, savings, and government. *National Bureau of Economic Research*, (2855), 55. http://www.nber.org/papers/w2855.pdf.

Barro RJ. (1990). Government spending in a simple model of endogenous growth. *Journal of Political Economy*. 98(5, Part 2), 103-125.

Barro RJ. (1991). Economic growth in a cross-section of countries. *Quarterly Journal of Economics*, Vol: 106, No: 2, 407-443.

Barro RJ. (1996). Determinants of economic growth: A cross-country empirical study (No. w5698). *National Bureau of Economic Research*.

Barro RJ. (2013). Inflation and economic growth, *Annals of Economics and Finance,* 14-1, 85–109.

Barth JR, Bradley M. (1988). The impact of government spending on economic activity. *Mimeo*, The National Chamber Foundation: Washington, D.C.

Begum H, Aziz MdSI. (2019). Impact of domestic credit to private sector on gross domestic product in Bangladesh, *IOSR Journal of Economics and Finance* (IOSR - JEF), e-ISSN: 2321-5933, p-ISSN: 2321-5925.Volume 10, Issue 1 Ver. I (Jan.–Feb.2019), 45-54.

Bengoa M, Sanchez-Robles B. (2003). Foreign direct investment, economic freedom, and growth: New evidence from Latin America. *European Journal of Political Economy*, 19, 529–545.

Bergh A, Karlsson M. (2010). Government size and growth: Accounting for economic freedom and globalization. *Public Choice*, 142(1–2), 195-213.

Borcherding TE, Ferris JS, Garzoni A. (2003). Growth in the real size of government since 1970. *Handbook of Public Finance: Kluwer Academic Press*, MA.

Borensztein E, De Gregorio J, Lee J. (1998). How does foreign direct investment affect economic growth? *Journal of International Economics*, 45(1), 115-135.

Bose N, Haque ME, Osborn DR. (2007). Public expenditure and economic growth: A disaggregated analysis for developing countries. *The Manchester School*, Vol: 75, No: 5, 533-556.

Brown RL, Durbin J, Ewans JM. (1975). Techniques for testing the constancy of regression relations over time. *Journal of the Royal Statistical Society*, 37, 149-172.

Buchanan JM. (1975). The Limits of Liberty –Between Anarchy and Leviathan- Chicago: Chicago University Press.

Buchanan JM. (1993). The constitution of economic policy, in Public Choice Theory III, Edited by Charles K. Rowley, The International Library of Critical Writings in Economics 24, An Elgar Reference Collection, E. Elgar Publishing, Aldershot.

Bulutay T. (1995). *Employment, Unemployment, and Wages in Turkey*, Ankara, International Labour Office State Institute of Statistics.

Buti MC, Martinez-Mongay C, Sekkat K, van den Noord P. (2003). Macroeconomic policy and structural reform: A conflict between stabilization and flexibility. in: M. Buti (ed.) *Monetary and Fiscal Policies in EMU* (Cambridge University Press), 187-210.

Carkovic M, Levine R. (2003). Does foreign direct investment accelerate economic growth? *University of Minnesota*, Working Paper.

Cesaratto S. (1999). Savings and economic growth in neoclassical theory, *Cambridge Journal of Economics*, 23, 771-793.

Chao J, Grubel H. (1998). Optimal levels of spending and taxation in Canada. *The Fraser Institute*, Vancouver.

Chen S, Lee C. (2005). Government size and economic growth in Taiwan: A threshold regression approach. *Journal of Policy Modeling,* 27, 1051–1066.

Chobanov D, Mladenova A. (2009). What is the optimal size of government? *Working Paper 335309.* Institute for Market Economics, Sofia.
http://ime.bg/uploads/335309_OptimalSizeOfGovernment.pdf.

Christie T. (2014). The effect of government spending on economic growth: Testing the non-linear hypothesis. *Bulletin of Economic Research*, 66: 2, 183-204.
http://dx.doi.org/10.1111/j.1467-8586.2012.00438.x.

Colombier C. (2009). Growth effects of fiscal policies: an application of robust modified estimator. *Applied Economics,* 41 (7): 899–912.

Cooray A. (2008). Economic growth and the size and quality of the government. Unpublished paper. The University of Tasmania. https://aeaweb.org/annual_mtg_papers/2008/2008_519.pdf.

Dar AA, AmirKhalkhali S. (2002). Government size, factor accumulation, and economic growth: Evidence from OECD countries. *Journal of Policy Modeling*, 24, 679-692.

Davies A. (2009). Human development and the optimal size of government. *Journal of Behavioral and Experimental Economics* (formerly The Journal of Socio-Economics), Elsevier, vol. 38(2), 326-330.

De Gregorio J. (1992). The effects of inflation on economic growth: Lessons from Latin America. *European Economic Review*, Elsevier, vol. 36(2-3), 417-425.

de Mendonça HF, Cacicedo T. (2015). Size of government and economic growth in the largest Latin American country. *Applied Economics Letters*, 22(11), 904–910. https://doi.org/10.1080/13504851.2014.987909.

Dergiades T, Tsoulfidis L. (2008). Estimating residential demand for electricity in the United States, 1965–2006. *Energy Economics*, 30(5), 2722-2730.

Devarajan S, Swaroop V, Zou H. (1996). The composition of public expenditure and economic growth. *Journal of Monetary Economics*, 37(2), 313-44.

El Husseiny IA. (2019). The optimal size of government in Egypt: an empirical investigation, *The Journal of North African Studies*, 24(2), 271-299. DOI: 10.1080/13629387.2018.1428798.

Facchini F, Melki M. (2013). Efficient government size: France in the 20th century. *European Journal of Political Economy,* 31, 1–14. http://dx.doi.org/10.1016/j.ejpoleco.2013.03.002.

Fischer S. (1993). The role of macroeconomic factors in growth. *NBER* Working Paper, No.4565.

Flint, C. and Taylor, P. (2007). Political geography: world-economy, nation-state, and locality. London: Prentice-Hall.

Forte F, Magazzino C. (2011). Optimal size of government and economic growth in EU countries. *Journal of Analytical and Institutional Economics* 28, 295–322.

Forte F, Magazzino C. (2016). Government size and economic growth in Italy: A time-series analysis. *European Scientific Journal*, vol.12, No.7 ISSN: 1857 – 7881 (Print) e - ISSN 1857- 7431 doi: 10.19044/esj. 2016.v12n7p149

Fölster S, Henrekson M. (2001). Growth effects of government expenditure and taxation in rich countries. *European Economic Review*, 45(8), 1501-1520.

Futagami KY, Morita Y, Shibata A. (1993). Dynamic analysis of an endogenous growth model with public capital. *Scandinavian Journal of Economics*, 95 (4), 607-625.

Gemmell N. (1983). International comparisons of the effects of nonmarket-sector growth. *Journal of Comparative Economics*, *7*(4), 368–381. https://doi.org/10.1016/0147-5967(83)90060-4.

Gemmell N. (1983). International comparisons of the effects of nonmarket-sector growth. *Journal of Comparative Economics*, *7*(4), 368–381. https://doi.org/10.1016/0147-5967(83)90060-4.

General Directorate of Budget and Fiscal Control. http://www.bumko.gov.tr/TR,4461/butce-gider-gelir-gerceklesmeleri-1924-2016.html.01 November 2018.

Ghali KH. (1998). Government size and economic growth: evidence from a multivariate cointegration analysis. *Applied Economics*, *31*(8), 975–987. https://doi.org/10.1080/000368499323698.

Ghose A, Das S. (2013). Government size and economic growth in emerging market economies: A panel co-integration approach. *Macroeconomics and Finance in Emerging Market Economies*, *6*(1), 14–38. https://doi.org/10.1080/17520843.2012.697075.

Ghosh S, Mourmouras IA. (2002). On public investment, long-run growth and the real exchange rate. *Oxford Economic Papers*, 54 (1), 72-90.

Gillman M, Harris M, Matyas L. (2002). Inflation and growth: some theory and evidence. Berlin: 10th International Conference on Panel Data. http://econpapers.repec.org/cpd/2002/42_Harris_2.pdf.

Gillman M, Harris M. (2010). The effect of inflation on growth. *The Economics of Transition*, Vol. 18, No. 4, 697-714.

Grier KB, Tullock G. (1989). An empirical analysis of cross-national economic growth, 1951-80. *Journal of Monetary Economics*, *24*(2), 259–276. https://doi.org/10.1016/0304-3932(89)90006-8.

Grossman P. (1987). The optimal size of government. *Public Choice,* 53, 131–147.

Grossman PJ. (1988). Government and economic growth: A non-linear relationship. *Public Choice*, 56, 193-200.

Grossman PJ. (1990). Government and growth: Cross-sectional evidence. *Public Choice*, 65, 217-227.

Günalp B, Dinçer O. (2005). The optimal government size in transition countries. Department of Economics, Hacettepe University, Beytepe, Ankara, and Department of Commerce, Massey University, Auckland.

Günalp B, Gür TH. (2002). Government expenditures and economic growth in developing countries: Evidence from a panel data analysis. *Middle East Technical University Studies in Development*, *29* (3–4), 311–332. http://www2.feas.metu.edu.tr/metusd/ojs/index.php/metusd/issue/archive

Gupta KL. (1988). Macroeconomic determinants of growth: Some implications of disaggregation. *Applied Economics*, 20(6), 843-52.

Guru-Gharana KK. (2012). Relationships among export, FDI and growth in India: An application of autoregressive distributed lag (ARDL) bounds testing approach. *Journal of International Business Research*, 11(1), 1.

Guseh J. (1997). Government size and economic growth in developing countries: A political-economy framework. *Journal of Macroeconomics*, 19 (1). 175-192.

Gwartney J, Lawson R, Holcombe, R. (1998). The size and functions of government and economic growth. *Joint Economic Committee*, Washington, D.C., April.

Hansson P, Henrekson M. (1994). A new framework for testing the effect of government spending on growth and productivity. *Public Choice*, *81*(3–4), 381–401. https://doi.org/10.1007/BF01053239.

Herath S. (2009). The size of the government and economic growth: An empirical study of Sri Lanka. *Institute for the Environment and Regional Development. SRE Discussion Working Paper 2009/08*. Vienna University of Economics and Business http://epub.wu.ac.at/2962/.

Herath S. (2012). Size of government and economic growth: A nonlinear analysis. *Economic Annals*. LVII (194): 7–30.

Hobbes T. (1993[1651]). *Leviathan- Bir Din ve Dünya Devletinin İçeriği, Biçimi ve Kudreti*, Çev. Semih Lin, Yapı Kredi Yayınları, Kâzım Taşkent Klasik Yapıtlar Dizisi.

Hok L, Jariyapan P, Buddhawongsa P, Tansuchat R. (2014). Optimal size of government spending: Empirical evidence from eight countries in Southeast Asia. *The Empirical Econometrics and Quantitative Economics Letters*, 3(4), 31–44. http://www.jyoungeconomist.com/images/stories/EEQEL_V3_N4_pp_31_44_Hok_etal.pdf.

Holmes JM, Hutton PA. (1990). On the causal relationship between government expenditures and national income. *The Review of Economics and Statistics*, Vol. 72, No. 1 (February), 87-95.

Hsieh E, Lai K. (1994). Government spending and economic growth: The G-7 experience. *Applied Economics*, 26, 535-542.

Jones LE, Manuelli RE, Rossi PE. (1993). Optimal taxation in models of endogenous growth. *Journal of Political Economy*, 101, 485-519.

Kahveci Ş, Terzi H. (2017). Türkiye'de doğrudan yabancı yatırımlar ve ekonomik büyüme arasındaki ilişkilerin nedensellik analizleri ile testi. *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, Sayı: 49, Ocak-Haziran, 135-154.

Kar M, Taban S. (2003). Kamu harcama çeşitlerinin ekonomik büyüme üzerine etkisi. *Ankara Üniversitesi SBF Dergisi*, 58(03), 145-169.

Karras G. (1996). The optimal government size: further international evidence on the productivity of government services. *Economic Inquiry* 34, 193–203.

Karras G. (1997). On the optimal government size in Europe: Theory and empirical evidence. *The Manchester School of Economic & Social Studies*, Blackwell Publishing, vol. 65(3), 280-294.

Kerr P. (1993). Adam Smith's theory of growth and technological change revisited. *Contributions to Political Economy*, 12, 1-27.

Kim DH, Wu YC, Lin SC. (2018). Heterogeneity in the effects of government size and governance on economic growth. *Economic Modelling*, *68*(October 2016), 205–216. https://doi.org/10.1016/j.econmod.2017.07.014.

King R, Rebelo S. (1990). Public policy and economic growth: Developing neoclassical implications. *Journal of Political Economy*, 98, 126-151.

Kneller R, Bleaney MF, Gemmell N. (1999). Fiscal policy and growth: Evidence from OECD countries. *Journal of Public Economics*, *74*(2), 171-190.

Kormendi RC, Meguire PG. (1985). Macroeconomic determinants of growth: Cross-country evidence. *Journal of Monetary Economics*, 16(2), 259-276.

Krugman P. (1990). *The Age of Diminished Expectations.* MIT Press, Mass., Cambridge.

Lamsiraroj S. (2016). The foreign direct investment–economic growth nexus. *International Review of Economics and Finance,* 42: 116–33.

Landau D. (1983). Government expenditure and economic growth: A cross-country study. *Southern Economic Journal*, 49(3), 783-792.

Landau D. (1986). Government and economic growth in the less developed countries: An empirical study for 1960-1980. *Economic Development and Cultural Change*, 35, 35-75.

Lerner AP. (1941). The economic steering wheel. *University Review*, June. 2-8.

Lerner AP. (1943). Functional finance and the federal debt. *Social Research*, 10(1), 38-51.

Levine R, Renelt D. (1991). Cross country studies of growth and policy: Some methodological, conceptual, and statistical problems. *World Bank Working Paper*, No. 608, Washington, D.C.: The World Bank.

Loto MA. (2011). Impact of government sectoral expenditure on economic growth. *Journal of Economics and International Finance*, Vol. 3 (11), 646-652.

Lucas R. (1988). On the mechanics of economic development, *Journal of Monetary Economics.* (22), 3-42.

Mallik G, Chowdhury A. (2001). Inflation and economic growth: Evidence from four Asian countries. *Asia-Pacific Development Journal*, vol. 8, No. 1, 123-135.

Marume SBM, Jubenkanda RR, Namusi CW, Madziyire NC. (2016). An analysis of essential elements of the State. International Journal of Engineering Science Invention. Volume 5, Issue 3, 24-28.

Mavrov H. (2007). The size of government expenditure and the rate of economic growth in Bulgaria. *Economic Alternatives* 1, 52–63.

Mendoza EG, Milesi-Ferretti GM, Asea P. (1997). On the effectiveness of tax policy in altering long-run growth: Harberger's super neutrality conjecture. *Journal of Public Economics*, 66, 99-126.

Miteski M, Stefanova DJ. (2017). The impact of sectoral FDI on economic growth in central, Eastern and Southeastern Europe, Working Paper, No. 1/2017, National Bank of the Republic of Macedonia, Skopje.

Mittnik S, Neumann T. (2003). Time-series evidence on the nonlinearity hypothesis for public spending. *Economic Inquiry,* 41, 565–573.

Musgrave RA. (1959). *The Theory of Public Finance: A Study in Public Economy*. McGraw-Hill: New York.

Narayan P. (2005). The saving and investment nexus for China: Evidence from co-integration tests. *Applied Economics*, 37(17), 1979-1990.

Olowofeso EO, Adeleke AO, Udoji AO. (2015). Impact of private sector credit on economic growth in Nigeria. *CBN Journal of Applied Statistics*, Vol.6, No.2.

Peden E. (1991). Productivity in the United States and its relationship to government activity: An analysis of 57 years, 1929-1986. *Public Choice* 69, 153-173.

Peon SBG. (2003). Increasing returns: A historical review, *BUAP*, VIII (22),79-98.

Pesaran MH, Shin Y. (1995). An autoregressive distributed lag modeling approach to cointegration analysis. *Cambridge: Cambridge University*, Department of Applied Economics, DP No. 9514.

Pesaran HM, Shin Y. (1999). Autoregressive distributed lag modeling approach to cointegration analysis, in S. Storm (Ed.) Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium, Chapter 11 (Cambridge University Press).

Pesaran MH, Shin Y, Smith RJ. (2001). Bounds testing approaches to the analysis of level relationship. *Journal of Applied Econometrics*, 16 (3): 289-326.

Pevcin P. (2004). Does optimal spending size of government exist? Paper presented at the European Group of Public Administration Conference, 1-4 September 2004, Ljubljana, Slovenia.

Presidency of Turkey, Strategy and Budget Office. http://www.sbb.gov.tr/ekonomik-veriler/#1540461995857-3570233a-09e6. 01 November 2018.

Rahn R, Fox H. (1996). What is the optimum size of government? Vernon K. Krieble Foundation.

Ram R. (1986). Government size and economic growth: A new framework and some evidence from cross-section and time-series data. *American Economic Review*, 76(1), 191-203.

Rebelo S. (1991). Long-run policy analysis and long-run growth. *Journal of Political Economy*, 99(3), 500-521.

Rezk E. (2005). Public expenditure and optimal government size in an endogenous growth model: An analysis of the Argentine case. The *National University of La Plata.*

Robinson EH. (2013). The distinction between state and government. *Geography Compass*, 7/8, 556-566.

Romer P. (1989). Human capital and growth: theory and evidence. *National Bureau of Economic Research*, (3173), 51. https://doi.org/10.1016/0167-2231(90)90028-J.

Romer PM. (1986). Increasing returns and long-run growth. *Journal of Political Economy*, 94(5), 1002-1037.

Romero-Avila D, Strauch R. (2008). Public finances and long-term growth in Europe: Evidence from a panel data analysis. *European Journal of Political Economy,* 24 (1): 172–191.

Rubinson R. (1977). Dependence, government revenue, and economic growth, 1955-1970. *Studies in Comparative International Development*, *12*(2), 3–28. https://doi.org/10.1007/BF02686481.

Saget C. (2000). Can the level of employment be explained by GDP growth in transition countries? (Theory versus the Quality of Data), *Labour*, 14(4), 623-643.

Sağbaş İ, Ciğerci İ. (2019). Türkiye'de kamu harcamalarının (2000-2018) döneminde yapısal değişim ve gelişimi, Ed: İsa Sağbaş, *Kamu Harcamalarının Ekonomik Analizi*, Ekin Yayınevi.

Sala-i-Martin X. (2002). Sources of growth, Ed: Mohsin S. Khan, Saleh M. Nsouli, Chang-Huey Wong, *Macroeconomic Management: Programs and Policies*, IMF Institute, Washington, DC., 58-97.

Saunders P. (1985). Public expenditure and economic performance in OECD countries. *Journal of Public Policy*, *5*(1), 1. https://doi.org/10.1017/S0143814X00002865.

Schoors K, Van Der Tol B. (2002). Foreign direct investment spillovers within and between sectors: Evidence from Hungarian data, Working Papers of Faculty of Economics and Business Administration, 02/157.

Scully G. (1994). What is the optimal size of government in the US? *National Center for Policy Analysis*, Policy Report No. 188.

Scully G. (2008). Optimal taxation, economic growth and income inequality in the United States. *National Center for Policy Analysis*, Policy Report No. 316.

Scully GW. (1989). The size of the state, economic growth and the efficient utilization of national resources", *Public Choice*, Vol: 63, 149-164.

Scully GW. (1998). Measuring the burden of high taxes. *National Centre for Policy Analysis–Policy Report*, No: 215, Mimeo.

Scully GW. (2003). Optimal taxation, economic growth, and income inequality. *Public Choice*, 115(3), 299-312.

Seyfred W. (2005). Examining relationship between employment and economic growth in ten largest states. *Southwestern Economic Review*, 32(1), 13-24.

Sidrauski M. (1967). Inflation and economic growth. *The Journal of Political Economy*, Vol. 75, No. 6, 796-810.

Skott P, Paul A. (1995). Cumulative causation and the "New" theories of economic growth", *Journal of Post Keynesian Economics*, 17(3), 381-402.

Snowdon B, Vane HR. (2005). Modern macroeconomics its origins, development and current state. (Cheltenham, UK, and Northampton, MA, USA: Edward Elgar) ISBN 1 84376 394 X.

Solow RM. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics*, 70, 1 (February), 65–94.

Stiroh KJ. (2001). What drives productivity growth. *Federal Reserve Bank of New York Policy Review*, (March), 37-59.

Stokey N, Rebelo S. (1995). Growth effects of flat-rate taxes. *Journal of Political Economy*, 103, 510-550.

Swan TW. (1956). Economic growth and capital accumulation. *Economic Record*, 32 (November), 334–361.

Şen H. (2008). Kamu maliyesi kamu ekonomisi. Orion Kitabevi.

Şen H, Kaya A. (2015). Ekonomik krizlerin değişmeyen imdatçısı: Maliye politikası. *Sosyoekonomi*, No. 23, 55-86.

Şen H, Öz E. (2017). Maliye Soruları ve Yanıtları [2001-2016]. Erek Basım Yayın Dağıtım/Ankara.

Şen H, Kaya A. (2019). Alternatif göstergeler bazında Türkiye'de optimal kamu kesimi büyüklüğünün tahmini. *Bankacılar Dergisi*, No. 109, 49-81.

Tanninen H. (1999). Income inequality, government expenditures, and growth. *Applied Economics*, *31*(9), 1109–1117. https://doi.org/10.1080/000368499323599.

Tanzi V, Schuknecht L. (1996). Reforming government in industrial countries. The Institute for Public-Private Partnerships, *Finance & Development*.

The Ministry of Treasury and Finance. Annually Budget Justifications.

The Ministry of Treasury and Finance. Bütçe Gider ve Gelir Gerçekleşmeleri (1924-1995). A statistical report revised the 2nd Edition.

Tobin J. (1965). Money and economic growth. *Econometrica*, Vol. 33, Issue 4, 671-684.

Vedder R, Gallaway L. (1998). Government size and economic growth. *Joint Economic Committee*, Washington D, 1-15.

World Bank. www.worldbank.org. 01 November 2018.

Wu SY, Tang JH, Lin E. (2010). The impact of government expenditure on economic growth: How sensitive to the level of development? *Journal of Policy Modeling*. 32(6), 804-817.

Yam TK, Wu F, Heng TM, Ping JT, Sia HY. (2002). Employment growth will trail economic recovery in 2002: Evidence from econometric estimates. *Economic Survey of Singapore*, First Quarter, 45-52.

Yamamura E. (2011). Decomposition of the effect of government size on growth. *Economics Letters*, 112 (3), 230-232.

Yülek, MA. (1997). İçsel büyüme teorileri, gelişmekte olan ülkeler ve kamu politikaları üzerine. *Hazine Dergisi,* April. (6).

Appendix A

The relationship between government size and economic growth

Empirical Studies	Period	Sample Country/Countries	Econometric Approach Used	Specified Variables	Empirical Findings	The effect of government size on economic growth
Asimakopoulos and Karavias (2016)	1980 - 2009	129 Countries	Non-linear panel Generalized Method of Moments approach, A dynamic panel threshold estimation	Government final consumption expenditure as a share of GDP, inflation, capital formation, openness to trade and population growth variables	An asymmetric impact of government size on economic growth in both developed and developing countries around the estimated threshold.	Positive and Negative
Afonso and Jalles (2016)	1970 - 2010	140 Countries	Panel data techniques	Government size, government consumption, total government expenditures, total government revenues, and total government debt, real GDP per capita, gross fixed capital formation, capital stock, investment, depreciation rate, human capital.	They showed a negative effect of the size of government on growth.	Negative
Afonso and Furceri (2010)	1970 - 2004	OECD and EU Countries	OLS	Indirect taxes, social contributions, government consumption, subsidies, government	Total revenue and total expenditure seem to impinge negatively on the real growth of per capita GDP both for the OECD and the EU	Negative

				investment.	countries.	
Bose et al. (2007)	1970s - 1980s	30 developing countries	Panel data techniques	Initial GDP per capita, population, initial human capital, life expectancy, political instability, private investment, initial trade ratio, growth of GDP per capita, agriculture's share in GDP and broad money (M2)	The share of government capital expenditure in GDP is positively and significantly correlated with economic growth, while the growth effect of current expenditure is insignificant for their group of countries.	Positive
Fölster and Henrekson (2001)	1970 - 1995	23/22 OECD Countries	Panel data techniques	Average annual growth rate of GDP per head, Total taxes as a fraction of GDP, Government expenditure as a fraction of GDP, Investment as a fraction of GDP, Average annual growth rate of the labor force, Export of goods and services as a fraction of GDP.	The results point to a robust negative relationship between government expenditure and growth in rich countries.	Negative
Tanninen (1999)	1970 - 1992	52 Countries	OLS	Average yearly rate of growth of income per capita, Gini coefficient, the adjusted Gini coefficient, the size of the middle class, the top to	The relationship between government expenditure and growth is more likely to be non-linear; positive with small amounts and negative with large amounts. Such a	Negative

				bottom quintile ratio, per capita GDP, the investment share of GDP, average educational level between 1960 and 1990, and several economic-system and regional dummies.	relationship, however, is only found for public goods.	
Karras (1997)	1950 - 1990	20 European Countries	OLS, GLS	The level of technology, real output, total (private and public) capital stock at the beginning of the period, employment, government consumption	The marginal productivity of government services may be negatively related to government size: the public sector may be more productive when small	Positive
Levine and Renelt (1991)	1960 - 1985	-	Some econometric specifications	Government Expenditures, GDP	Both the ratio of government consumption expenditures and total government expenditures to GDP are not strongly related to growth.	Positive
Engen and Skinner (1992)	1970 - 1985	107 Countries	OLS	Real GDP growth rate, Investment/GDP, Labor force growth rate, Government Expenditure/GDP, Average tax rate, Population,	They found strong and negative effects of both government spending and taxation on output growth.	Negative
Barro (1991)	1960 - 1985	98 Countries	Regression	Government Expenditures,	Economic growth is inversely related to the	Negative

				GDP	share of government consumption in GDP.	
Scully (1989)	1960 - 1980	115 Market Economies	Linear OLS	Real gross domestic product per capita, population, and the percentage of real gross domestic product devoted to gross domestic investment	It was found that the size of the government share in the economy was negatively correlated with economic growth.	Negative
Grier and Tullock (1989)	1950 - 1981	113 Countries	F-statistic	Initial per-capita real GDP, the growth of government's share of GDP, the standard deviation of GDP growth, population growth, inflation, the change in inflation, and the standard deviation of inflation.	Estimate separate equations for different groups of countries: Asia, Africa, the Americas and the OECD countries. They find that government growth is positively correlated with GDP growth for the Asian countries while it is negatively correlated with GDP growth for the other three groups.	Positive and Negative
Barro (1989)	1960 – 1985	72 Countries	Panel data techniques	The growth rate of real per capita GDP, the ratio of physical investment expenditure (private + public) to GDP, a proxy for investment in human capital (the secondary school enrollment rate), and the growth rate of population.	Public consumption spending is systematically inversely related to growth and investment while public investment tends to be positively correlated with growth and private investment.	Negative

Romer (1989)	1960 - 1985	112 Countries	Regression	Growth, Government spending, Investment, Population	The principal empirical finding is that literacy has no additional explanatory power in a cross-country regression of growth rates on investment and other variables, but consistent with the model, the initial level of literacy does help predict the subsequent rate of investment, and indirectly, the rate of growth.	Negative
Ram (1986)	1960 - 1980	115 Countries	OLS and Autoregressive Disturbance Term (ARI) estimates	Output (GDP), Investment, Consumption, Government Services, Population Growth, Labor input	Government size has a positive effect on economic performance and growth.	Positive
Saunders (1985)	1960 – 1981	OECD Countries	A cross-section multiple regression approach	Economic growth, Inflation, Private sector employment growth	The results provide little evidence that government size and growth have been detrimental to economic performance, particularly in the period since 1975, although an inverse relation existed in the sixties between government size and economic growth.	Negative

Appendix B

The growth-maximizing level of government size (Optimal government size)

Study	Period	Country	The growth-maximizing level of government size (%GDP)
Hok et al. (2014)	1995-2011	8 Asian countries	28.50%
Christie (2014)	1971-2005	136 countries	35%
Forte and Magazzino (2011)	1970-2009	27 EU countries	35.39% – 43.50%
Abounoori and Nademi (2010)	1956-2006	Iran	34.7%
Davies (2009)	1975-2002	154 countries	14.7%
Chobanov and Mladenova (2009)	1970-2009	28 EU countries	25%
Mavrov (2007)	1990-2004	Bulgaria	21.4%
Günalp and Dinçer (2005)	1990-2001	20 Transition countries	17.3% (+/-3%)
Chen and Lee (2005)	1979-2003	Taiwan	23%
Pevcin (2004)	1950-1996	12 European countries	36% – 42%
Afonso et al. (2003)	1990-2000	23 OECD countries	35%
Karras (1997)	1950-1990	20 European countries	16% (+ / -3%)
Karras (1996)	1960-1985	118 countries	23%
Tanzi and Schuknecht (1996)	1960-1990	21 countries	less than 30%

Appendix C

ARDL bound test results are presented below as eviews output:

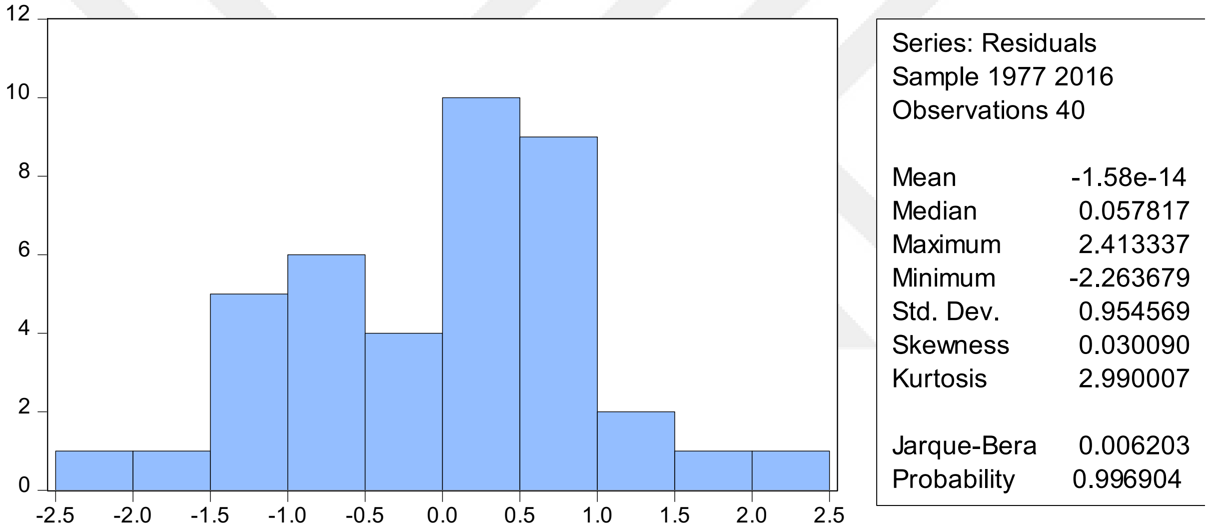
Model 1

Breusch-Godfrey Serial Correlation LM Test[7]:

F-statistic	4.912168	Prob. F(3,9)	0.0273
Obs*R-squared	24.83349	Prob. Chi-Square(3)	0.0000

Heteroskedasticity Test: White

F-statistic	3.273566	Prob. F(27,12)	0.0174
Obs*R-squared	35.21847	Prob. Chi-Square(27)	0.1334
Scaled explained SS	3.153825	Prob. Chi-Square(27)	1.0000



[7] With the exception of Models 6, 8 and 12, autocorrelation problem was found in all models and problems were solved by estimator Heteroskedasticity and Autocorrelation Consistent (HAC).

Dependent Variable: GROWTH
Method: ARDL
Date: 04/15/19 Time: 16:16
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY ECENGOV ECENGOVSQ
Fixed regressors: C
Number of models evalulated: 49152
Selected Model: ARDL(3, 3, 3, 3, 2, 3, 0, 3)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.626733	0.180769	-3.467037	0.0047
GROWTH(-2)	-0.520333	0.117235	-4.438386	0.0008
GROWTH(-3)	-0.334922	0.277005	-1.209083	0.2499
INFCPI	-0.047106	0.018790	-2.507019	0.0276
INFCPI(-1)	-0.005516	0.029570	-0.186526	0.8551
INFCPI(-2)	0.045504	0.044856	1.014426	0.3304
INFCPI(-3)	-0.090931	0.027419	-3.316375	0.0062
DCPS	0.640001	0.192910	3.317608	0.0061
DCPS(-1)	0.267744	0.346976	0.771651	0.4552
DCPS(-2)	-0.582857	0.334589	-1.742008	0.1071
DCPS(-3)	-0.454799	0.179710	-2.530733	0.0264
FDI_INFL_	-1.724633	1.272548	-1.355261	0.2003
FDI_INFL_(-1)	-2.174886	1.098993	-1.978979	0.0712
FDI_INFL_(-2)	-2.723141	0.938628	-2.901192	0.0133
FDI_INFL_(-3)	-4.855359	1.359554	-3.571289	0.0038
EMP	-0.056740	0.436969	-0.129850	0.8988
EMP(-1)	0.758821	0.506507	1.498144	0.1599
EMP(-2)	-1.560425	0.525995	-2.966617	0.0118
DUMMY	-7.026712	2.448411	-2.869907	0.0141
DUMMY(-1)	-7.096367	2.792967	-2.540799	0.0259
DUMMY(-2)	-9.202587	1.990581	-4.623066	0.0006
DUMMY(-3)	-5.283442	3.593016	-1.470475	0.1672
ECENGOV	1.658373	0.755860	2.194021	0.0487
ECENGOVSQ	-0.033242	0.015360	-2.164283	0.0513
ECENGOVSQ(-1)	0.004740	0.004273	1.109467	0.2890
ECENGOVSQ(-2)	0.003200	0.005588	0.572661	0.5774
ECENGOVSQ(-3)	-0.011173	0.004764	-2.345580	0.0370
C	58.21995	8.929178	6.520192	0.0000

R-squared	0.951434	Mean dependent var	4.305062
Adjusted R-squared	0.842160	S.D. dependent var	4.331519
S.E. of regression	1.720874	Akaike info criterion	4.119569
Sum squared resid	35.53690	Schwarz criterion	5.301785
Log likelihood	-54.39139	Hannan-Quinn criter.	4.547021
F-statistic	8.706858	Durbin-Watson stat	2.930701
Prob(F-statistic)	0.000174		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 3, 3, 2, 3, 0, 3)
Case 3: Unrestricted Constant and No Trend
Date: 04/15/19 Time: 16:19
Sample: 1974 2016
Included observations: 40

Conditional Error Correction Regression

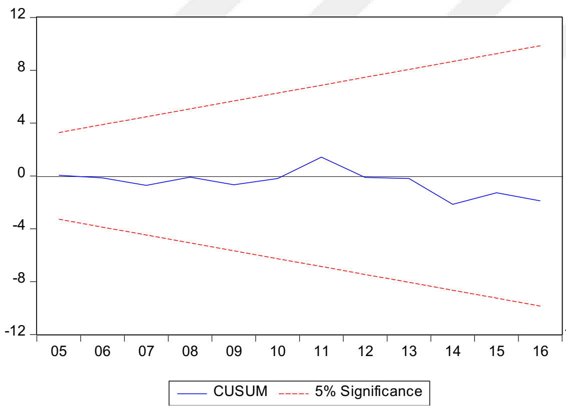
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	58.21995	12.20949	4.768419	0.0005
GROWTH(-1)*	-2.481988	0.380243	-6.527368	0.0000
INFCPI(-1)	-0.098049	0.042581	-2.302645	0.0400
DCPS(-1)	-0.129910	0.042719	-3.040999	0.0103
FDI_INFL_(-1)	-11.47802	2.068030	-5.550218	0.0001
EMP(-1)	-0.858345	0.203880	-4.210054	0.0012
DUMMY(-1)	-28.60911	6.351939	-4.503996	0.0007
ECENGOV**	1.658373	0.774058	2.142441	0.0534
ECENGOVSQ(-1)	-0.036476	0.019480	-1.872443	0.0857
D(GROWTH(-1))	0.855255	0.267848	3.193066	0.0077
D(GROWTH(-2))	0.334922	0.163126	2.053147	0.0625
D(INFCPI)	-0.047106	0.030125	-1.563681	0.1439
D(INFCPI(-1))	0.045428	0.037125	1.223625	0.2446
D(INFCPI(-2))	0.090931	0.035858	2.535891	0.0261
D(DCPS)	0.640001	0.212859	3.006691	0.0109
D(DCPS(-1))	1.037655	0.255604	4.059624	0.0016
D(DCPS(-2))	0.454799	0.190983	2.381354	0.0347
D(FDI_INFL_)	-1.724633	1.427278	-1.208338	0.2502
D(FDI_INFL_(-1))	7.578500	1.468092	5.162141	0.0002
D(FDI_INFL_(-2))	4.855359	1.561120	3.110176	0.0090
D(EMP)	-0.056740	0.385420	-0.147217	0.8854
D(EMP(-1))	1.560425	0.433875	3.596488	0.0037
D(DUMMY)	-7.026712	1.707975	-4.114060	0.0014
D(DUMMY(-1))	14.48603	4.209006	3.441674	0.0049
D(DUMMY(-2))	5.283442	2.487167	2.124281	0.0551
D(ECENGOVSQ)	-0.033242	0.017067	-1.947775	0.0752
D(ECENGOVSQ(-1))	0.007974	0.004439	1.796147	0.0977
D(ECENGOVSQ(-2))	0.011173	0.005382	2.076067	0.0600

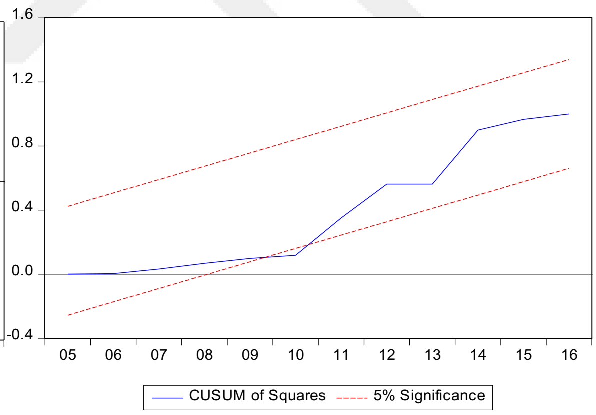
* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.039504	0.012490	-3.162847	0.0082
DCPS	-0.052341	0.012162	-4.303478	0.0010
FDI_INFL_	-4.624526	0.760080	-6.084264	0.0001
EMP	-0.345829	0.063126	-5.478441	0.0001
DUMMY	-11.52669	1.491589	-7.727792	0.0000
ECENGOV	0.668163	0.213267	3.132988	0.0086
ECENGOVSQ	-0.014696	0.005213	-2.818942	0.0155

EC = GROWTH - (-0.0395*INFCPI -0.0523*DCPS -4.6245*FDI_INFL_
-0.3458*EMP -11.5267*DUMMY + 0.6682*ECENGOV -0.0147
*ECENGOVSQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	8.006950	10%	2.03	3.13
k	7	5%	2.32	3.5
		2.5%	2.6	3.84
		1%	2.96	4.26





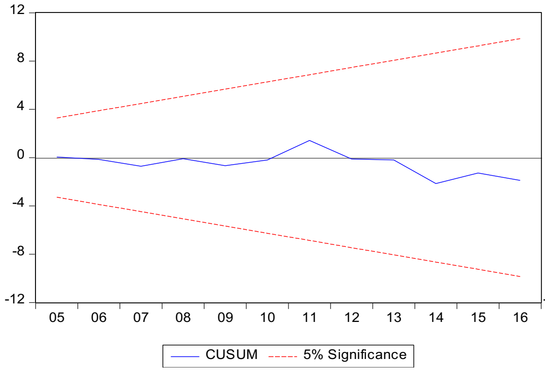
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 3, 3, 2, 3, 0, 3)
Case 3: Unrestricted Constant and No Trend
Date: 04/15/19 Time: 16:20
Sample: 1974 2016
Included observations: 40

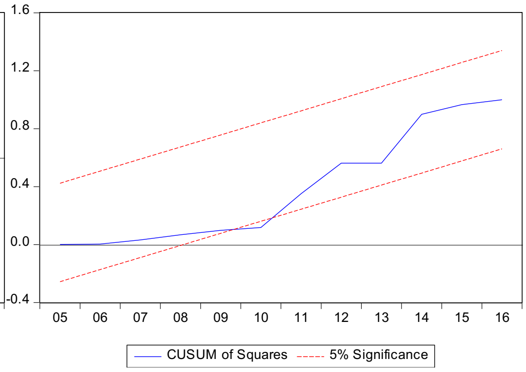
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	58.21995	5.881495	9.898837	0.0000
D(GROWTH(-1))	0.855255	0.170235	5.023975	0.0003
D(GROWTH(-2))	0.334922	0.106737	3.137833	0.0086
D(INFCPI)	-0.047106	0.018725	-2.515686	0.0271
D(INFCPI(-1))	0.045428	0.020231	2.245482	0.0444
D(INFCPI(-2))	0.090931	0.022564	4.029973	0.0017
D(DCPS)	0.640001	0.106692	5.998600	0.0001
D(DCPS(-1))	1.037655	0.165243	6.279562	0.0000
D(DCPS(-2))	0.454799	0.124194	3.662000	0.0033
D(FDI_INFL_)	-1.724633	0.864788	-1.994284	0.0693
D(FDI_INFL_(-1))	7.578500	0.956240	7.925309	0.0000
D(FDI_INFL_(-2))	4.855359	1.012129	4.797174	0.0004
D(EMP)	-0.056740	0.281469	-0.201587	0.8436
D(EMP(-1))	1.560425	0.329025	4.742571	0.0005
D(DUMMY)	-7.026712	0.844615	-8.319430	0.0000
D(DUMMY(-1))	14.48603	2.322244	6.237944	0.0000
D(DUMMY(-2))	5.283442	1.513878	3.490005	0.0045
D(ECENGOVSQ)	-0.033242	0.004261	-7.802176	0.0000
D(ECENGOVSQ(-1))	0.007974	0.002629	3.033173	0.0104
D(ECENGOVSQ(-2))	0.011173	0.003456	3.232770	0.0072
CointEq(-1)*	-2.481988	0.246454	-10.07082	0.0000

R-squared	0.976674	Mean dependent var	-0.181936
Adjusted R-squared	0.952121	S.D. dependent var	6.250129
S.E. of regression	1.367612	Akaike info criterion	3.769569
Sum squared resid	35.53690	Schwarz criterion	4.656231
Log likelihood	-54.39139	Hannan-Quinn criter.	4.090158
F-statistic	39.77739	Durbin-Watson stat	2.930701
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.





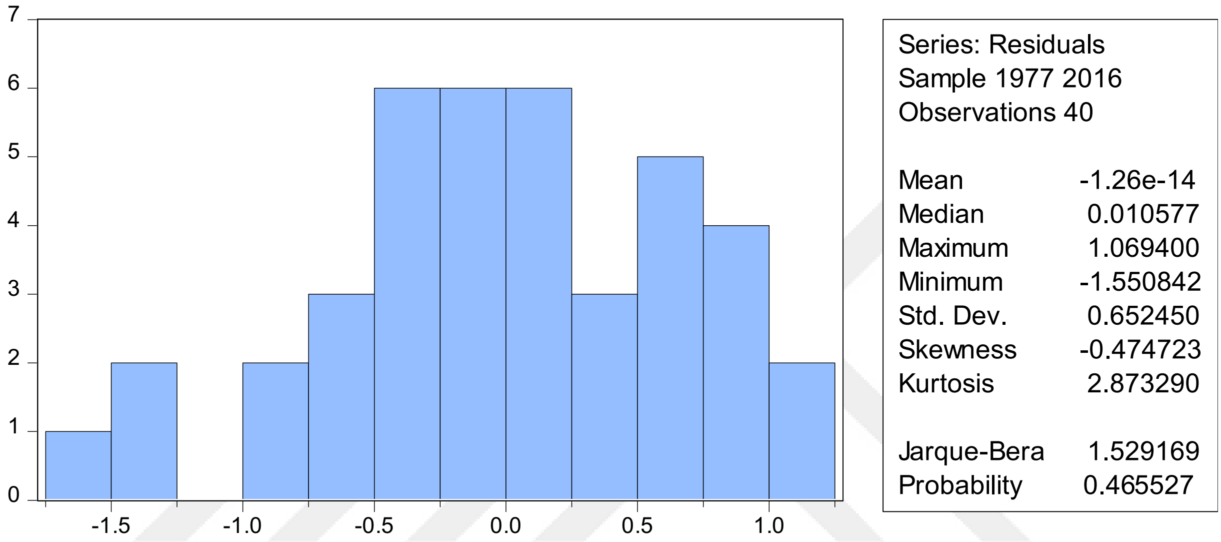
Model 2

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.024561	Prob. F(3,5)	0.2292
Obs*R-squared	21.93916	Prob. Chi-Square(3)	0.0001

Heteroskedasticity Test: White

F-statistic	1.290477	Prob. F(31,8)	0.3725
Obs*R-squared	33.33400	Prob. Chi-Square(31)	0.3544
Scaled explained SS	1.248885	Prob. Chi-Square(31)	1.0000



Dependent Variable: GROWTH
Method: ARDL
Date: 04/15/19 Time: 16:38
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY EE EESQ
Fixed regressors: C
Number of models evaluated: 49152
Selected Model: ARDL(3, 3, 3, 3, 3, 3, 3, 3)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.344438	0.203196	-1.695099	0.1285
GROWTH(-2)	-0.432601	0.172479	-2.508133	0.0365
GROWTH(-3)	-0.587199	0.227129	-2.585312	0.0323
INFCPI	-0.041193	0.028655	-1.437572	0.1885
INFCPI(-1)	-0.032910	0.028817	-1.142048	0.2865
INFCPI(-2)	-0.014585	0.039836	-0.366116	0.7238
INFCPI(-3)	-0.049163	0.033309	-1.475963	0.1782
DCPS	0.495132	0.159308	3.108010	0.0145
DCPS(-1)	-0.206846	0.270492	-0.764700	0.4664
DCPS(-2)	0.097248	0.195233	0.498112	0.6318
DCPS(-3)	-0.176178	0.140417	-1.254678	0.2450
FDI_INFL_	-4.392582	1.506696	-2.915375	0.0194
FDI_INFL_(-1)	-2.026909	1.108494	-1.828526	0.1049
FDI_INFL_(-2)	-3.851038	1.254611	-3.069506	0.0154
FDI_INFL_(-3)	-0.999164	1.201634	-0.831504	0.4298
EMP	-1.046036	0.357332	-2.927352	0.0191
EMP(-1)	0.408953	0.616416	0.663436	0.5257
EMP(-2)	-0.828994	0.495467	-1.673158	0.1328
EMP(-3)	0.363273	0.497178	0.730670	0.4858
DUMMY	-9.311816	1.778606	-5.235459	0.0008
DUMMY(-1)	-6.077688	2.611938	-2.326888	0.0484
DUMMY(-2)	-9.126235	2.571287	-3.549287	0.0075
DUMMY(-3)	-11.61148	3.845674	-3.019362	0.0166
EE	28.20138	7.829843	3.601781	0.0070
EE(-1)	-4.949192	11.48289	-0.431006	0.6778
EE(-2)	-15.04426	9.140508	-1.645889	0.1384
EE(-3)	18.93733	9.174068	2.064224	0.0729
EESQ	-4.927204	1.391802	-3.540163	0.0076
EESQ(-1)	-0.014284	1.999386	-0.007144	0.9945
EESQ(-2)	2.513899	1.390253	1.808232	0.1082
EESQ(-3)	-2.445059	1.757551	-1.391174	0.2016
C	50.06068	12.82274	3.904056	0.0045

R-squared	0.977311	Mean dependent var	4.305062
Adjusted R-squared	0.889391	S.D. dependent var	4.331519
S.E. of regression	1.440571	Akaike info criterion	3.558518
Sum squared resid	16.60195	Schwarz criterion	4.909621
Log likelihood	-39.17036	Hannan-Quinn criter.	4.047034
F-statistic	11.11596	Durbin-Watson stat	3.015497
Prob(F-statistic)	0.000702		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 3, 3, 3, 3, 3, 3)
Case 3: Unrestricted Constant and No Trend
Date: 04/15/19   Time: 16:41
Sample: 1974 2016
Included observations: 40

Conditional Error Correction Regression

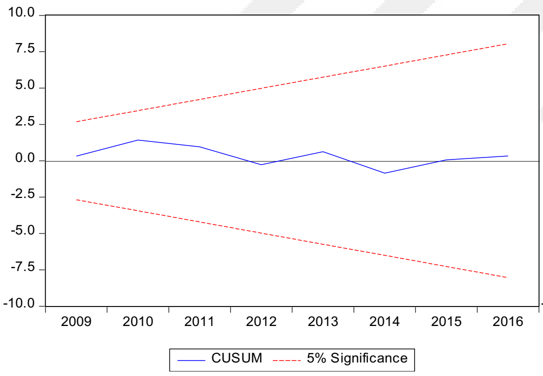
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	50.06068	14.15116	3.537567	0.0076
GROWTH(-1)*	-2.364238	0.434112	-5.446145	0.0006
INFCPI(-1)	-0.137850	0.030778	-4.478931	0.0021
DCPS(-1)	0.209356	0.141930	1.475072	0.1784
FDI_INFL_(-1)	-11.26969	2.404426	-4.687061	0.0016
EMP(-1)	-1.102804	0.175177	-6.295361	0.0002
DUMMY(-1)	-36.12722	7.414640	-4.872417	0.0012
EE(-1)	27.14526	10.56846	2.568517	0.0332
EESQ(-1)	-4.872648	2.294423	-2.123692	0.0664
D(GROWTH(-1))	1.019800	0.321432	3.172679	0.0131
D(GROWTH(-2))	0.587199	0.204203	2.875562	0.0207
D(INFCPI)	-0.041193	0.045676	-0.901850	0.3935
D(INFCPI(-1))	0.063747	0.032425	1.965981	0.0849
D(INFCPI(-2))	0.049163	0.027609	1.780694	0.1128
D(DCPS)	0.495132	0.167153	2.962143	0.0181
D(DCPS(-1))	0.078930	0.319330	0.247174	0.8110
D(DCPS(-2))	0.176178	0.181341	0.971525	0.3597
D(FDI_INFL_)	-4.392582	1.721676	-2.551341	0.0341
D(FDI_INFL_(-1))	4.850201	1.468018	3.303910	0.0108
D(FDI_INFL_(-2))	0.999164	1.470207	0.679608	0.5159
D(EMP)	-1.046036	0.478943	-2.184050	0.0605
D(EMP(-1))	0.465721	0.607209	0.766986	0.4651
D(EMP(-2))	-0.363273	0.486923	-0.746058	0.4770
D(DUMMY)	-9.311816	2.110144	-4.412883	0.0022
D(DUMMY(-1))	20.73771	5.135003	4.038501	0.0037
D(DUMMY(-2))	11.61148	3.008469	3.859598	0.0048
D(EE)	28.20138	8.521359	3.309494	0.0107
D(EE(-1))	-3.893074	12.96625	-0.300247	0.7716
D(EE(-2))	-18.93733	12.33117	-1.535729	0.1632
D(EESQ)	-4.927204	1.601985	-3.075688	0.0152
D(EESQ(-1))	-0.068840	2.560371	-0.026887	0.9792
D(EESQ(-2))	2.445059	2.461728	0.993229	0.3497

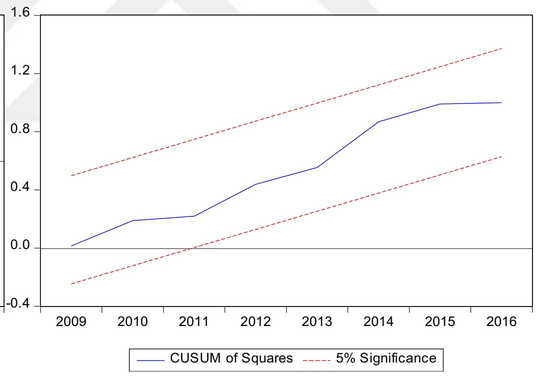
* p-value incompatible with t-Bounds distribution.

Levels Equation Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.058306	0.012484	-4.670582	0.0016
DCPS	0.088551	0.053175	1.665277	0.1344
FDI_INFL_	-4.766733	0.705880	-6.752891	0.0001
EMP	-0.466452	0.065459	-7.125859	0.0001
DUMMY	-15.28070	1.148926	-13.29999	0.0000
EE	11.48161	4.102508	2.798681	0.0232
EESQ	-2.060980	0.865410	-2.381508	0.0444

EC = GROWTH - (-0.0583*INFCPI + 0.0886*DCPS -4.7667*FDI_INFL_
-0.4665*EMP -15.2807*DUMMY + 11.4816*EE -2.0610*EESQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.164484	10%	2.03	3.13
k	7	5%	2.32	3.5
		2.5%	2.6	3.84
		1%	2.96	4.26





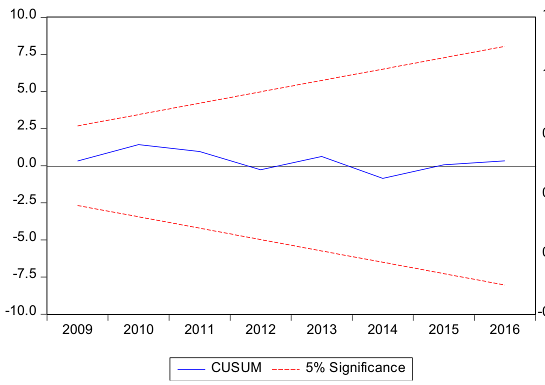
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 3, 3, 3, 3, 3)
Case 3: Unrestricted Constant and No Trend
Date: 04/15/19 Time: 16:38
Sample: 1974 2016
Included observations: 40

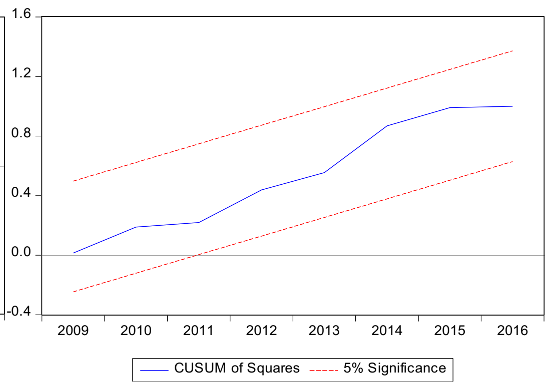
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	50.06068	5.506242	9.091624	0.0000
D(GROWTH(-1))	1.019800	0.182769	5.579722	0.0005
D(GROWTH(-2))	0.587199	0.126929	4.626203	0.0017
D(INFCPI)	-0.041193	0.020440	-2.015289	0.0786
D(INFCPI(-1))	0.063747	0.018499	3.445943	0.0087
D(INFCPI(-2))	0.049163	0.016139	3.046261	0.0159
D(DCPS)	0.495132	0.093673	5.285721	0.0007
D(DCPS(-1))	0.078930	0.095025	0.830623	0.4303
D(DCPS(-2))	0.176178	0.091306	1.929535	0.0898
D(FDI_INFL_)	-4.392582	0.692451	-6.343524	0.0002
D(FDI_INFL_(-1))	4.850201	0.818492	5.925775	0.0004
D(FDI_INFL_(-2))	0.999164	0.720099	1.387537	0.2027
D(EMP)	-1.046036	0.247371	-4.228607	0.0029
D(EMP(-1))	0.465721	0.329552	1.413194	0.1953
D(EMP(-2))	-0.363273	0.250020	-1.452976	0.1843
D(DUMMY)	-9.311816	0.789100	-11.80055	0.0000
D(DUMMY(-1))	20.73771	2.946459	7.038181	0.0001
D(DUMMY(-2))	11.61148	1.830020	6.345000	0.0002
D(EE)	28.20138	3.821609	7.379452	0.0001
D(EE(-1))	-3.893074	4.253243	-0.915319	0.3868
D(EE(-2))	-18.93733	4.328718	-4.374813	0.0024
D(EESQ)	-4.927204	0.672703	-7.324486	0.0001
D(EESQ(-1))	-0.068840	0.700193	-0.098315	0.9241
D(EESQ(-2))	2.445059	0.821585	2.976028	0.0177
CointEq(-1)*	-2.364238	0.245865	-9.615990	0.0000

R-squared	0.989103	Mean dependent var	-0.181936
Adjusted R-squared	0.971667	S.D. dependent var	6.250129
S.E. of regression	1.052044	Akaike info criterion	3.208518
Sum squared resid	16.60195	Schwarz criterion	4.264068
Log likelihood	-39.17036	Hannan-Quinn criter.	3.590171
F-statistic	56.72896	Durbin-Watson stat	3.015497
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.





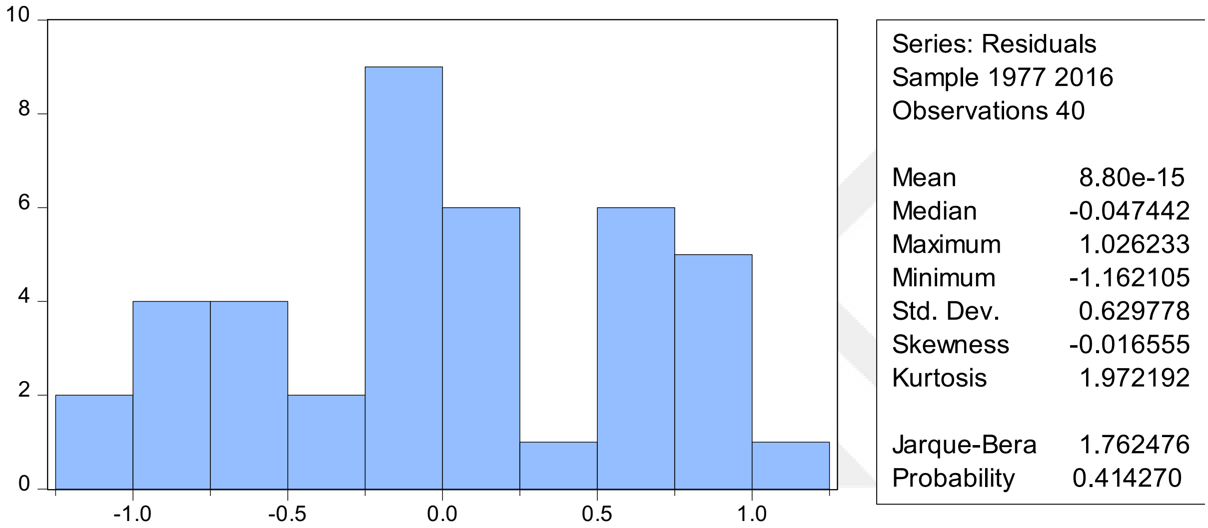
Model 3

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.283114	Prob. F(3,8)	0.1559
Obs*R-squared	18.45022	Prob. Chi-Square(3)	0.0004

Heteroskedasticity Test: White

F-statistic	0.538358	Prob. F(28,11)	0.9090
Obs*R-squared	23.12497	Prob. Chi-Square(28)	0.7268
Scaled explained SS	0.850097	Prob. Chi-Square(28)	1.0000



Dependent Variable: GROWTH
Method: ARDL
Date: 04/15/19 Time: 16:45
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY HE HESQ
Fixed regressors: C @TREND
Number of models evalulated: 49152
Selected Model: ARDL(3, 3, 2, 3, 3, 3, 1, 2)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.655289	0.132425	-4.948365	0.0004
GROWTH(-2)	-0.522483	0.117487	-4.447152	0.0010
GROWTH(-3)	-0.375790	0.156258	-2.404937	0.0349
INFCPI	-0.072938	0.026793	-2.722230	0.0199
INFCPI(-1)	0.014245	0.030907	0.460905	0.6538
INFCPI(-2)	0.065214	0.026384	2.471752	0.0310
INFCPI(-3)	-0.047642	0.027424	-1.737213	0.1102
DCPS	0.456047	0.115907	3.934581	0.0023
DCPS(-1)	0.678779	0.247589	2.741560	0.0192
DCPS(-2)	-0.204765	0.168150	-1.217749	0.2488
FDI_INFL_	-1.079962	0.938523	-1.150703	0.2743
FDI_INFL_(-1)	-3.682563	0.830072	-4.436440	0.0010
FDI_INFL_(-2)	-1.791529	0.933197	-1.919776	0.0812
FDI_INFL_(-3)	-3.747003	1.512450	-2.477440	0.0307
EMP	-0.964958	0.261182	-3.694579	0.0035
EMP(-1)	-0.570115	0.520581	-1.095151	0.2968
EMP(-2)	-2.401057	0.326740	-7.348536	0.0000
EMP(-3)	-0.685383	0.376752	-1.819186	0.0962
DUMMY	-6.035889	1.884118	-3.203561	0.0084
DUMMY(-1)	-3.623402	1.912660	-1.894430	0.0847
DUMMY(-2)	-5.426151	1.950077	-2.782532	0.0178
DUMMY(-3)	-2.892161	2.288063	-1.264022	0.2324
HE	41.65170	9.763814	4.265926	0.0013
HE(-1)	20.75228	11.73789	1.767974	0.1048
HESQ	-16.45482	4.028648	-4.084453	0.0018
HESQ(-1)	-12.17428	4.864019	-2.502925	0.0294
HESQ(-2)	2.380297	1.200920	1.982062	0.0730
C	289.7451	36.55109	7.927126	0.0000
@TREND	-2.965174	0.442972	-6.693818	0.0000

R-squared	0.978861	Mean dependent var	4.305062
Adjusted R-squared	0.925051	S.D. dependent var	4.331519
S.E. of regression	1.185832	Akaike info criterion	3.337782
Sum squared resid	15.46817	Schwarz criterion	4.562220
Log likelihood	-37.75564	Hannan-Quinn criter.	3.780500
F-statistic	18.19121	Durbin-Watson stat	2.766867
Prob(F-statistic)	0.000008		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 2, 3, 3, 3, 1, 2)
Case 5: Unrestricted Constant and Unrestricted Trend
Date: 04/15/19 Time: 16:45
Sample: 1974 2016
Included observations: 40

Conditional Error Correction Regression

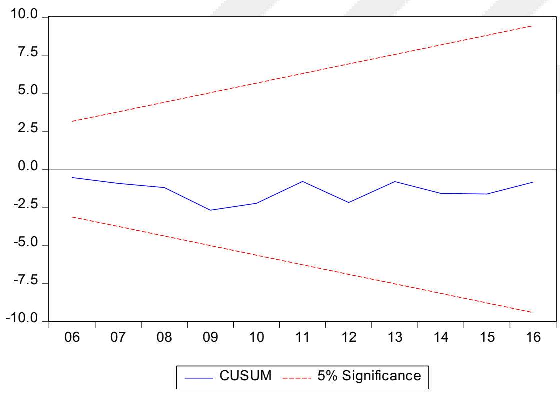
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	289.7451	55.37162	5.232736	0.0003
@TREND	-2.965174	0.655947	-4.520450	0.0009
GROWTH(-1)*	-2.553562	0.317061	-8.053838	0.0000
INFCPI(-1)	-0.041120	0.020387	-2.016929	0.0688
DCPS(-1)	0.930062	0.215207	4.321702	0.0012
FDI_INFL_(-1)	-10.30106	1.621272	-6.353688	0.0001
EMP(-1)	-4.621513	0.911979	-5.067566	0.0004
DUMMY(-1)	-17.97760	3.483920	-5.160165	0.0003
HE(-1)	62.40399	15.28187	4.083531	0.0018
HESQ(-1)	-26.24880	7.935186	-3.307900	0.0070
D(GROWTH(-1))	0.898273	0.212073	4.235677	0.0014
D(GROWTH(-2))	0.375790	0.155237	2.420750	0.0340
D(INFCPI)	-0.072938	0.026473	-2.755141	0.0187
D(INFCPI(-1))	-0.017572	0.026159	-0.671764	0.5156
D(INFCPI(-2))	0.047642	0.021878	2.177635	0.0521
D(DCPS)	0.456047	0.115792	3.938513	0.0023
D(DCPS(-1))	0.204765	0.173239	1.181974	0.2621
D(FDI_INFL_)	-1.079962	1.048506	-1.030001	0.3251
D(FDI_INFL_(-1))	5.538532	1.136240	4.874437	0.0005
D(FDI_INFL_(-2))	3.747003	1.170794	3.200396	0.0084
D(EMP)	-0.964958	0.356611	-2.705911	0.0204
D(EMP(-1))	3.086440	0.649947	4.748760	0.0006
D(EMP(-2))	0.685383	0.474003	1.445947	0.1761
D(DUMMY)	-6.035889	1.319980	-4.572713	0.0008
D(DUMMY(-1))	8.318312	2.536870	3.278967	0.0073
D(DUMMY(-2))	2.892161	1.940486	1.490431	0.1642
D(HE)	41.65170	12.77881	3.259434	0.0076
D(HESQ)	-16.45482	5.112749	-3.218391	0.0082
D(HESQ(-1))	-2.380297	1.216748	-1.956278	0.0763

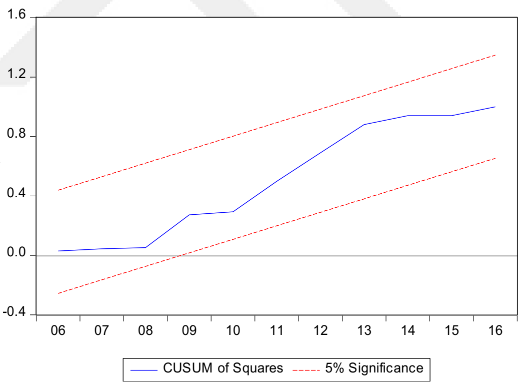
* p-value incompatible with t-Bounds distribution.

Levels Equation Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.016103	0.006047	-2.663076	0.0221
DCPS	0.364221	0.062300	5.846255	0.0001
FDI_INFL_	-4.033995	0.676126	-5.966341	0.0001
EMP	-1.809830	0.271723	-6.660581	0.0000
DUMMY	-7.040207	1.418749	-4.962264	0.0004
HE	24.43802	4.090124	5.974885	0.0001
HESQ	-10.27929	2.208472	-4.654481	0.0007

EC = GROWTH - (-0.0161*INFCPI + 0.3642*DCPS -4.0340*FDI_INFL_
-1.8098*EMP -7.0402*DUMMY + 24.4380*HE -10.2793*HESQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	11.91861	10%	2.38	3.45
k	7	5%	2.69	3.83
		2.5%	2.98	4.16
		1%	3.31	4.63





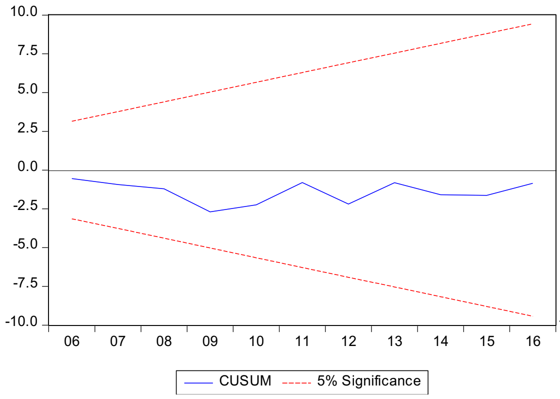
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 2, 3, 3, 3, 1, 2)
Case 5: Unrestricted Constant and Unrestricted Trend
Date: 04/15/19 Time: 16:46
Sample: 1974 2016
Included observations: 40

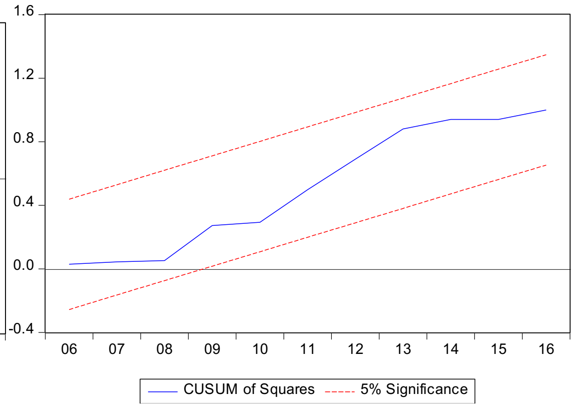
ECM Regression
Case 5: Unrestricted Constant and Unrestricted Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	289.7451	23.52806	12.31487	0.0000
@TREND	-2.965174	0.245503	-12.07798	0.0000
D(GROWTH(-1))	0.898273	0.138560	6.482938	0.0000
D(GROWTH(-2))	0.375790	0.103015	3.647934	0.0038
D(INFCPI)	-0.072938	0.017057	-4.276176	0.0013
D(INFCPI(-1))	-0.017572	0.014694	-1.195910	0.2569
D(INFCPI(-2))	0.047642	0.014403	3.307787	0.0070
D(DCPS)	0.456047	0.068524	6.655281	0.0000
D(DCPS(-1))	0.204765	0.085496	2.395019	0.0355
D(FDI_INFL_)	-1.079962	0.498347	-2.167090	0.0530
D(FDI_INFL_(-1))	5.538532	0.710555	7.794655	0.0000
D(FDI_INFL_(-2))	3.747003	0.640082	5.853944	0.0001
D(EMP)	-0.964958	0.190896	-5.054878	0.0004
D(EMP(-1))	3.086440	0.380055	8.121045	0.0000
D(EMP(-2))	0.685383	0.290541	2.358989	0.0379
D(DUMMY)	-6.035889	0.677539	-8.908551	0.0000
D(DUMMY(-1))	8.318312	1.619963	5.134878	0.0003
D(DUMMY(-2))	2.892161	1.244967	2.323083	0.0404
D(HE)	41.65170	7.555719	5.512606	0.0002
D(HESQ)	-16.45482	3.126736	-5.262619	0.0003
D(HESQ(-1))	-2.380297	0.667208	-3.567549	0.0044
CointEq(-1)*	-2.553562	0.204432	-12.49102	0.0000

R-squared	0.989847	Mean dependent var	-0.181936
Adjusted R-squared	0.978002	S.D. dependent var	6.250129
S.E. of regression	0.927007	Akaike info criterion	2.987782
Sum squared resid	15.46817	Schwarz criterion	3.916666
Log likelihood	-37.75564	Hannan-Quinn criter.	3.323637
F-statistic	83.56509	Durbin-Watson stat	2.766867
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.





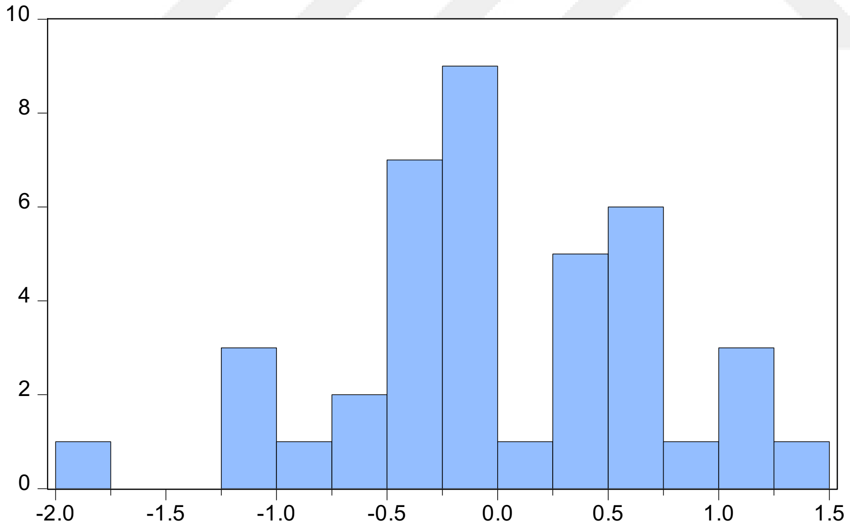
Model 4

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.822185	Prob. F(3,5)	0.2601
Obs*R-squared	20.89152	Prob. Chi-Square(3)	0.0001

Heteroskedasticity Test: White

F-statistic	0.665615	Prob. F(31,8)	0.8033
Obs*R-squared	28.82449	Prob. Chi-Square(31)	0.5784
Scaled explained SS	0.988829	Prob. Chi-Square(31)	1.0000



Series: Residuals	
Sample 1977 2016	
Observations 40	
Mean	-1.03e-14
Median	-0.119044
Maximum	1.341875
Minimum	-1.768276
Std. Dev.	0.698528
Skewness	-0.219962
Kurtosis	2.715259
Jarque-Bera	0.457684
Probability	0.795454

Dependent Variable: GROWTH
Method: ARDL
Date: 04/15/19 Time: 16:48
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY EHE EHESQ
Fixed regressors: C
Number of models evalulated: 49152
Selected Model: ARDL(3, 3, 3, 3, 3, 3, 3, 3)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.300773	0.197257	-1.524773	0.1658
GROWTH(-2)	-0.452831	0.222844	-2.032053	0.0766
GROWTH(-3)	-0.485179	0.204783	-2.369236	0.0453
INFCPI	-0.031749	0.015847	-2.003432	0.0801
INFCPI(-1)	-0.024271	0.026502	-0.915829	0.3865
INFCPI(-2)	0.005714	0.040714	0.140335	0.8919
INFCPI(-3)	-0.074185	0.031471	-2.357257	0.0462
DCPS	0.484773	0.210886	2.298742	0.0506
DCPS(-1)	-0.157839	0.351928	-0.448499	0.6657
DCPS(-2)	0.015875	0.205434	0.077277	0.9403
DCPS(-3)	-0.246936	0.150060	-1.645583	0.1385
FDI_INFL_	-2.594563	0.973427	-2.665390	0.0286
FDI_INFL_(-1)	-2.550705	1.221440	-2.088277	0.0702
FDI_INFL_(-2)	-2.561651	1.463918	-1.749860	0.1183
FDI_INFL_(-3)	-1.066122	1.532982	-0.695457	0.5065
EMP	-0.728275	0.398139	-1.829199	0.1048
EMP(-1)	0.336398	0.465514	0.722639	0.4905
EMP(-2)	-0.923954	0.523386	-1.765340	0.1155
EMP(-3)	0.365117	0.546656	0.667910	0.5230
DUMMY	-8.783420	1.037818	-8.463352	0.0000
DUMMY(-1)	-4.448011	2.418574	-1.839105	0.1032
DUMMY(-2)	-9.039039	3.419606	-2.643298	0.0296
DUMMY(-3)	-9.322370	3.258256	-2.861153	0.0211
EHE	14.66393	3.469120	4.226990	0.0029
EHE(-1)	-1.605251	6.689177	-0.239977	0.8164
EHE(-2)	-12.11596	8.721917	-1.389139	0.2022
EHE(-3)	15.75397	4.571131	3.446405	0.0087
EHESQ	-1.906044	0.428365	-4.449578	0.0021
EHESQ(-1)	-0.237164	0.796305	-0.297831	0.7734
EHESQ(-2)	1.499514	1.026719	1.460491	0.1823
EHESQ(-3)	-1.738842	0.532831	-3.263405	0.0115
C	48.87375	8.997112	5.432160	0.0006

R-squared	0.973993	Mean dependent var	4.305062
Adjusted R-squared	0.873217	S.D. dependent var	4.331519
S.E. of regression	1.542307	Akaike info criterion	3.694998
Sum squared resid	19.02970	Schwarz criterion	5.046102
Log likelihood	-41.89997	Hannan-Quinn criter.	4.183515
F-statistic	9.664899	Durbin-Watson stat	2.879833
Prob(F-statistic)	0.001166		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 3, 3, 3, 3, 3, 3)
Case 3: Unrestricted Constant and No Trend
Date: 04/15/19 Time: 16:48
Sample: 1974 2016
Included observations: 40

Conditional Error Correction Regression

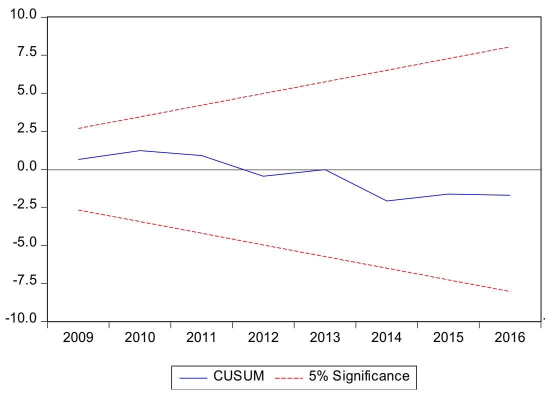
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	48.87375	12.08509	4.044137	0.0037
GROWTH(-1)*	-2.238783	0.565417	-3.959525	0.0042
INFCPI(-1)	-0.124492	0.044066	-2.825102	0.0223
DCPS(-1)	0.095873	0.129294	0.741514	0.4796
FDI_INFL_(-1)	-8.773040	2.211626	-3.966783	0.0041
EMP(-1)	-0.950714	0.231463	-4.107402	0.0034
DUMMY(-1)	-31.59284	9.201417	-3.433476	0.0089
EHE(-1)	16.69669	8.343844	2.001079	0.0804
EHESQ(-1)	-2.382536	1.390702	-1.713190	0.1250
D(GROWTH(-1))	0.938010	0.412133	2.275989	0.0524
D(GROWTH(-2))	0.485179	0.245416	1.976967	0.0834
D(INFCPI)	-0.031749	0.033471	-0.948570	0.3706
D(INFCPI(-1))	0.068471	0.039426	1.736705	0.1206
D(INFCPI(-2))	0.074185	0.031621	2.346052	0.0470
D(DCPS)	0.484773	0.183372	2.643655	0.0295
D(DCPS(-1))	0.231060	0.241835	0.955447	0.3673
D(DCPS(-2))	0.246936	0.166486	1.483221	0.1763
D(FDI_INFL_)	-2.594563	1.323670	-1.960127	0.0856
D(FDI_INFL_(-1))	3.627773	1.849170	1.961838	0.0854
D(FDI_INFL_(-2))	1.066122	1.420625	0.750460	0.4745
D(EMP)	-0.728275	0.506203	-1.438702	0.1882
D(EMP(-1))	0.558837	0.683631	0.817453	0.4373
D(EMP(-2))	-0.365117	0.562385	-0.649229	0.5344
D(DUMMY)	-8.783420	1.532840	-5.730162	0.0004
D(DUMMY(-1))	18.36141	6.535829	2.809347	0.0229
D(DUMMY(-2))	9.322370	3.603554	2.586994	0.0323
D(EHE)	14.66393	5.565361	2.634857	0.0300
D(EHE(-1))	-3.638012	7.541447	-0.482402	0.6424
D(EHE(-2))	-15.75397	5.348075	-2.945727	0.0185
D(EHESQ)	-1.906044	0.708064	-2.691907	0.0274
D(EHESQ(-1))	0.239328	1.057670	0.226278	0.8267
D(EHESQ(-2))	1.738842	0.717332	2.424041	0.0416

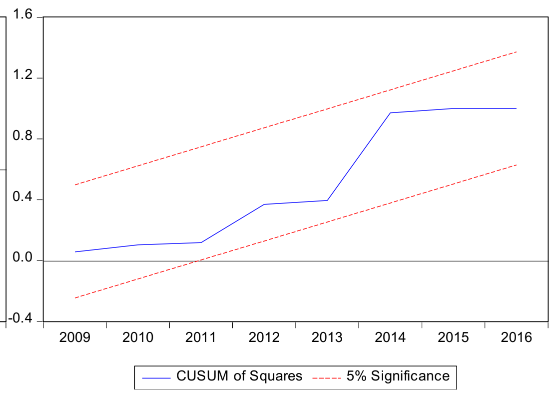
* p-value incompatible with t-Bounds distribution.

Levels Equation Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.055607	0.013335	-4.169948	0.0031
DCPS	0.042824	0.034300	1.248515	0.2471
FDI_INFL_	-3.918665	0.558581	-7.015388	0.0001
EMP	-0.424656	0.059901	-7.089322	0.0001
DUMMY	-14.11161	1.071802	-13.16625	0.0000
EHE	7.457934	1.849358	4.032714	0.0038
EHESQ	-1.064210	0.306805	-3.468690	0.0085

EC = GROWTH - (-0.0556*INFCPI + 0.0428*DCPS -3.9187*FDI_INFL_
-0.4247*EMP -14.1116*DUMMY + 7.4579*EHE -1.0642*EHESQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	3.495126	10%	2.03	3.13
k	7	5%	2.32	3.5
		2.5%	2.6	3.84
		1%	2.96	4.26





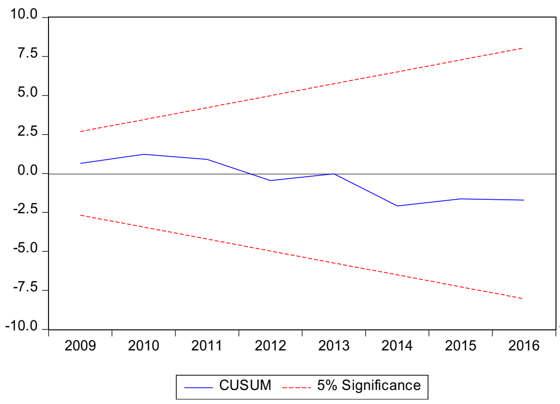
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 3, 3, 3, 3, 3, 3)
Case 3: Unrestricted Constant and No Trend
Date: 04/15/19 Time: 16:48
Sample: 1974 2016
Included observations: 40

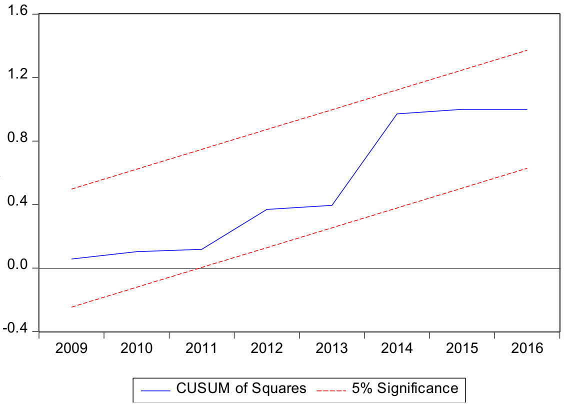
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	48.87375	7.137447	6.847511	0.0001
D(GROWTH(-1))	0.938010	0.231214	4.056893	0.0036
D(GROWTH(-2))	0.485179	0.152307	3.185536	0.0129
D(INFCPI)	-0.031749	0.018950	-1.675382	0.1324
D(INFCPI(-1))	0.068471	0.021338	3.208953	0.0124
D(INFCPI(-2))	0.074185	0.018033	4.113892	0.0034
D(DCPS)	0.484773	0.101507	4.775744	0.0014
D(DCPS(-1))	0.231060	0.104522	2.210646	0.0580
D(DCPS(-2))	0.246936	0.096862	2.549358	0.0342
D(FDI_INFL_)	-2.594563	0.672514	-3.858007	0.0048
D(FDI_INFL_(-1))	3.627773	0.966376	3.753999	0.0056
D(FDI_INFL_(-2))	1.066122	0.850655	1.253295	0.2455
D(EMP)	-0.728275	0.267261	-2.724959	0.0260
D(EMP(-1))	0.558837	0.368287	1.517395	0.1676
D(EMP(-2))	-0.365117	0.312020	-1.170172	0.2756
D(DUMMY)	-8.783420	0.827422	-10.61541	0.0000
D(DUMMY(-1))	18.36141	3.570653	5.142311	0.0009
D(DUMMY(-2))	9.322370	2.105376	4.427888	0.0022
D(EHE)	14.66393	2.827064	5.186983	0.0008
D(EHE(-1))	-3.638012	3.804369	-0.956272	0.3669
D(EHE(-2))	-15.75397	2.737271	-5.755356	0.0004
D(EHESQ)	-1.906044	0.358005	-5.324066	0.0007
D(EHESQ(-1))	0.239328	0.465450	0.514185	0.6210
D(EHESQ(-2))	1.738842	0.372755	4.664839	0.0016
CointEq(-1)*	-2.238783	0.309197	-7.240641	0.0001

R-squared	0.987509	Mean dependent var	-0.181936
Adjusted R-squared	0.967524	S.D. dependent var	6.250129
S.E. of regression	1.126342	Akaike info criterion	3.344998
Sum squared resid	19.02970	Schwarz criterion	4.400548
Log likelihood	-41.89997	Hannan-Quinn criter.	3.726652
F-statistic	49.41193	Durbin-Watson stat	2.879833
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.





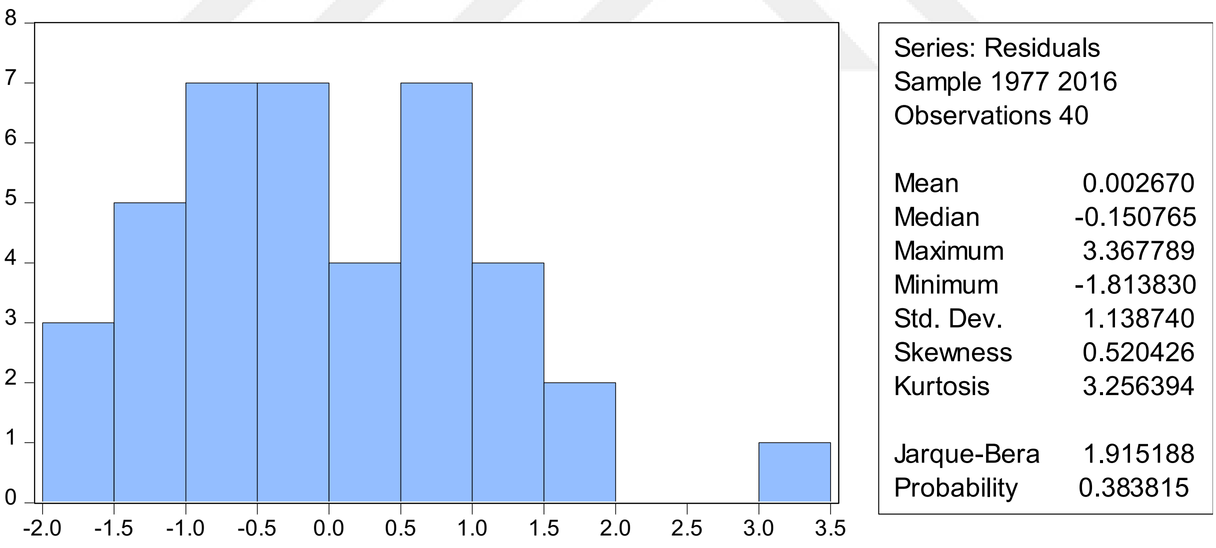
Model 5

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.708123	Prob. F(3,17)	0.0777
Obs*R-squared	12.93464	Prob. Chi-Square(3)	0.0048

Heteroskedasticity Test: White

F-statistic	0.920299	Prob. F(20,19)	0.5734
Obs*R-squared	19.68239	Prob. Chi-Square(20)	0.4779
Scaled explained SS	5.563556	Prob. Chi-Square(20)	0.9994



Dependent Variable: GROWTH
Method: ARDL
Date: 04/15/19 Time: 16:50
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY DE EDSQ
Fixed regressors:
Number of models evalulated: 49152
Selected Model: ARDL(1, 1, 3, 2, 0, 2, 2, 2)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.412108	0.106767	-3.859877	0.0010
INFCPI	-0.032357	0.019283	-1.678043	0.1089
INFCPI(-1)	-0.026809	0.016201	-1.654771	0.1136
DCPS	0.505825	0.082067	6.163560	0.0000
DCPS(-1)	-0.286105	0.136665	-2.093479	0.0493
DCPS(-2)	-0.025898	0.175320	-0.147718	0.8840
DCPS(-3)	-0.167848	0.132207	-1.269590	0.2188
FDI_INFL_	-1.905282	0.658143	-2.894939	0.0090
FDI_INFL_(-1)	0.477117	0.933589	0.511057	0.6149
FDI_INFL_(-2)	-2.625067	0.719212	-3.649918	0.0016
EMP	-0.311463	0.058501	-5.324028	0.0000
DUMMY	-8.935955	1.170873	-7.631874	0.0000
DUMMY(-1)	-3.982053	1.511115	-2.635176	0.0159
DUMMY(-2)	2.164222	1.077546	2.008473	0.0583
DE	-14.80794	7.734144	-1.914619	0.0700
DE(-1)	28.96846	15.99563	1.811024	0.0852
DE(-2)	15.15119	12.13062	1.249004	0.2261
EDSQ	3.218529	1.485706	2.166330	0.0425
EDSQ(-1)	-5.297249	3.035863	-1.744890	0.0964
EDSQ(-2)	-4.994854	2.326628	-2.146821	0.0443

R-squared	0.930885	Mean dependent var	4.305062
Adjusted R-squared	0.865226	S.D. dependent var	4.331519
S.E. of regression	1.590169	Akaike info criterion	4.072410
Sum squared resid	50.57273	Schwarz criterion	4.916850
Log likelihood	-61.44820	Hannan-Quinn criter.	4.377733
Durbin-Watson stat	2.405186		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 1, 3, 2, 0, 2, 2, 2)
Case 1: No Constant and No Trend
Date: 04/15/19 Time: 16:50
Sample: 1974 2016
Included observations: 40

Conditional Error Correction Regression

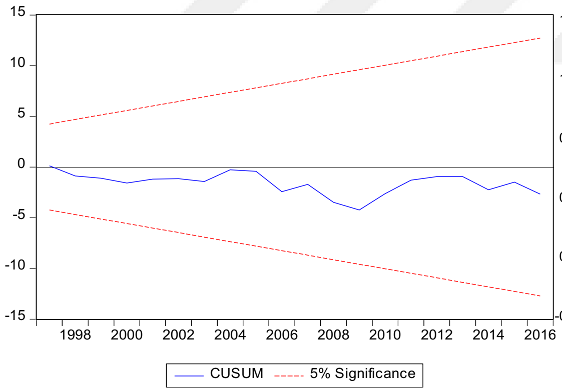
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH(-1)*	-1.412108	0.135565	-10.41650	0.0000
INFCPI(-1)	-0.059167	0.020913	-2.829153	0.0104
DCPS(-1)	0.025973	0.035240	0.737040	0.4697
FDI_INFL_(-1)	-4.053232	0.718472	-5.641457	0.0000
EMP**	-0.311463	0.067907	-4.586644	0.0002
DUMMY(-1)	-10.75379	2.594849	-4.144282	0.0005
DE(-1)	29.31171	4.215595	6.953160	0.0000
EDSQ(-1)	-7.073574	1.049563	-6.739544	0.0000
D(INFCPI)	-0.032357	0.024975	-1.295583	0.2099
D(DCPS)	0.505825	0.129494	3.906156	0.0009
D(DCPS(-1))	0.193746	0.138534	1.398544	0.1773
D(DCPS(-2))	0.167848	0.127256	1.318982	0.2021
D(FDI_INFL_)	-1.905282	0.708251	-2.690123	0.0141
D(FDI_INFL_(-1))	2.625067	0.727034	3.610652	0.0017
D(DUMMY)	-8.935955	1.099457	-8.127609	0.0000
D(DUMMY(-1))	-2.164222	1.137977	-1.901815	0.0717
D(DE)	-14.80794	8.054394	-1.838492	0.0809
D(DE(-1))	-15.15119	9.021520	-1.679450	0.1086
D(EDSQ)	3.218529	1.692352	1.901809	0.0717
D(EDSQ(-1))	4.994854	1.979609	2.523152	0.0202

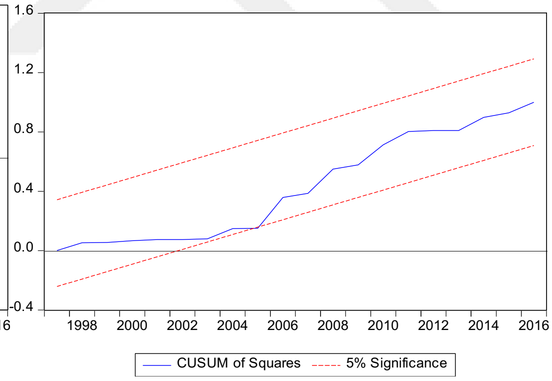
* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation Case 1: No Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.041900	0.010025	-4.179457	0.0005
DCPS	0.018393	0.020435	0.900072	0.3788
FDI_INFL_	-2.870341	0.380345	-7.546676	0.0000
EMP	-0.220566	0.044052	-5.006944	0.0001
DUMMY	-7.615414	1.043425	-7.298475	0.0000
DE	20.75742	2.072929	10.01357	0.0000
EDSQ	-5.009230	0.463821	-10.79992	0.0000

EC = GROWTH - (-0.0419*INFCPI + 0.0184*DCPS -2.8703*FDI_INFL_
-0.2206*EMP -7.6154*DUMMY + 20.7574*DE -5.0092*EDSQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	14.83204	10%	1.7	2.83
k	7	5%	1.97	3.18
		2.5%	2.22	3.49
		1%	2.54	3.91





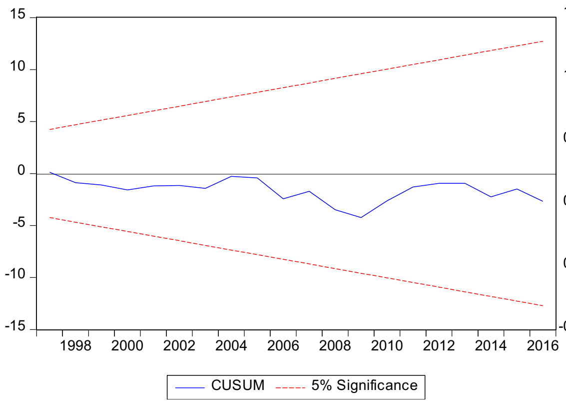
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 1, 3, 2, 0, 2, 2, 2)
Case 1: No Constant and No Trend
Date: 04/15/19 Time: 16:51
Sample: 1974 2016
Included observations: 40

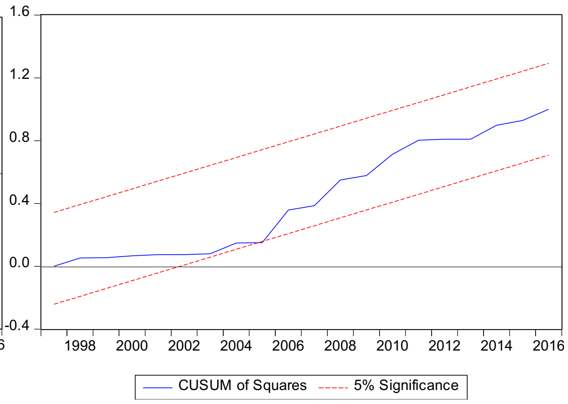
ECM Regression
Case 1: No Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INFCPI)	-0.032357	0.018277	-1.770338	0.0919
D(DCPS)	0.505825	0.086818	5.826276	0.0000
D(DCPS(-1))	0.193746	0.103960	1.863664	0.0771
D(DCPS(-2))	0.167848	0.087740	1.913029	0.0702
D(FDI_INFL_)	-1.905282	0.479906	-3.970119	0.0008
D(FDI_INFL_(-1))	2.625067	0.513636	5.110748	0.0001
D(DUMMY)	-8.935955	0.741211	-12.05588	0.0000
D(DUMMY(-1))	-2.164222	0.773980	-2.796226	0.0111
D(DE)	-14.80794	6.282988	-2.356831	0.0287
D(DE(-1))	-15.15119	7.262221	-2.086303	0.0500
D(EDSQ)	3.218529	1.345445	2.392168	0.0267
D(EDSQ(-1))	4.994854	1.609572	3.103218	0.0056
CointEq(-1)*	-1.412108	0.111572	-12.65646	0.0000

R-squared	0.966805	Mean dependent var	-0.181936
Adjusted R-squared	0.952052	S.D. dependent var	6.250129
S.E. of regression	1.368599	Akaike info criterion	3.722410
Sum squared resid	50.57273	Schwarz criterion	4.271296
Log likelihood	-61.44820	Hannan-Quinn criter.	3.920870
Durbin-Watson stat	2.405186		

* p-value incompatible with t-Bounds distribution.





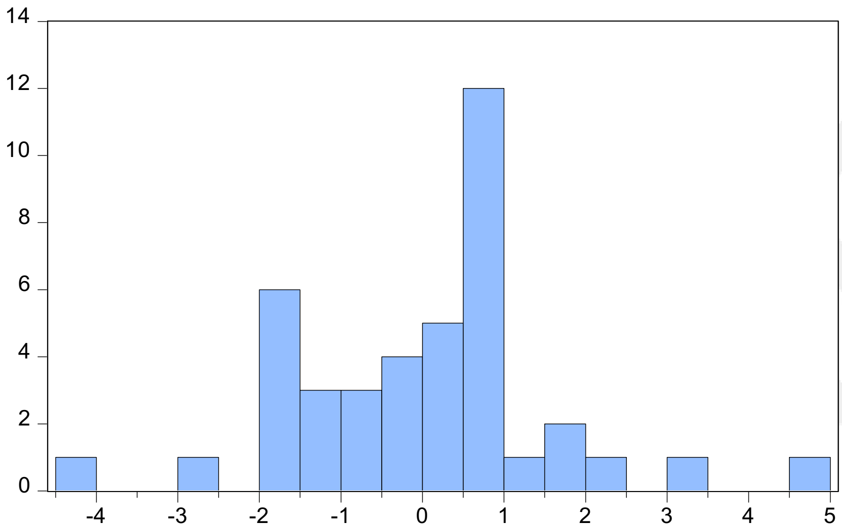
Model 6

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.428923	Prob. F(2,20)	0.6571
Obs*R-squared	1.686258	Prob. Chi-Square(2)	0.4304

Heteroskedasticity Test: White

F-statistic	0.805610	Prob. F(19,21)	0.6801
Obs*R-squared	17.28530	Prob. Chi-Square(19)	0.5705
Scaled explained SS	8.250126	Prob. Chi-Square(19)	0.9840



Series: Residuals	
Sample 1976 2016	
Observations 41	
Mean	0.010816
Median	0.324073
Maximum	4.810963
Minimum	-4.358142
Std. Dev.	1.627042
Skewness	0.134642
Kurtosis	4.311895
Jarque-Bera	3.064036
Probability	0.216099

Dependent Variable: GROWTH
Method: ARDL
Date: 04/16/19 Time: 01:25
Sample (adjusted): 1976 2016
Included observations: 41 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY CE CESQ
Fixed regressors:
Number of models evalulated: 4374
Selected Model: ARDL(2, 0, 2, 2, 2, 2, 0, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.109726	0.173739	-0.631555	0.5342
GROWTH(-2)	-0.294842	0.175204	-1.682855	0.1065
INFCPI	-0.060878	0.020645	-2.948774	0.0074
DCPS	0.671203	0.173512	3.868340	0.0008
DCPS(-1)	-0.425029	0.277295	-1.532771	0.1396
DCPS(-2)	-0.244226	0.187775	-1.300633	0.2068
FDI_INFL_	-2.257427	0.973119	-2.319785	0.0300
FDI_INFL_(-1)	1.498200	1.252289	1.196370	0.2443
FDI_INFL_(-2)	-3.488866	1.103217	-3.162449	0.0045
EMP	0.062938	0.408983	0.153888	0.8791
EMP(-1)	1.186155	0.573870	2.066939	0.0507
EMP(-2)	-1.634563	0.491829	-3.323438	0.0031
DUMMY	-2.771148	2.078149	-1.333469	0.1960
DUMMY(-1)	-4.862897	2.309188	-2.105890	0.0469
DUMMY(-2)	-3.484430	2.292638	-1.519835	0.1428
CE	7.112448	1.492851	4.764338	0.0001
CESQ	-0.403357	0.081160	-4.969926	0.0001
CESQ(-1)	0.105901	0.042591	2.486485	0.0210
CESQ(-2)	-0.048720	0.027982	-1.741116	0.0956

R-squared	0.862240	Mean dependent var	4.455213
Adjusted R-squared	0.749527	S.D. dependent var	4.383762
S.E. of regression	2.193952	Akaike info criterion	4.713586
Sum squared resid	105.8954	Schwarz criterion	5.507680
Log likelihood	-77.62851	Hannan-Quinn criter.	5.002751
Durbin-Watson stat	1.946087		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(2, 0, 2, 2, 2, 2, 0, 2)
Case 1: No Constant and No Trend
Date: 04/16/19 Time: 01:26
Sample: 1974 2016
Included observations: 41

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH(-1)*	-1.404568	0.269407	-5.213551	0.0000
INFCPI**	-0.060878	0.020645	-2.948774	0.0074
DCPS(-1)	0.001948	0.044549	0.043717	0.9655
FDI_INFL_(-1)	-4.248093	1.013568	-4.191226	0.0004
EMP(-1)	-0.385471	0.103171	-3.736227	0.0011
DUMMY(-1)	-11.11847	4.465079	-2.490096	0.0208
CE**	7.112448	1.492851	4.764338	0.0001
CESQ(-1)	-0.346176	0.076694	-4.513749	0.0002
D(GROWTH(-1))	0.294842	0.175204	1.682855	0.1065
D(DCPS)	0.671203	0.173512	3.868340	0.0008
D(DCPS(-1))	0.244226	0.187775	1.300633	0.2068
D(FDI_INFL_)	-2.257427	0.973119	-2.319785	0.0300
D(FDI_INFL_(-1))	3.488866	1.103217	3.162449	0.0045
D(EMP)	0.062938	0.408983	0.153888	0.8791
D(EMP(-1))	1.634563	0.491829	3.323438	0.0031
D(DUMMY)	-2.771148	2.078149	-1.333469	0.1960
D(DUMMY(-1))	3.484430	2.292638	1.519835	0.1428
D(CESQ)	-0.403357	0.081160	-4.969926	0.0001
D(CESQ(-1))	0.048720	0.027982	1.741116	0.0956

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

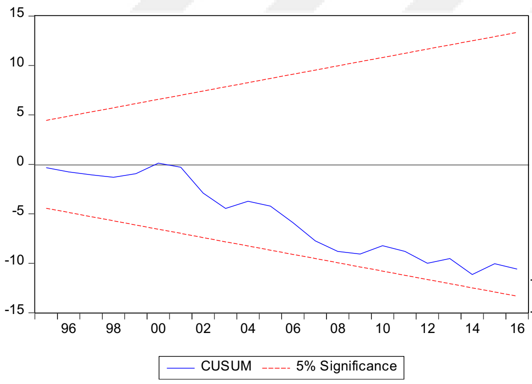
Levels Equation
Case 1: No Constant and No Trend

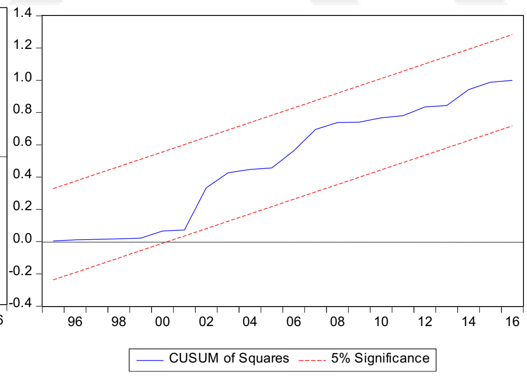
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.043343	0.016226	-2.671247	0.0139
DCPS	0.001387	0.031734	0.043693	0.9655
FDI_INFL_	-3.024484	0.881828	-3.429789	0.0024
EMP	-0.274441	0.077922	-3.522008	0.0019
DUMMY	-7.915940	2.177076	-3.636043	0.0015
CE	5.063798	1.088003	4.654214	0.0001
CESQ	-0.246464	0.057443	-4.290564	0.0003

EC = GROWTH - (-0.0433*INFCPI + 0.0014*DCPS -3.0245*FDI_INFL_
-0.2744*EMP -7.9159*DUMMY + 5.0638*CE -0.2465*CESQ)

F-Bounds Test Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.687536	10%	1.7	2.83
k	7	5%	1.97	3.18
		2.5%	2.22	3.49
		1%	2.54	3.91





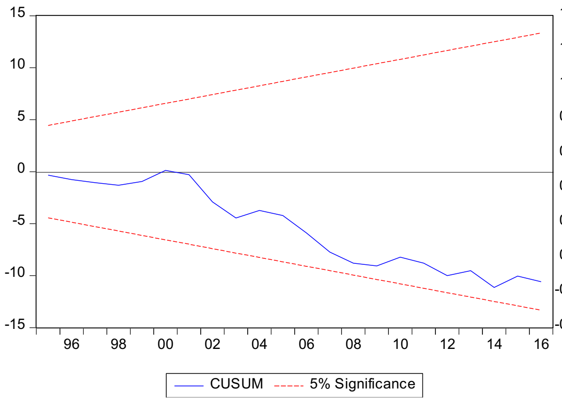
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(2, 0, 2, 2, 2, 2, 0, 2)
Case 1: No Constant and No Trend
Date: 04/16/19 Time: 01:27
Sample: 1974 2016
Included observations: 41

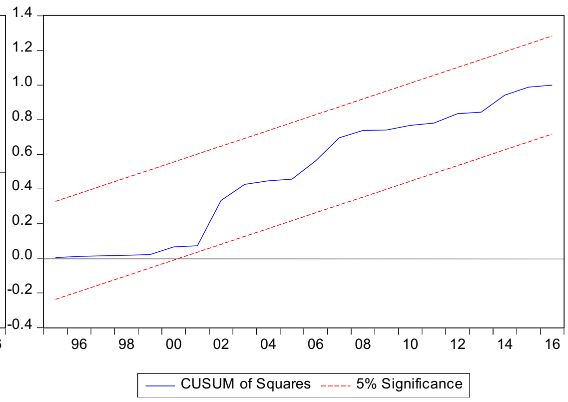
ECM Regression
Case 1: No Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GROWTH(-1))	0.294842	0.121246	2.431778	0.0236
D(DCPS)	0.671203	0.122837	5.464197	0.0000
D(DCPS(-1))	0.244226	0.145195	1.682063	0.1067
D(FDI_INFL_)	-2.257427	0.666104	-3.389004	0.0026
D(FDI_INFL_(-1))	3.488866	0.851691	4.096397	0.0005
D(EMP)	0.062938	0.290252	0.216838	0.8303
D(EMP(-1))	1.634563	0.345938	4.725023	0.0001
D(DUMMY)	-2.771148	1.211291	-2.287763	0.0321
D(DUMMY(-1))	3.484430	1.468917	2.372108	0.0269
D(CESQ)	-0.403357	0.046491	-8.676043	0.0000
D(CESQ(-1))	0.048720	0.019082	2.553152	0.0181
CointEq(-1)*	-1.404568	0.167254	-8.397804	0.0000

R-squared	0.931024	Mean dependent var	-0.097324
Adjusted R-squared	0.904860	S.D. dependent var	6.195243
S.E. of regression	1.910907	Akaike info criterion	4.372123
Sum squared resid	105.8954	Schwarz criterion	4.873656
Log likelihood	-77.62851	Hannan-Quinn criter.	4.554753
Durbin-Watson stat	1.946087		

* p-value incompatible with t-Bounds distribution.





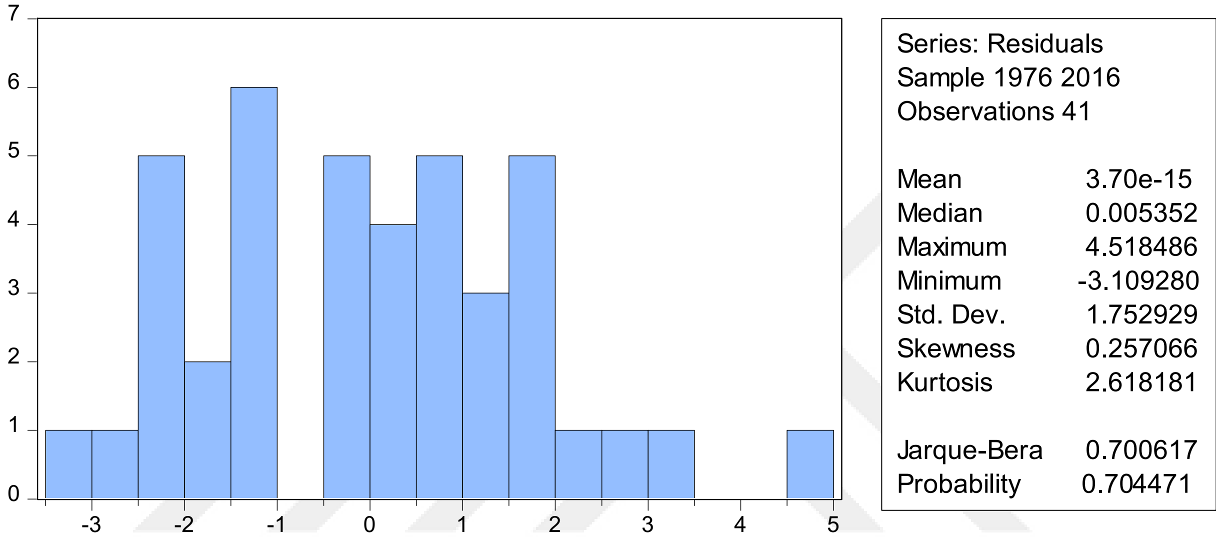
Model 7

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	4.022140	Prob. F(2,23)	0.0318
Obs*R-squared	10.62403	Prob. Chi-Square(2)	0.0049

Heteroskedasticity Test: White

F-statistic	1.962094	Prob. F(15,25)	0.0659
Obs*R-squared	22.16896	Prob. Chi-Square(15)	0.1034
Scaled explained SS	6.668907	Prob. Chi-Square(15)	0.9662



Dependent Variable: GROWTH
Method: ARDL
Date: 04/15/19 Time: 17:20
Sample (adjusted): 1976 2016
Included observations: 41 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY IE IESQ
Fixed regressors: C
Number of models evalulated: 4374
Selected Model: ARDL(1, 0, 2, 2, 2, 0, 0, 1)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.063178	0.094188	-0.670759	0.5085
INFCPI	-0.005699	0.027349	-0.208366	0.8366
DCPS	0.446647	0.103048	4.334366	0.0002
DCPS(-1)	-0.068582	0.175267	-0.391302	0.6989
DCPS(-2)	-0.397610	0.161464	-2.462531	0.0210
FDI_INFL_	-0.921457	0.952341	-0.967571	0.3425
FDI_INFL_(-1)	-0.708627	1.073084	-0.660365	0.5151
FDI_INFL_(-2)	-2.196579	0.625317	-3.512744	0.0017
EMP	-0.343789	0.414770	-0.828867	0.4150
EMP(-1)	1.138743	0.480803	2.368419	0.0259
EMP(-2)	-1.033769	0.372787	-2.773079	0.0103
DUMMY	-6.451390	1.355932	-4.757901	0.0001
IE	5.831457	2.712185	2.150096	0.0414
IESQ	-0.528474	0.553280	-0.955166	0.3486
IESQ(-1)	-0.604296	0.189115	-3.195383	0.0038
C	14.73513	11.70913	1.258431	0.2199

R-squared	0.840105	Mean dependent var	4.455213
Adjusted R-squared	0.744168	S.D. dependent var	4.383762
S.E. of regression	2.217300	Akaike info criterion	4.716249
Sum squared resid	122.9104	Schwarz criterion	5.384960
Log likelihood	-80.68310	Hannan-Quinn criter.	4.959757
F-statistic	8.756838	Durbin-Watson stat	2.507310
Prob(F-statistic)	0.000002		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 0, 2, 2, 2, 0, 0, 1)
Case 3: Unrestricted Constant and No Trend
Date: 04/15/19 Time: 17:20
Sample: 1974 2016
Included observations: 41

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14.73513	10.60419	1.389557	0.1769
GROWTH(-1)*	-1.063178	0.107771	-9.865184	0.0000
INFCPI**	-0.005699	0.026213	-0.217398	0.8297
DCPS(-1)	-0.019545	0.040582	-0.481604	0.6343
FDI_INFL_(-1)	-3.826663	1.161233	-3.295345	0.0029
EMP(-1)	-0.238815	0.188478	-1.267070	0.2168
DUMMY**	-6.451390	1.458426	-4.423528	0.0002
IE**	5.831457	3.456077	1.687306	0.1040
IESQ(-1)	-1.132770	0.703684	-1.609770	0.1200
D(DCPS)	0.446647	0.159576	2.798956	0.0097
D(DCPS(-1))	0.397610	0.167853	2.368793	0.0259
D(FDI_INFL_)	-0.921457	0.973138	-0.946893	0.3528
D(FDI_INFL_(-1))	2.196579	0.921524	2.383636	0.0251
D(EMP)	-0.343789	0.372927	-0.921868	0.3654
D(EMP(-1))	1.033769	0.435874	2.371716	0.0257
D(IESQ)	-0.528474	0.608538	-0.868432	0.3934

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

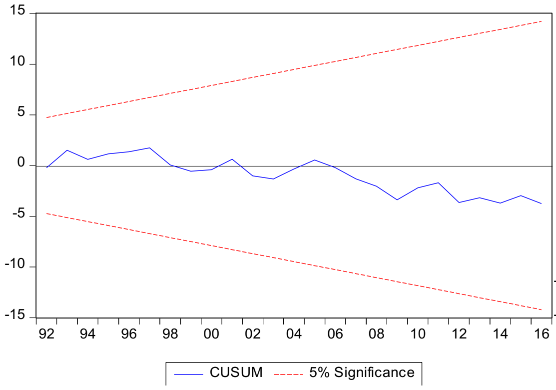
Levels Equation
Case 3: Unrestricted Constant and No Trend

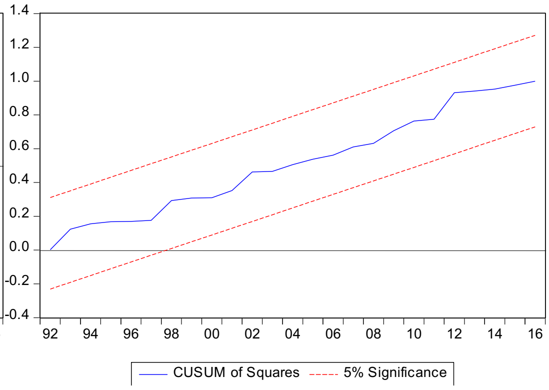
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.005360	0.025505	-0.210159	0.8352
DCPS	-0.018383	0.020577	-0.893389	0.3802
FDI_INFL_	-3.599270	0.968701	-3.715563	0.0010
EMP	-0.224624	0.224051	-1.002557	0.3257
DUMMY	-6.068026	1.417135	-4.281897	0.0002
IE	5.484932	2.661190	2.061083	0.0498
IESQ	-1.065457	0.617248	-1.726141	0.0967

EC = GROWTH - (-0.0054*INFCPI -0.0184*DCPS -3.5993*FDI_INFL_
-0.2246*EMP -6.0680*DUMMY + 5.4849*IE -1.0655*IESQ)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	20.03103	10%	2.03	3.13
k	7	5%	2.32	3.5
		2.5%	2.6	3.84
		1%	2.96	4.26





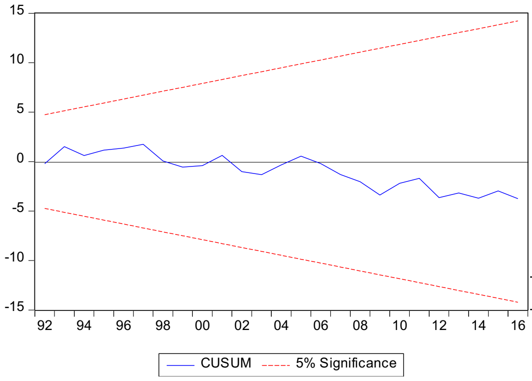
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 0, 2, 2, 2, 0, 0, 1)
Case 3: Unrestricted Constant and No Trend
Date: 04/15/19 Time: 17:20
Sample: 1974 2016
Included observations: 41

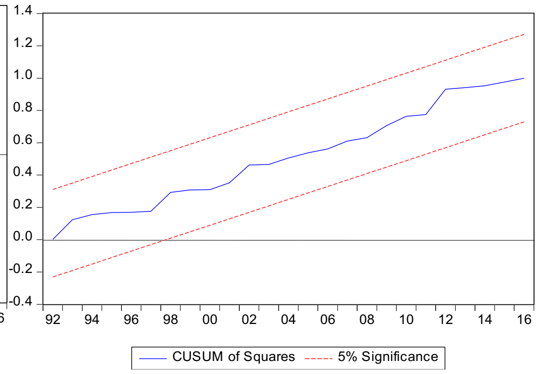
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14.73513	1.145012	12.86897	0.0000
D(DCPS)	0.446647	0.114357	3.905744	0.0006
D(DCPS(-1))	0.397610	0.119618	3.323994	0.0027
D(FDI_INFL_)	-0.921457	0.602701	-1.528879	0.1388
D(FDI_INFL_(-1))	2.196579	0.605147	3.629826	0.0013
D(EMP)	-0.343789	0.305358	-1.125855	0.2709
D(EMP(-1))	1.033769	0.296073	3.491606	0.0018
D(IESQ)	-0.528474	0.168193	-3.142076	0.0043
CointEq(-1)*	-1.063178	0.074234	-14.32193	0.0000

R-squared	0.919941	Mean dependent var	-0.097324
Adjusted R-squared	0.899926	S.D. dependent var	6.195243
S.E. of regression	1.959835	Akaike info criterion	4.374785
Sum squared resid	122.9104	Schwarz criterion	4.750935
Log likelihood	-80.68310	Hannan-Quinn criter.	4.511758
F-statistic	45.96293	Durbin-Watson stat	2.507310
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.





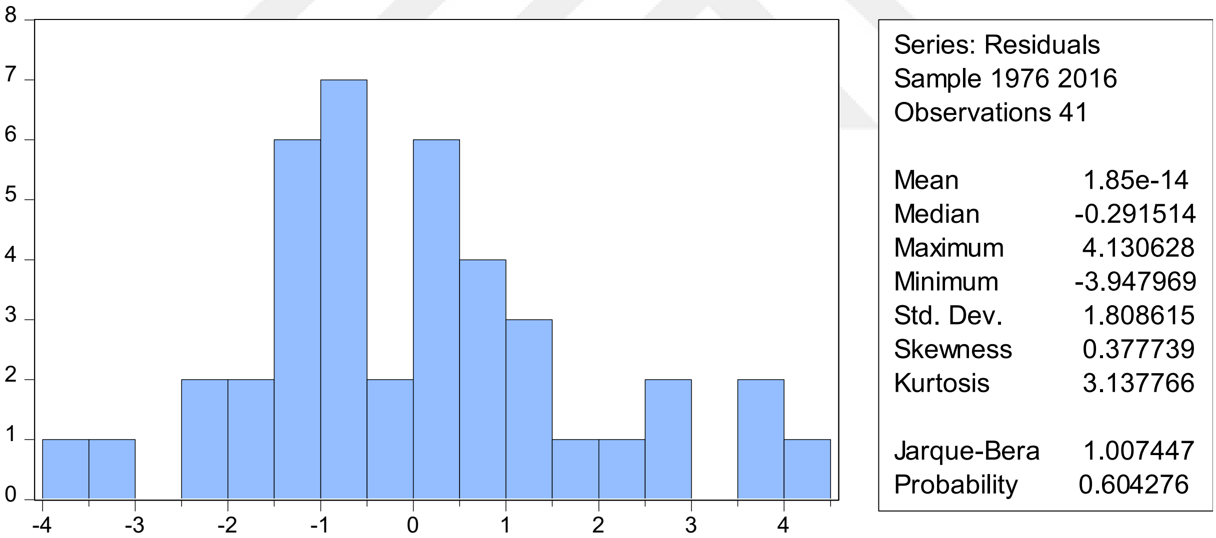
Model 8

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.994196	Prob. F(2,25)	0.3842
Obs*R-squared	3.020708	Prob. Chi-Square(2)	0.2208

Heteroskedasticity Test: White

F-statistic	1.061806	Prob. F(13,27)	0.4284
Obs*R-squared	13.86996	Prob. Chi-Square(13)	0.3831
Scaled explained SS	6.429322	Prob. Chi-Square(13)	0.9291



Dependent Variable: GROWTH
Method: ARDL
Date: 04/15/19 Time: 17:21
Sample (adjusted): 1976 2016
Included observations: 41 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY CIE CIESQ
Fixed regressors: C @TREND
Number of models evalulated: 4374
Selected Model: ARDL(1, 0, 0, 2, 2, 0, 0, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.114213	0.095678	-1.193717	0.2430
INFCPI	-0.025783	0.020693	-1.245964	0.2235
DCPS	0.450742	0.103427	4.358047	0.0002
FDI_INFL_	-1.354140	0.902913	-1.499746	0.1453
FDI_INFL_(-1)	-1.178077	0.991827	-1.187785	0.2453
FDI_INFL_(-2)	-1.887642	0.959746	-1.966815	0.0596
EMP	-1.047066	0.407923	-2.566822	0.0161
EMP(-1)	0.099537	0.534800	0.186120	0.8537
EMP(-2)	-1.255971	0.442168	-2.840482	0.0085
DUMMY	-7.060084	1.534078	-4.602166	0.0001
CIE	6.584189	2.766916	2.379613	0.0247
CIESQ	-0.219478	0.105076	-2.088756	0.0463
C	99.07183	29.50113	3.358238	0.0023
@TREND	-1.254718	0.290186	-4.323841	0.0002

R-squared	0.829785	Mean dependent var	4.455213
Adjusted R-squared	0.747829	S.D. dependent var	4.383762
S.E. of regression	2.201376	Akaike info criterion	4.681234
Sum squared resid	130.8435	Schwarz criterion	5.266356
Log likelihood	-81.96529	Hannan-Quinn criter.	4.894303
F-statistic	10.12483	Durbin-Watson stat	2.260783
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 0, 0, 2, 2, 0, 0, 0)
Case 5: Unrestricted Constant and Unrestricted Trend
Date: 04/15/19 Time: 17:23
Sample: 1974 2016
Included observations: 41

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	99.07183	29.50113	3.358238	0.0023
@TREND	-1.254718	0.290186	-4.323841	0.0002
GROWTH(-1)*	-1.114213	0.095678	-11.64540	0.0000
INFCPI**	-0.025783	0.020693	-1.245964	0.2235
DCPS**	0.450742	0.103427	4.358047	0.0002
FDI_INFL_(-1)	-4.419859	1.159791	-3.810908	0.0007
EMP(-1)	-2.203500	0.459416	-4.796305	0.0001
DUMMY**	-7.060084	1.534078	-4.602166	0.0001
CIE**	6.584189	2.766916	2.379613	0.0247
CIESQ**	-0.219478	0.105076	-2.088756	0.0463
D(FDI_INFL_)	-1.354140	0.902913	-1.499746	0.1453
D(FDI_INFL_(-1))	1.887642	0.959746	1.966815	0.0596
D(EMP)	-1.047066	0.407923	-2.566822	0.0161
D(EMP(-1))	1.255971	0.442168	2.840482	0.0085

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

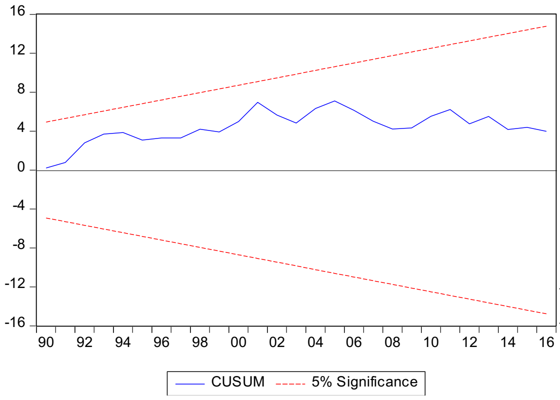
Levels Equation
Case 5: Unrestricted Constant and Unrestricted Trend

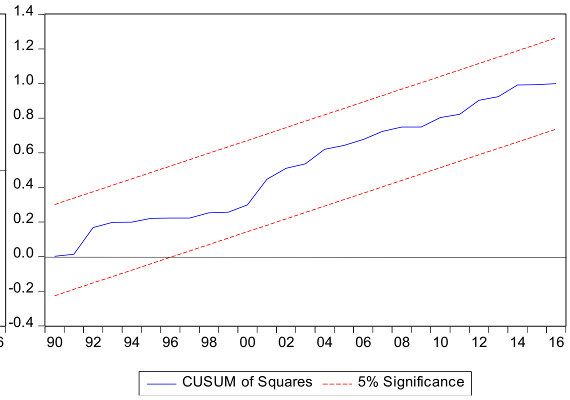
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.023140	0.018727	-1.235654	0.2272
DCPS	0.404538	0.095411	4.239942	0.0002
FDI_INFL_	-3.966799	1.091692	-3.633626	0.0012
EMP	-1.977629	0.433214	-4.565018	0.0001
DUMMY	-6.336387	1.409540	-4.495357	0.0001
CIE	5.909274	2.577417	2.292712	0.0299
CIESQ	-0.196980	0.097267	-2.025151	0.0528

EC = GROWTH - (-0.0231*INFCPI + 0.4045*DCPS -3.9668*FDI_INFL_
-1.9776*EMP -6.3364*DUMMY + 5.9093*CIE -0.1970*CIESQ)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	25.75045	10%	2.38	3.45
k	7	5%	2.69	3.83
		2.5%	2.98	4.16
		1%	3.31	4.63





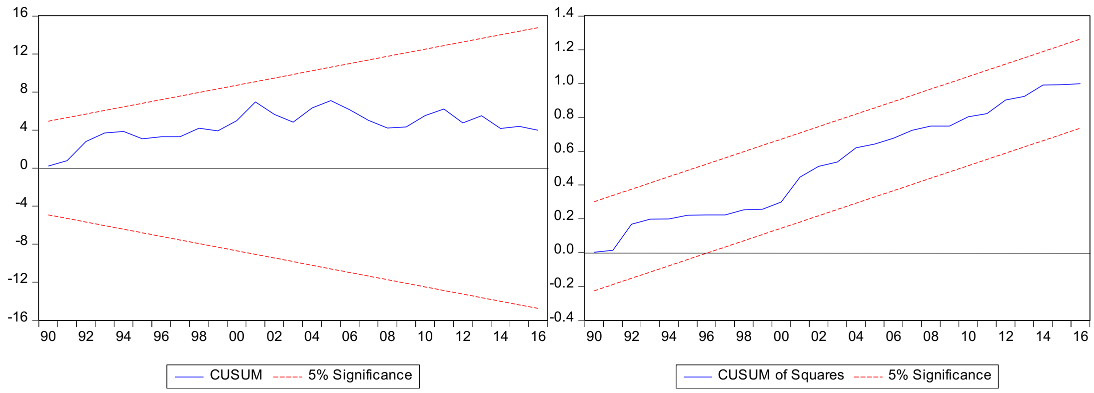
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 0, 0, 2, 2, 0, 0, 0)
Case 5: Unrestricted Constant and Unrestricted Trend
Date: 04/15/19 Time: 17:23
Sample: 1974 2016
Included observations: 41

ECM Regression
Case 5: Unrestricted Constant and Unrestricted Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	99.07183	6.205516	15.96512	0.0000
@TREND	-1.254718	0.083398	-15.04492	0.0000
D(FDI_INFL_)	-1.354140	0.599800	-2.257653	0.0323
D(FDI_INFL_(-1))	1.887642	0.600954	3.141076	0.0041
D(EMP)	-1.047066	0.276117	-3.792106	0.0008
D(EMP(-1))	1.255971	0.284762	4.410604	0.0001
CointEq(-1)*	-1.114213	0.069179	-16.10627	0.0000

R-squared	0.914773	Mean dependent var	-0.097324
Adjusted R-squared	0.899733	S.D. dependent var	6.195243
S.E. of regression	1.961718	Akaike info criterion	4.339770
Sum squared resid	130.8435	Schwarz criterion	4.632331
Log likelihood	-81.96529	Hannan-Quinn criter.	4.446305
F-statistic	60.82272	Durbin-Watson stat	2.260783
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.



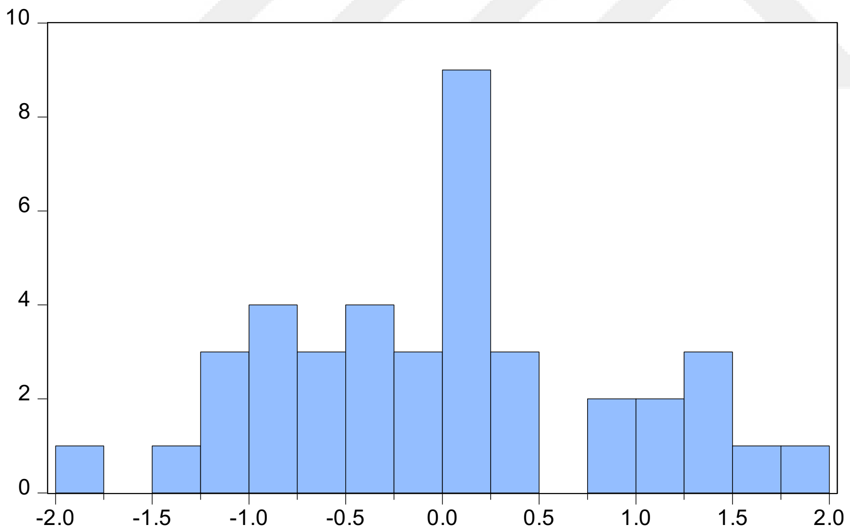
Model 9

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.310457	Prob. F(3,8)	0.1529
Obs*R-squared	18.56861	Prob. Chi-Square(3)	0.0003

Heteroskedasticity Test: White

F-statistic	0.904050	Prob. F(28,11)	0.6075
Obs*R-squared	27.88326	Prob. Chi-Square(28)	0.4706
Scaled explained SS	1.496816	Prob. Chi-Square(28)	1.0000



Series: Residuals
Sample 1977 2016
Observations 40

Mean	7.99e-15
Median	0.058535
Maximum	1.848270
Minimum	-1.779043
Std. Dev.	0.875340
Skewness	0.239279
Kurtosis	2.419677
Jarque-Bera	0.942989
Probability	0.624069

Dependent Variable: GROWTH
Method: ARDL
Date: 04/15/19 Time: 17:26
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY RCENGOV RCENGOVSQ
Fixed regressors: C
Number of models evalulated: 49152
Selected Model: ARDL(3, 3, 3, 3, 3, 3, 3, 0)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.587509	0.188062	-3.124017	0.0097
GROWTH(-2)	-0.284127	0.179341	-1.584279	0.1414
GROWTH(-3)	-0.251254	0.189432	-1.326352	0.2116
INFCPI	-0.022088	0.019549	-1.129865	0.2826
INFCPI(-1)	-0.019441	0.026428	-0.735607	0.4774
INFCPI(-2)	0.049013	0.044452	1.102605	0.2937
INFCPI(-3)	-0.136703	0.024984	-5.471528	0.0002
DCPS	0.514739	0.116207	4.429501	0.0010
DCPS(-1)	-0.012216	0.235654	-0.051840	0.9596
DCPS(-2)	-0.388557	0.218142	-1.781210	0.1025
DCPS(-3)	-0.265867	0.220361	-1.206506	0.2529
FDI_INFL_	-1.934779	1.031757	-1.875227	0.0875
FDI_INFL_(-1)	-2.299319	1.440942	-1.595706	0.1389
FDI_INFL_(-2)	-4.413978	1.664284	-2.652179	0.0225
FDI_INFL_(-3)	-2.308779	1.120802	-2.059934	0.0639
EMP	-0.236336	0.508319	-0.464936	0.6510
EMP(-1)	0.427454	0.407422	1.049168	0.3166
EMP(-2)	-1.605474	0.475280	-3.377957	0.0062
EMP(-3)	0.334115	0.377290	0.885566	0.3948
DUMMY	-8.757107	1.381958	-6.336737	0.0001
DUMMY(-1)	-6.241985	2.499399	-2.497394	0.0296
DUMMY(-2)	-3.910420	2.700641	-1.447960	0.1755
DUMMY(-3)	-4.811148	2.861767	-1.681181	0.1209
RCENGOV	4.913287	1.633415	3.007985	0.0119
RCENGOV(-1)	-1.378774	0.392904	-3.509184	0.0049
RCENGOV(-2)	-0.430325	0.383046	-1.123429	0.2852
RCENGOV(-3)	0.818855	0.347811	2.354310	0.0382
RCENGOVSQ	-0.115094	0.045744	-2.516020	0.0287
C	56.69489	7.428767	7.631803	0.0000

R-squared	0.959161	Mean dependent var	4.305062
Adjusted R-squared	0.855208	S.D. dependent var	4.331519
S.E. of regression	1.648210	Akaike info criterion	3.996272
Sum squared resid	29.88255	Schwarz criterion	5.220710
Log likelihood	-50.92545	Hannan-Quinn criter.	4.438990
F-statistic	9.226853	Durbin-Watson stat	2.476966
Prob(F-statistic)	0.000225		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 3, 3, 3, 3, 3, 0)
Case 3: Unrestricted Constant and No Trend
Date: 04/15/19 Time: 17:26
Sample: 1974 2016
Included observations: 40

Conditional Error Correction Regression

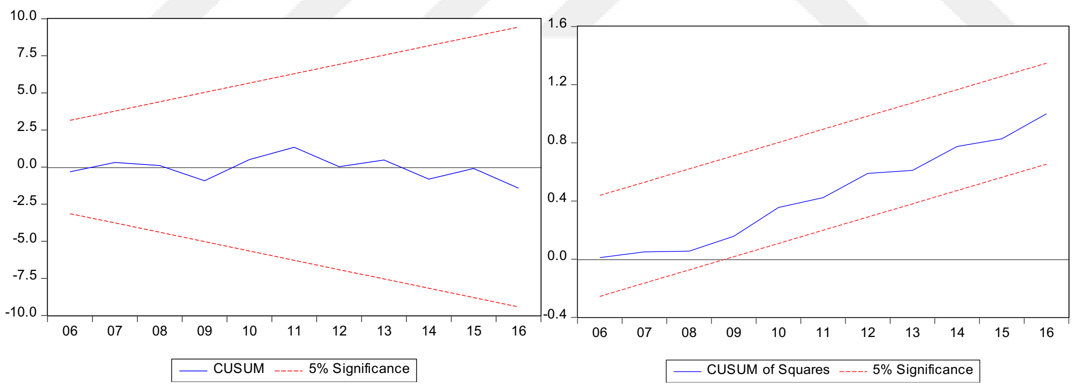
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	56.69489	10.58545	5.355924	0.0002
GROWTH(-1)*	-2.122889	0.369315	-5.748176	0.0001
INFCPI(-1)	-0.129218	0.042387	-3.048510	0.0111
DCPS(-1)	-0.151901	0.044042	-3.449035	0.0054
FDI_INFL_(-1)	-10.95685	1.995777	-5.490020	0.0002
EMP(-1)	-1.080241	0.197189	-5.478187	0.0002
DUMMY(-1)	-23.72066	5.877216	-4.036037	0.0020
RCENGOV(-1)	3.923043	1.364651	2.874758	0.0151
RCENGOVSQ**	-0.115094	0.043291	-2.658619	0.0222
D(GROWTH(-1))	0.535381	0.259937	2.059659	0.0639
D(GROWTH(-2))	0.251254	0.171349	1.466328	0.1706
D(INFCPI)	-0.022088	0.031889	-0.692644	0.5029
D(INFCPI(-1))	0.087690	0.036733	2.387216	0.0360
D(INFCPI(-2))	0.136703	0.039443	3.465844	0.0053
D(DCPS)	0.514739	0.148661	3.462505	0.0053
D(DCPS(-1))	0.654424	0.224808	2.911031	0.0142
D(DCPS(-2))	0.265867	0.179518	1.481002	0.1667
D(FDI_INFL_)	-1.934779	1.165757	-1.659676	0.1252
D(FDI_INFL_(-1))	6.722756	1.464476	4.590555	0.0008
D(FDI_INFL_(-2))	2.308779	1.232152	1.873777	0.0878
D(EMP)	-0.236336	0.376466	-0.627776	0.5430
D(EMP(-1))	1.271359	0.435448	2.919654	0.0139
D(EMP(-2))	-0.334115	0.431187	-0.774874	0.4547
D(DUMMY)	-8.757107	1.550106	-5.649359	0.0001
D(DUMMY(-1))	8.721568	4.051163	2.152855	0.0544
D(DUMMY(-2))	4.811148	2.579847	1.864896	0.0891
D(RCENGOV)	4.913287	1.511439	3.250736	0.0077
D(RCENGOV(-1))	-0.388529	0.352875	-1.101039	0.2944
D(RCENGOV(-2))	-0.818855	0.356624	-2.296128	0.0423

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.060869	0.016583	-3.670533	0.0037
DCPS	-0.071554	0.016098	-4.444879	0.0010
FDI_INFL_	-5.161293	0.633682	-8.144923	0.0000
EMP	-0.508854	0.081800	-6.220682	0.0001
DUMMY	-11.17376	1.563738	-7.145545	0.0000
RCENGOV	1.847973	0.614768	3.005970	0.0120
RCENGOVSQ	-0.054216	0.019263	-2.814428	0.0168

EC = GROWTH - (-0.0609*INFCPI -0.0716*DCPS -5.1613*FDI_INFL_
-0.5089*EMP -11.1738*DUMMY + 1.8480*RCENGOV -0.0542
*RCENGOVSQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.769768	10%	2.03	3.13
k	7	5%	2.32	3.5
		2.5%	2.6	3.84
		1%	2.96	4.26



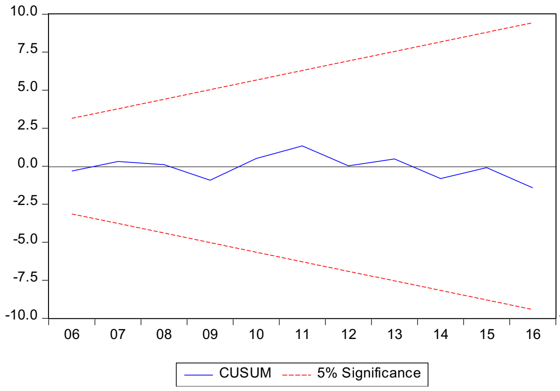
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 3, 3, 3, 3, 0)
Case 3: Unrestricted Constant and No Trend
Date: 04/15/19 Time: 17:27
Sample: 1974 2016
Included observations: 40

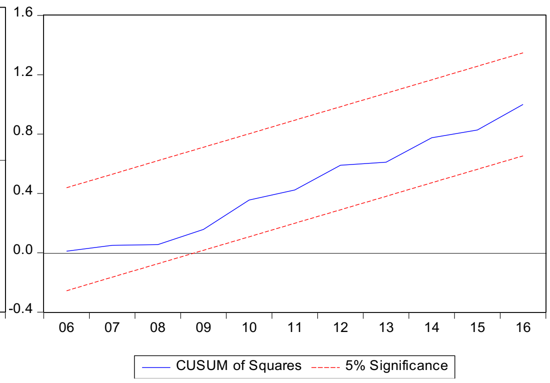
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	56.69489	6.231844	9.097610	0.0000
D(GROWTH(-1))	0.535381	0.152397	3.513058	0.0049
D(GROWTH(-2))	0.251254	0.113419	2.215273	0.0488
D(INFCPI)	-0.022088	0.019308	-1.143950	0.2769
D(INFCPI(-1))	0.087690	0.021841	4.014873	0.0020
D(INFCPI(-2))	0.136703	0.023792	5.745865	0.0001
D(DCPS)	0.514739	0.098578	5.221642	0.0003
D(DCPS(-1))	0.654424	0.131053	4.993599	0.0004
D(DCPS(-2))	0.265867	0.106975	2.485310	0.0303
D(FDI_INFL_)	-1.934779	0.658117	-2.939872	0.0135
D(FDI_INFL_(-1))	6.722756	0.936209	7.180829	0.0000
D(FDI_INFL_(-2))	2.308779	0.749456	3.080604	0.0105
D(EMP)	-0.236336	0.258679	-0.913625	0.3805
D(EMP(-1))	1.271359	0.311956	4.075440	0.0018
D(EMP(-2))	-0.334115	0.291001	-1.148158	0.2753
D(DUMMY)	-8.757107	0.785578	-11.14734	0.0000
D(DUMMY(-1))	8.721568	2.082668	4.187690	0.0015
D(DUMMY(-2))	4.811148	1.500107	3.207203	0.0083
D(RCENGOV)	4.913287	0.531867	9.237809	0.0000
D(RCENGOV(-1))	-0.388529	0.205813	-1.887783	0.0857
D(RCENGOV(-2))	-0.818855	0.209907	-3.901032	0.0025
CointEq(-1)*	-2.122889	0.225505	-9.413948	0.0000

R-squared	0.980386	Mean dependent var	-0.181936
Adjusted R-squared	0.957502	S.D. dependent var	6.250129
S.E. of regression	1.288465	Akaike info criterion	3.646272
Sum squared resid	29.88255	Schwarz criterion	4.575156
Log likelihood	-50.92545	Hannan-Quinn criter.	3.982127
F-statistic	42.84252	Durbin-Watson stat	2.476966
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.





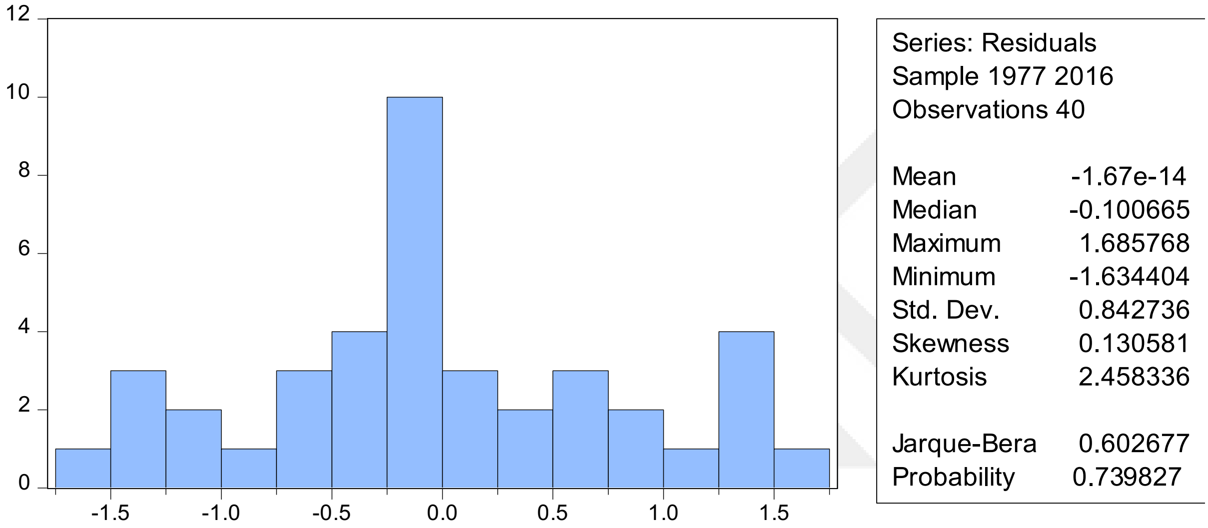
Model 10

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.005300	Prob. F(3,6)	0.2148
Obs*R-squared	20.02647	Prob. Chi-Square(3)	0.0002

Heteroskedasticity Test: White

F-statistic	1.832649	Prob. F(30,9)	0.1707
Obs*R-squared	34.37320	Prob. Chi-Square(30)	0.2662
Scaled explained SS	1.268856	Prob. Chi-Square(30)	1.0000



Dependent Variable: GROWTH
Method: ARDL
Date: 04/15/19 Time: 17:28
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): INFCPI DCPS FDI_INFL_ EMP
DUMMY RNONT RNONTSQ
Fixed regressors: C
Number of models evalulated: 49152
Selected Model: ARDL(3, 3, 3, 3, 2, 3, 3, 3)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed
bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.690350	0.195331	-3.534260	0.0064
GROWTH(-2)	-0.611321	0.174293	-3.507426	0.0066
GROWTH(-3)	-0.795228	0.299747	-2.652998	0.0263
INFCPI	-0.122439	0.058165	-2.105013	0.0646
INFCPI(-1)	0.037531	0.038230	0.981695	0.3519
INFCPI(-2)	0.031683	0.052881	0.599137	0.5639
INFCPI(-3)	-0.083786	0.042593	-1.967130	0.0807
DCPS	0.802835	0.318241	2.522725	0.0326
DCPS(-1)	0.302606	0.360935	0.838393	0.4235
DCPS(-2)	-0.657020	0.285027	-2.305116	0.0466
DCPS(-3)	-0.482180	0.256810	-1.877572	0.0932
FDI_INFL_	-4.555969	1.831207	-2.487959	0.0345
FDI_INFL_(-1)	-2.058399	1.812727	-1.135526	0.2855
FDI_INFL_(-2)	-2.719524	1.949026	-1.395324	0.1964
FDI_INFL_(-3)	-4.718142	1.469598	-3.210498	0.0107
EMP	-0.443116	0.504129	-0.878974	0.4023
EMP(-1)	0.864434	0.495989	1.742850	0.1153
EMP(-2)	-1.435119	0.502800	-2.854253	0.0190
DUMMY	-5.564875	2.674045	-2.081070	0.0671
DUMMY(-1)	-6.728390	3.624865	-1.856177	0.0964
DUMMY(-2)	-8.364151	2.784231	-3.004115	0.0149
DUMMY(-3)	-10.64225	5.477202	-1.943008	0.0839
RNONT	8.718125	3.576160	2.437846	0.0375
RNONT(-1)	-1.857763	2.364925	-0.785548	0.4523
RNONT(-2)	-5.457695	2.852324	-1.913420	0.0880
RNONT(-3)	-6.987585	3.946987	-1.770360	0.1104
RNONTSQ	-1.208035	0.560800	-2.154128	0.0596
RNONTSQ(-1)	0.279753	0.381478	0.733340	0.4820
RNONTSQ(-2)	1.000707	0.438539	2.281908	0.0484
RNONTSQ(-3)	1.347913	0.618785	2.178324	0.0573
C	91.91986	15.00147	6.127388	0.0002

R-squared	0.962147	Mean dependent var	4.305062
Adjusted R-squared	0.835969	S.D. dependent var	4.331519
S.E. of regression	1.754295	Akaike info criterion	4.020356
Sum squared resid	27.69796	Schwarz criterion	5.329238
Log likelihood	-49.40713	Hannan-Quinn criter.	4.493607
F-statistic	7.625351	Durbin-Watson stat	2.984308
Prob(F-statistic)	0.001567		

*Note: p-values and any subsequent tests do not account for model
selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 3, 3, 2, 3, 3, 3)
Case 3: Unrestricted Constant and No Trend
Date: 04/15/19 Time: 17:29
Sample: 1974 2016
Included observations: 40

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	91.91986	15.15366	6.065852	0.0002
GROWTH(-1)*	-3.096900	0.502840	-6.158814	0.0002
INFCPI(-1)	-0.137012	0.045464	-3.013597	0.0146
DCPS(-1)	-0.033758	0.088343	-0.382129	0.7112
FDI_INFL_(-1)	-14.05203	2.804978	-5.009677	0.0007
EMP(-1)	-1.013801	0.187619	-5.403526	0.0004
DUMMY(-1)	-31.29966	8.510600	-3.677727	0.0051
RNONT(-1)	-5.584918	5.802427	-0.962514	0.3609
RNONTSQ(-1)	1.420339	1.322125	1.074284	0.3107
D(GROWTH(-1))	1.406549	0.405303	3.470363	0.0070
D(GROWTH(-2))	0.795228	0.271298	2.931202	0.0167
D(INFCPI)	-0.122439	0.051100	-2.396074	0.0402
D(INFCPI(-1))	0.052103	0.034867	1.494346	0.1693
D(INFCPI(-2))	0.083786	0.034613	2.420658	0.0386
D(DCPS)	0.802835	0.228042	3.520565	0.0065
D(DCPS(-1))	1.139199	0.258813	4.401636	0.0017
D(DCPS(-2))	0.482180	0.203947	2.364240	0.0423
D(FDI_INFL_)	-4.555969	1.778249	-2.562054	0.0306
D(FDI_INFL_(-1))	7.437666	1.737288	4.281192	0.0020
D(FDI_INFL_(-2))	4.718142	1.517749	3.108644	0.0125
D(EMP)	-0.443116	0.412522	-1.074162	0.3107
D(EMP(-1))	1.435119	0.487697	2.942647	0.0164
D(DUMMY)	-5.564875	2.057801	-2.704282	0.0242
D(DUMMY(-1))	19.00640	6.056800	3.138027	0.0120
D(DUMMY(-2))	10.64225	3.948873	2.695009	0.0246
D(RNONT)	8.718125	3.417578	2.550966	0.0311
D(RNONT(-1))	12.44528	4.846950	2.567652	0.0303
D(RNONT(-2))	6.987585	3.023945	2.310751	0.0462
D(RNONTSQ)	-1.208035	0.531988	-2.270795	0.0493
D(RNONTSQ(-1))	-2.348620	0.943738	-2.488635	0.0345
D(RNONTSQ(-2))	-1.347913	0.558707	-2.412558	0.0391

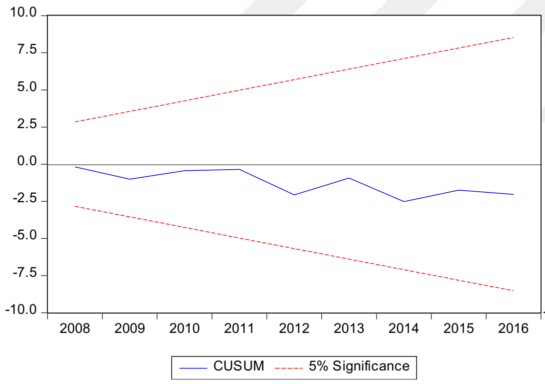
* p-value incompatible with t-Bounds distribution.

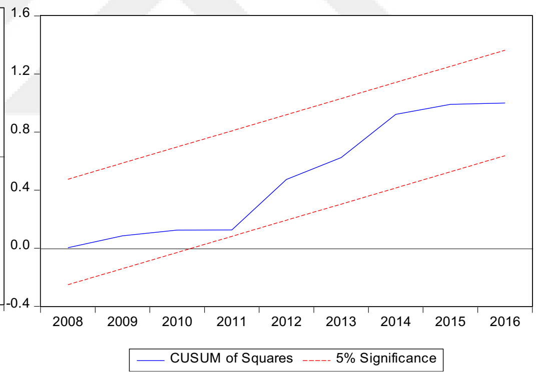
Levels Equation Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.044242	0.014806	-2.988145	0.0152
DCPS	-0.010901	0.021819	-0.499586	0.6294
FDI_INFL_	-4.537452	0.710136	-6.389551	0.0001
EMP	-0.327360	0.048117	-6.803375	0.0001
DUMMY	-10.10677	2.520916	-4.009168	0.0031
RNONT	-1.803390	1.763691	-1.022509	0.3332
RNONTSQ	0.458632	0.383995	1.194370	0.2629

EC = GROWTH - (-0.0442*INFCPI -0.0109*DCPS -4.5375*FDI_INFL_
-0.3274*EMP -10.1068*DUMMY -1.8034*RNONT + 0.4586*RNONTSQ)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.782374	10%	2.03	3.13
k	7	5%	2.32	3.5
		2.5%	2.6	3.84
		1%	2.96	4.26





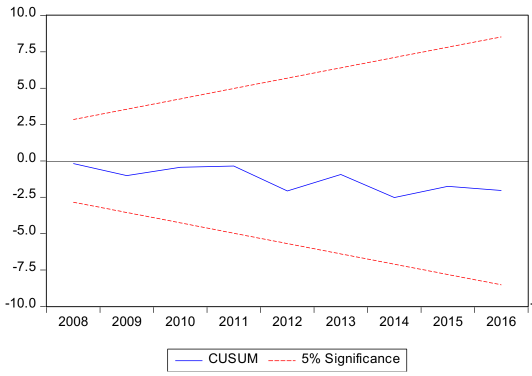
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 3, 3, 2, 3, 3, 3)
Case 3: Unrestricted Constant and No Trend
Date: 04/15/19 Time: 17:29
Sample: 1974 2016
Included observations: 40

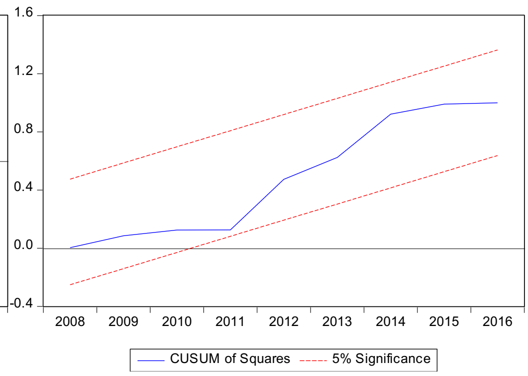
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	91.91986	9.420649	9.757275	0.0000
D(GROWTH(-1))	1.406549	0.241865	5.815433	0.0003
D(GROWTH(-2))	0.795228	0.155426	5.116433	0.0006
D(INFCPI)	-0.122439	0.021786	-5.620126	0.0003
D(INFCPI(-1))	0.052103	0.020569	2.533092	0.0321
D(INFCPI(-2))	0.083786	0.022797	3.675366	0.0051
D(DCPS)	0.802835	0.114522	7.010286	0.0001
D(DCPS(-1))	1.139199	0.163341	6.974365	0.0001
D(DCPS(-2))	0.482180	0.126866	3.800710	0.0042
D(FDI_INFL_)	-4.555969	0.827683	-5.504482	0.0004
D(FDI_INFL_(-1))	7.437666	1.024905	7.256931	0.0000
D(FDI_INFL_(-2))	4.718142	1.026878	4.594648	0.0013
D(EMP)	-0.443116	0.267553	-1.656179	0.1321
D(EMP(-1))	1.435119	0.321097	4.469429	0.0016
D(DUMMY)	-5.564875	0.846907	-6.570822	0.0001
D(DUMMY(-1))	19.00640	2.932007	6.482385	0.0001
D(DUMMY(-2))	10.64225	2.011469	5.290785	0.0005
D(RNONT)	8.718125	1.906587	4.572634	0.0013
D(RNONT(-1))	12.44528	1.880163	6.619257	0.0001
D(RNONT(-2))	6.987585	1.379330	5.065929	0.0007
D(RNONTSQ)	-1.208035	0.279446	-4.322962	0.0019
D(RNONTSQ(-1))	-2.348620	0.327866	-7.163354	0.0001
D(RNONTSQ(-2))	-1.347913	0.248468	-5.424907	0.0004
CointEq(-1)*	-3.096900	0.315321	-9.821427	0.0000

R-squared	0.981820	Mean dependent var	-0.181936
Adjusted R-squared	0.955685	S.D. dependent var	6.250129
S.E. of regression	1.315721	Akaike info criterion	3.670356
Sum squared resid	27.69796	Schwarz criterion	4.683684
Log likelihood	-49.40713	Hannan-Quinn criter.	4.036744
F-statistic	37.56805	Durbin-Watson stat	2.984308
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.





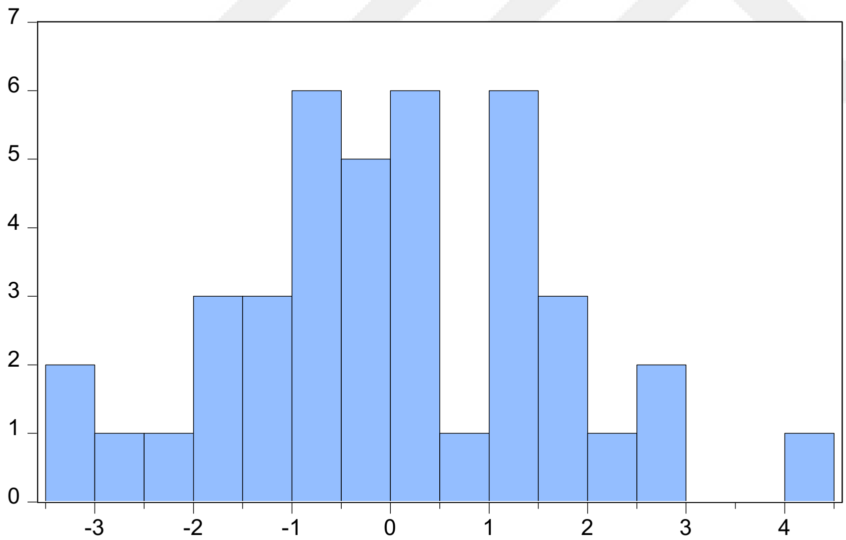
Model 11

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.426167	Prob. F(2,23)	0.0498
Obs*R-squared	9.411179	Prob. Chi-Square(2)	0.0090

Heteroskedasticity Test: White

F-statistic	0.768733	Prob. F(16,24)	0.7029
Obs*R-squared	13.89236	Prob. Chi-Square(16)	0.6067
Scaled explained SS	4.794384	Prob. Chi-Square(16)	0.9967



Series: Residuals
Sample 1976 2016
Observations 41

Mean	-0.007279
Median	-0.084358
Maximum	4.071297
Minimum	-3.075319
Std. Dev.	1.604410
Skewness	0.233902
Kurtosis	2.860704
Jarque-Bera	0.407001
Probability	0.815870

Dependent Variable: GROWTH
Method: ARDL
Date: 04/16/19 Time: 01:46
Sample (adjusted): 1976 2016
Included observations: 41 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY TDIR RDIRTSQ
Fixed regressors:
Number of models evaluated: 4374
Selected Model: ARDL(2, 0, 2, 2, 0, 0, 2, 1)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.274077	0.080079	-3.422593	0.0021
GROWTH(-2)	-0.134334	0.087572	-1.533976	0.1376
INFCPI	-0.063960	0.020469	-3.124724	0.0045
DCPS	0.396248	0.114224	3.469051	0.0019
DCPS(-1)	-0.054684	0.211228	-0.258885	0.7978
DCPS(-2)	-0.384249	0.174698	-2.199499	0.0373
FDI_INFL_	-1.503283	0.957203	-1.570495	0.1289
FDI_INFL_(-1)	0.281469	1.027114	0.274039	0.7863
FDI_INFL_(-2)	-3.304879	0.828185	-3.990509	0.0005
EMP	-0.258933	0.063055	-4.106434	0.0004
DUMMY	-6.329582	1.772497	-3.570997	0.0015
TDIR	-1.383383	3.573361	-0.387138	0.7019
TDIR(-1)	14.83575	4.539383	3.268231	0.0031
TDIR(-2)	-1.089426	0.699956	-1.556420	0.1322
RDIRTSQ	0.093219	0.325597	0.286303	0.7770
RDIRTSQ(-1)	-1.411953	0.386403	-3.654093	0.0012

R-squared	0.866049	Mean dependent var	4.455213
Adjusted R-squared	0.785678	S.D. dependent var	4.383762
S.E. of regression	2.029457	Akaike info criterion	4.539205
Sum squared resid	102.9674	Schwarz criterion	5.207916
Log likelihood	-77.05371	Hannan-Quinn criter.	4.782713
Durbin-Watson stat	2.393476		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(2, 0, 2, 2, 0, 0, 2, 1)
Case 1: No Constant and No Trend
Date: 04/16/19 Time: 01:49
Sample: 1974 2016
Included observations: 41

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH(-1)*	-1.408411	0.158352	-8.894151	0.0000
INFCPI**	-0.063960	0.020465	-3.125422	0.0045
DCPS(-1)	-0.042685	0.032340	-1.319869	0.1988
FDI_INFL_(-1)	-4.526693	0.897936	-5.041222	0.0000
EMP**	-0.258933	0.079610	-3.252506	0.0033
DUMMY**	-6.329582	1.285277	-4.924685	0.0000
TDIR(-1)	12.36294	2.059566	6.002694	0.0000
RDIRTSQ(-1)	-1.318734	0.221869	-5.943758	0.0000
D(GROWTH(-1))	0.134334	0.098218	1.367705	0.1836
D(DCPS)	0.396248	0.150636	2.630494	0.0144
D(DCPS(-1))	0.384249	0.158084	2.430657	0.0226
D(FDI_INFL_)	-1.503283	0.846230	-1.776446	0.0878
D(FDI_INFL_(-1))	3.304879	0.880343	3.754080	0.0009
D(TDIR)	-1.383383	4.794078	-0.288561	0.7753
D(TDIR(-1))	1.089426	0.724452	1.503794	0.1452
D(RDIRTSQ)	0.093219	0.430530	0.216522	0.8303

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

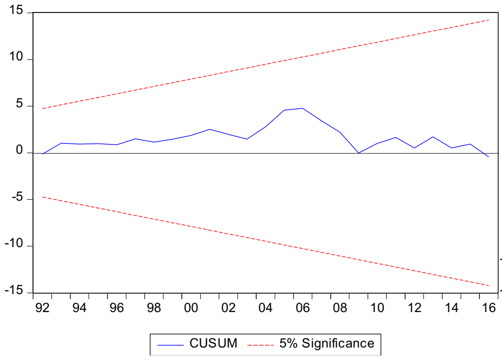
Levels Equation
Case 1: No Constant and No Trend

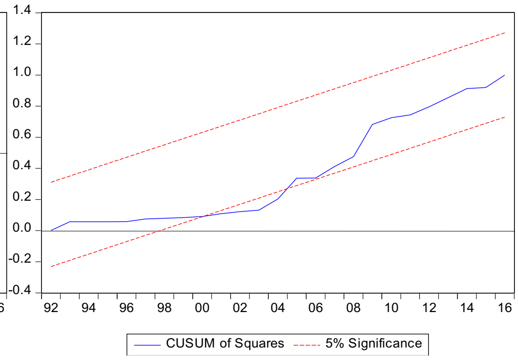
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.045413	0.013411	-3.386221	0.0023
DCPS	-0.030307	0.018812	-1.611041	0.1197
FDI_INFL_	-3.214043	0.564176	-5.696879	0.0000
EMP	-0.183847	0.049627	-3.704620	0.0011
DUMMY	-4.494132	1.426476	-3.150513	0.0042
TDIR	8.777940	1.120752	7.832188	0.0000
RDIRTSQ	-0.936328	0.108680	-8.615477	0.0000

EC = GROWTH - (-0.0454*INFCPI -0.0303*DCPS -3.2140*FDI_INFL_
-0.1838*EMP -4.4941*DUMMY + 8.7779*TDIR -0.9363*RDIRTSQ)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	23.73239	10%	1.7	2.83
k	7	5%	1.97	3.18
		2.5%	2.22	3.49
		1%	2.54	3.91





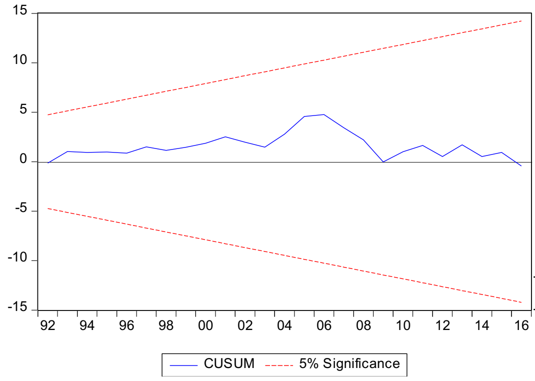
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(2, 0, 2, 2, 0, 0, 2, 1)
Case 1: No Constant and No Trend
Date: 04/16/19 Time: 01:49
Sample: 1974 2016
Included observations: 41

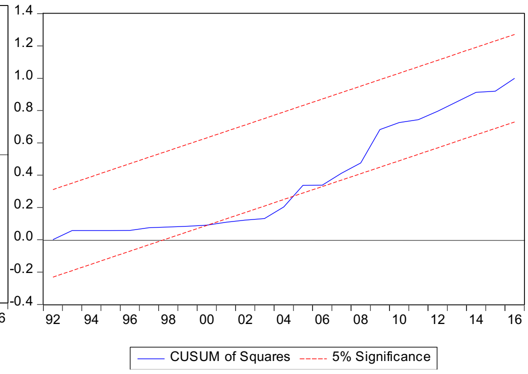
ECM Regression
Case 1: No Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GROWTH(-1))	0.134334	0.072184	1.861002	0.0745
D(DCPS)	0.396248	0.100902	3.927044	0.0006
D(DCPS(-1))	0.384249	0.107958	3.559251	0.0015
D(FDI_INFL_)	-1.503283	0.582965	-2.578684	0.0162
D(FDI_INFL_(-1))	3.304879	0.637443	5.184589	0.0000
D(TDIR)	-1.383383	4.128956	-0.335044	0.7404
D(TDIR(-1))	1.089426	0.573710	1.898912	0.0692
D(RDIRTSQ)	0.093219	0.369618	0.252205	0.8029
CointEq(-1)*	-1.408411	0.090346	-15.58909	0.0000

R-squared	0.932931	Mean dependent var	-0.097324
Adjusted R-squared	0.916164	S.D. dependent var	6.195243
S.E. of regression	1.793804	Akaike info criterion	4.197742
Sum squared resid	102.9674	Schwarz criterion	4.573892
Log likelihood	-77.05371	Hannan-Quinn criter.	4.334715
Durbin-Watson stat	2.393476		

* p-value incompatible with t-Bounds distribution.





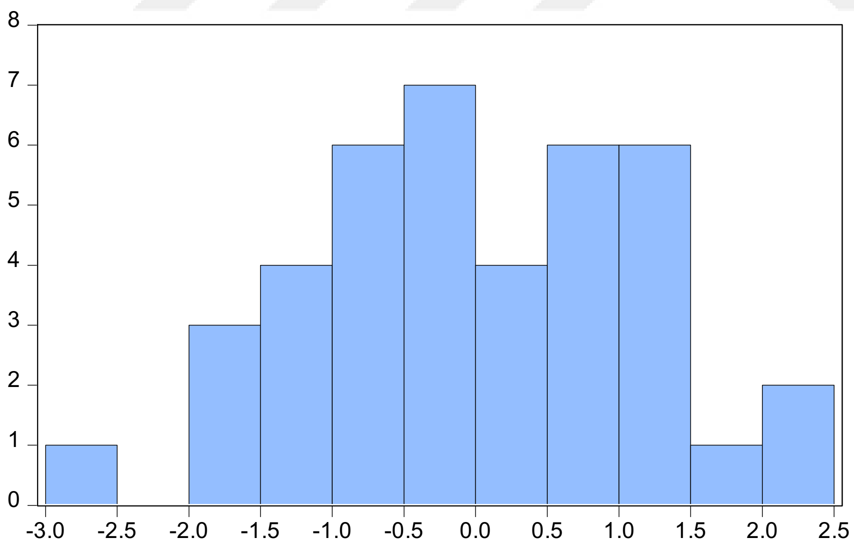
Model 12

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.032866	Prob. F(3,14)	0.9916
Obs*R-squared	0.279742	Prob. Chi-Square(3)	0.9638

Heteroskedasticity Test: White

F-statistic	0.449086	Prob. F(23,16)	0.9610
Obs*R-squared	15.69219	Prob. Chi-Square(23)	0.8681
Scaled explained SS	1.983735	Prob. Chi-Square(23)	1.0000



Series: Residuals	
Sample 1977 2016	
Observations 40	
Mean	0.008594
Median	-0.072353
Maximum	2.226285
Minimum	-2.625395
Std. Dev.	1.139594
Skewness	-0.034673
Kurtosis	2.400745
Jarque-Bera	0.606526
Probability	0.738405

Dependent Variable: GROWTH
Method: ARDL
Date: 04/16/19 Time: 19:20
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY TIND RINDTSQ
Fixed regressors:
Number of models evaluated: 16384
Selected Model: ARDL(1, 0, 2, 1, 3, 3, 3, 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.167286	0.152182	-1.099250	0.2870
INFCPI	-0.010403	0.024838	-0.418857	0.6806
DCPS	1.115171	0.217845	5.119098	0.0001
DCPS(-1)	-0.236541	0.218613	-1.082009	0.2944
DCPS(-2)	-0.733774	0.172236	-4.260289	0.0005
FDI_INFL_	-2.247706	0.895760	-2.509274	0.0225
FDI_INFL_(-1)	0.927811	0.918651	1.009970	0.3267
EMP	-0.816256	0.323162	-2.525845	0.0218
EMP(-1)	0.843312	0.469291	1.796993	0.0901
EMP(-2)	-1.326000	0.453761	-2.922244	0.0095
EMP(-3)	1.185789	0.356700	3.324329	0.0040
DUMMY	-7.026600	1.280230	-5.488544	0.0000
DUMMY(-1)	-7.626729	1.984537	-3.843077	0.0013
DUMMY(-2)	-7.336141	1.793506	-4.090390	0.0008
DUMMY(-3)	-8.315837	1.886136	-4.408928	0.0004
TIND	-2.737947	2.190500	-1.249918	0.2283
TIND(-1)	-1.816509	2.260459	-0.803602	0.4327
TIND(-2)	2.582819	2.555425	1.010720	0.3263
TIND(-3)	5.839812	2.411492	2.421659	0.0269
RINDTSQ	0.302184	0.121338	2.490437	0.0234
RINDTSQ(-1)	0.106198	0.115062	0.922956	0.3689
RINDTSQ(-2)	-0.072101	0.140112	-0.514594	0.6135
RINDTSQ(-3)	-0.641210	0.169152	-3.790738	0.0015

R-squared	0.930778	Mean dependent var	4.305062
Adjusted R-squared	0.841196	S.D. dependent var	4.331519
S.E. of regression	1.726118	Akaike info criterion	4.223961
Sum squared resid	50.65122	Schwarz criterion	5.195067
Log likelihood	-61.47922	Hannan-Quinn criter.	4.575082
Durbin-Watson stat	2.021600		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 0, 2, 1, 3, 3, 3, 3)
Case 1: No Constant and No Trend
Date: 04/16/19 Time: 19:20
Sample: 1974 2016
Included observations: 40

Conditional Error Correction Regression

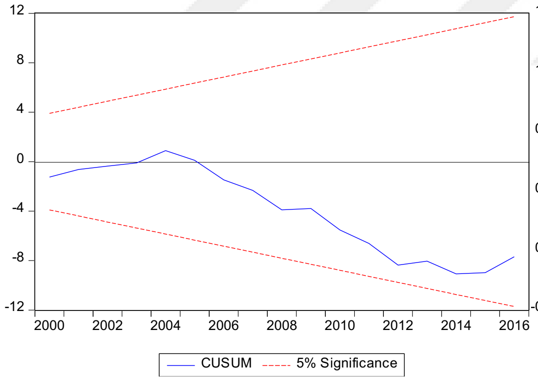
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH(-1)*	-1.167286	0.152182	-7.670340	0.0000
INFCPI**	-0.010403	0.024838	-0.418857	0.6806
DCPS(-1)	0.144856	0.065186	2.222190	0.0401
FDI_INFL_(-1)	-1.319895	0.793433	-1.663525	0.1145
EMP(-1)	-0.113155	0.102658	-1.102250	0.2857
DUMMY(-1)	-30.30531	4.803239	-6.309349	0.0000
TIND(-1)	3.868175	1.953577	1.980048	0.0641
RINDTSQ(-1)	-0.304929	0.150184	-2.030376	0.0583
D(DCPS)	1.115171	0.217845	5.119098	0.0001
D(DCPS(-1))	0.733774	0.172236	4.260289	0.0005
D(FDI_INFL_)	-2.247706	0.895760	-2.509274	0.0225
D(EMP)	-0.816256	0.323162	-2.525845	0.0218
D(EMP(-1))	0.140211	0.336316	0.416902	0.6820
D(EMP(-2))	-1.185789	0.356700	-3.324329	0.0040
D(DUMMY)	-7.026600	1.280230	-5.488544	0.0000
D(DUMMY(-1))	15.65198	3.322449	4.710976	0.0002
D(DUMMY(-2))	8.315837	1.886136	4.408928	0.0004
D(TIND)	-2.737947	2.190500	-1.249918	0.2283
D(TIND(-1))	-8.422631	3.471603	-2.426151	0.0267
D(TIND(-2))	-5.839812	2.411492	-2.421659	0.0269
D(RINDTSQ)	0.302184	0.121338	2.490437	0.0234
D(RINDTSQ(-1))	0.713311	0.226435	3.150175	0.0058
D(RINDTSQ(-2))	0.641210	0.169152	3.790738	0.0015

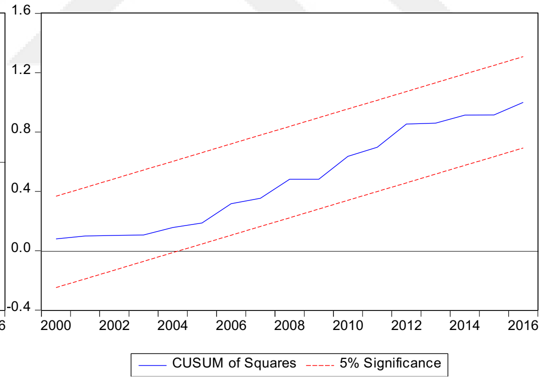
* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation Case 1: No Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.008912	0.021062	-0.423155	0.6775
DCPS	0.124097	0.058126	2.134956	0.0476
FDI_INFL_	-1.130739	0.672825	-1.680584	0.1111
EMP	-0.096939	0.089099	-1.087984	0.2918
DUMMY	-25.96220	4.130132	-6.286046	0.0000
TIND	3.313820	1.654112	2.003383	0.0613
RINDTSQ	-0.261229	0.128300	-2.036088	0.0576

EC = GROWTH - (-0.0089*INFCPI + 0.1241*DCPS -1.1307*FDI_INFL_
-0.0969*EMP -25.9622*DUMMY + 3.3138*TIND -0.2612*RINDTSQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	13.24702	10%	1.7	2.83
k	7	5%	1.97	3.18
		2.5%	2.22	3.49
		1%	2.54	3.91





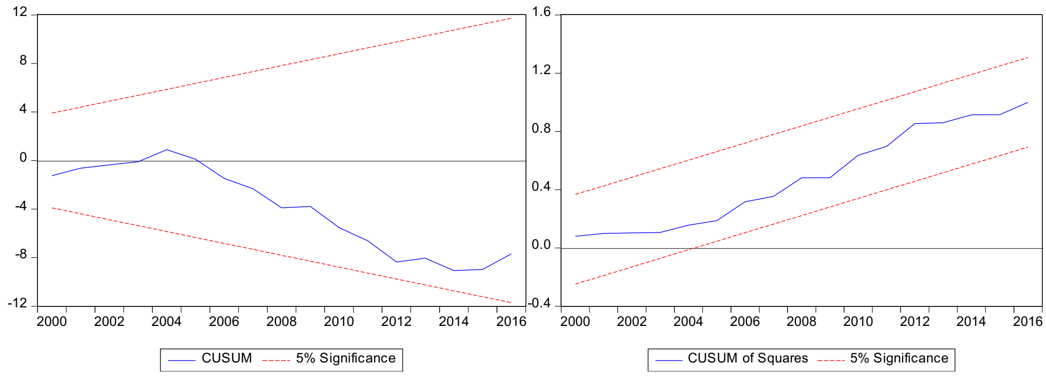
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 0, 2, 1, 3, 3, 3, 3)
Case 1: No Constant and No Trend
Date: 04/16/19 Time: 19:21
Sample: 1974 2016
Included observations: 40

ECM Regression
Case 1: No Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DCPS)	1.115171	0.115757	9.633684	0.0000
D(DCPS(-1))	0.733774	0.125273	5.857414	0.0000
D(FDI_INFL_)	-2.247706	0.511253	-4.396461	0.0004
D(EMP)	-0.816256	0.208269	-3.919243	0.0011
D(EMP(-1))	0.140211	0.251807	0.556818	0.5849
D(EMP(-2))	-1.185789	0.222138	-5.338070	0.0001
D(DUMMY)	-7.026600	0.755764	-9.297343	0.0000
D(DUMMY(-1))	15.65198	1.627838	9.615193	0.0000
D(DUMMY(-2))	8.315837	1.047462	7.939032	0.0000
D(TIND)	-2.737947	1.384235	-1.977950	0.0644
D(TIND(-1))	-8.422631	1.378689	-6.109160	0.0000
D(TIND(-2))	-5.839812	1.537825	-3.797448	0.0014
D(RINDTSQ)	0.302184	0.069348	4.357495	0.0004
D(RINDTSQ(-1))	0.713311	0.089614	7.959828	0.0000
D(RINDTSQ(-2))	0.641210	0.097874	6.551401	0.0000
CointEq(-1)*	-1.167286	0.095432	-12.23165	0.0000

R-squared	0.966753	Mean dependent var	-0.181936
Adjusted R-squared	0.945974	S.D. dependent var	6.250129
S.E. of regression	1.452745	Akaike info criterion	3.873961
Sum squared resid	50.65122	Schwarz criterion	4.549513
Log likelihood	-61.47922	Hannan-Quinn criter.	4.118219
Durbin-Watson stat	2.021600		

* p-value incompatible with t-Bounds distribution.



Appendix D

Robustness check results are presented as below as eviews output:

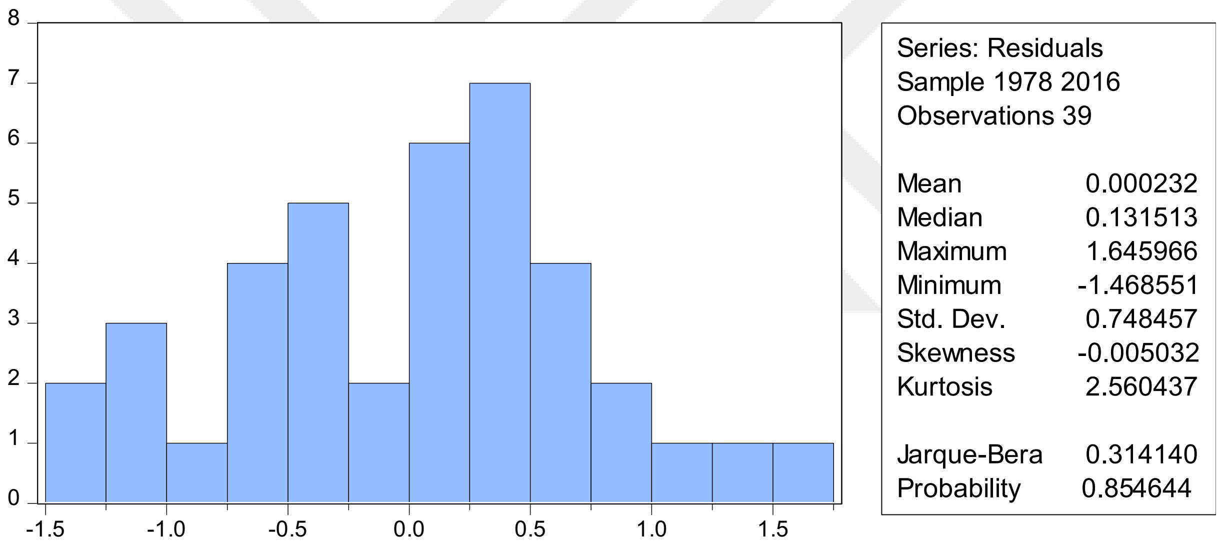
Model 1

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.667972	Prob. F(3,4)	0.3096
Obs*R-squared	21.67420	Prob. Chi-Square(3)	0.0001

Heteroskedasticity Test: White

F-statistic	1.220635	Prob. F(32,6)	0.4367
Obs*R-squared	33.80696	Prob. Chi-Square(32)	0.3802
Scaled explained SS	0.849743	Prob. Chi-Square(32)	1.0000



Dependent Variable: GROWTH
Method: ARDL
Date: 04/26/19 Time: 22:14
Sample (adjusted): 1978 2016
Included observations: 39 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY RCENGOVROBUST ECENGOV ECENGOVSQ
Fixed regressors:
Number of models evaluated: 196608
Selected Model: ARDL(3, 3, 3, 2, 3, 3, 3, 2, 2)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.213354	0.174276	-1.224229	0.2605
GROWTH(-2)	-0.359630	0.171336	-2.098973	0.0740
GROWTH(-3)	-0.151679	0.188663	-0.803965	0.4479
INFCPI	-0.046507	0.031730	-1.465681	0.1862
INFCPI(-1)	-0.048571	0.029046	-1.672235	0.1384
INFCPI(-2)	0.097973	0.075475	1.298078	0.2354
INFCPI(-3)	-0.147400	0.052471	-2.809187	0.0262
DCPS	0.865987	0.292672	2.958897	0.0211
DCPS(-1)	-0.578563	0.288903	-2.002621	0.0853
DCPS(-2)	-0.094521	0.236530	-0.399616	0.7014
DCPS(-3)	-0.356794	0.251601	-1.418095	0.1991
FDI_INFL_	0.937098	1.626742	0.576058	0.5826
FDI_INFL_(-1)	-3.293326	2.004239	-1.643181	0.1443
FDI_INFL_(-2)	-3.947537	1.527892	-2.583649	0.0363
EMP	0.321402	0.388883	0.826474	0.4358
EMP(-1)	-0.069936	0.575885	-0.121441	0.9068
EMP(-2)	-1.939391	0.540508	-3.588089	0.0089
EMP(-3)	1.454876	0.354916	4.099208	0.0046
DUMMY	-11.97436	1.789602	-6.691075	0.0003
DUMMY(-1)	-7.767194	3.796379	-2.045948	0.0800
DUMMY(-2)	-6.384807	2.091504	-3.052734	0.0185
DUMMY(-3)	-3.872301	3.719351	-1.041123	0.3324
RCENGOVROBUST	-2.977493	0.634224	-4.694706	0.0022
RCENGOVROBUST(-1)	0.582325	0.553992	1.051144	0.3281
RCENGOVROBUST(-2)	0.605936	0.328622	1.843869	0.1077
RCENGOVROBUST(-3)	-0.415649	0.356376	-1.166324	0.2817
ECENGOV	2.739982	1.001043	2.737127	0.0290
ECENGOV(-1)	4.783599	1.757367	2.722026	0.0297
ECENGOV(-2)	-2.029065	1.895384	-1.070530	0.3199
ECENGOVSQ	-0.032801	0.019438	-1.687479	0.1354
ECENGOVSQ(-1)	-0.092215	0.034690	-2.658235	0.0326
ECENGOVSQ(-2)	0.042140	0.036440	1.156405	0.2855

R-squared	0.970875	Mean dependent var	4.328100
Adjusted R-squared	0.841893	S.D. dependent var	4.385659
S.E. of regression	1.743853	Akaike info criterion	3.873445
Sum squared resid	21.28716	Schwarz criterion	5.238419
Log likelihood	-43.53218	Hannan-Quinn criter.	4.363186
Durbin-Watson stat	2.704493		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 3, 2, 3, 3, 3, 2, 2)
Case 1: No Constant and No Trend
Date: 04/26/19 Time: 22:15
Sample: 1974 2016
Included observations: 39

Conditional Error Correction Regression

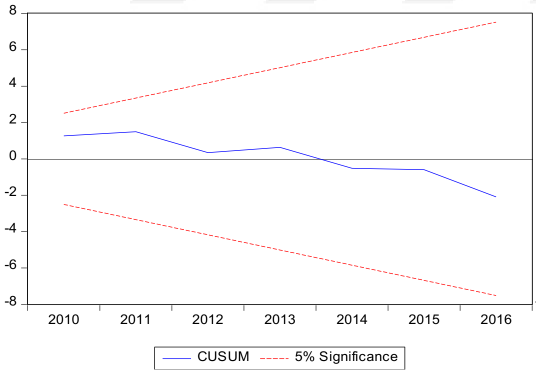
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH(-1)*	-1.724663	0.382561	-4.508207	0.0028
INFCPI(-1)	-0.144505	0.053362	-2.708010	0.0303
DCPS(-1)	-0.163891	0.055895	-2.932105	0.0220
FDI_INFL_(-1)	-6.303765	1.628527	-3.870840	0.0061
EMP(-1)	-0.233049	0.135198	-1.723764	0.1284
DUMMY(-1)	-29.99867	8.014959	-3.742835	0.0072
RCENGOVROBUST(-1)	-2.204881	0.727335	-3.031452	0.0191
ECENGOV(-1)	5.494516	1.608856	3.415170	0.0112
ECENGOVSQ(-1)	-0.082877	0.031473	-2.633307	0.0338
D(GROWTH(-1))	0.511309	0.271276	1.884829	0.1014
D(GROWTH(-2))	0.151679	0.173391	0.874779	0.4107
D(INFCPI)	-0.046507	0.039277	-1.184063	0.2750
D(INFCPI(-1))	0.049427	0.041100	1.202604	0.2682
D(INFCPI(-2))	0.147400	0.055511	2.655336	0.0327
D(DCPS)	0.865987	0.226159	3.829112	0.0065
D(DCPS(-1))	0.451315	0.265827	1.697775	0.1334
D(DCPS(-2))	0.356794	0.272167	1.310937	0.2312
D(FDI_INFL_)	0.937098	1.382763	0.677699	0.5197
D(FDI_INFL_(-1))	3.947537	1.654712	2.385634	0.0485
D(EMP)	0.321402	0.611389	0.525691	0.6153
D(EMP(-1))	0.484515	0.415943	1.164859	0.2822
D(EMP(-2))	-1.454876	0.477314	-3.048049	0.0186
D(DUMMY)	-11.97436	1.937582	-6.180057	0.0005
D(DUMMY(-1))	10.25711	5.393900	1.901613	0.0990
D(DUMMY(-2))	3.872301	3.442175	1.124958	0.2977
D(RCENGOVROBUST)	-2.977493	0.712935	-4.176388	0.0042
D(RCENGOVROBUST(-1))	-0.190287	0.421114	-0.451866	0.6650
D(RCENGOVROBUST(-2))	0.415649	0.483886	0.858982	0.4188
D(ECENGOV)	2.739982	1.345052	2.037082	0.0811
D(ECENGOV(-1))	2.029065	2.638221	0.769103	0.4670
D(ECENGOVSQ)	-0.032801	0.023380	-1.402969	0.2034
D(ECENGOVSQ(-1))	-0.042140	0.048263	-0.873132	0.4115

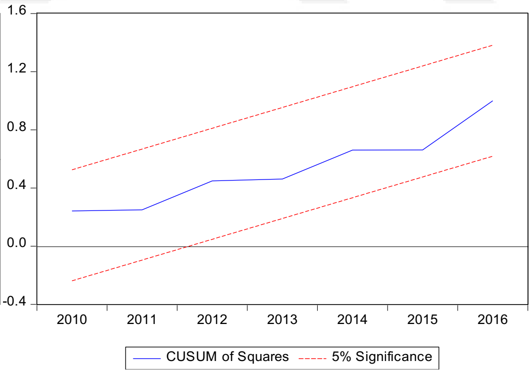
* p-value incompatible with t-Bounds distribution.

Levels Equation Case 1: No Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.083788	0.032449	-2.582134	0.0364
DCPS	-0.095028	0.036600	-2.596374	0.0356
FDI_INFL_	-3.655071	0.941175	-3.883520	0.0060
EMP	-0.135127	0.047206	-2.862519	0.0243
DUMMY	-17.39393	2.669820	-6.515018	0.0003
RCENGOVROBUST	-1.278441	0.392131	-3.260241	0.0139
ECENGOV	3.185849	0.571292	5.576567	0.0008
ECENGOVSQ	-0.048054	0.010040	-4.786066	0.0020

EC = GROWTH - (-0.0838*INFCPI -0.0950*DCPS -3.6551*FDI_INFL_
-0.1351*EMP -17.3939*DUMMY -1.2784*RCENGOVROBUST + 3.1858
*ECENGOV -0.0481*ECENGOVSQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	7.441610	10%	1.66	2.79
k	8	5%	1.91	3.11
		2.5%	2.15	3.4
		1%	2.45	3.79





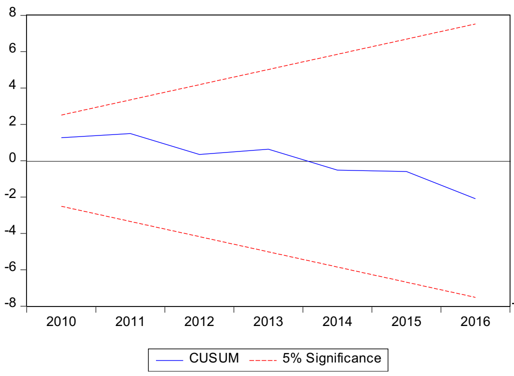
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 3, 2, 3, 3, 3, 2, 2)
Case 1: No Constant and No Trend
Date: 04/26/19 Time: 22:17
Sample: 1974 2016
Included observations: 39

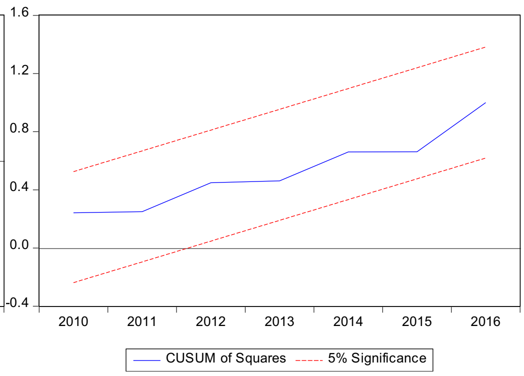
ECM Regression
Case 1: No Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GROWTH(-1))	0.511309	0.109596	4.665389	0.0023
D(GROWTH(-2))	0.151679	0.081739	1.855650	0.1059
D(INFCPI)	-0.046507	0.017432	-2.667894	0.0321
D(INFCPI(-1))	0.049427	0.019552	2.528037	0.0393
D(INFCPI(-2))	0.147400	0.021204	6.951553	0.0002
D(DCPS)	0.865987	0.114520	7.561862	0.0001
D(DCPS(-1))	0.451315	0.108129	4.173859	0.0042
D(DCPS(-2))	0.356794	0.120778	2.954123	0.0213
D(FDI_INFL_)	0.937098	0.696699	1.345054	0.2206
D(FDI_INFL_(-1))	3.947537	0.858926	4.595900	0.0025
D(EMP)	0.321402	0.267413	1.201894	0.2685
D(EMP(-1))	0.484515	0.203463	2.381338	0.0488
D(EMP(-2))	-1.454876	0.227019	-6.408622	0.0004
D(DUMMY)	-11.97436	0.832214	-14.38857	0.0000
D(DUMMY(-1))	10.25711	1.948895	5.263037	0.0012
D(DUMMY(-2))	3.872301	1.675129	2.311644	0.0541
D(RCENGOVROBUST)	-2.977493	0.371665	-8.011227	0.0001
D(RCENGOVROBUST(-1))	-0.190287	0.214853	-0.885661	0.4052
D(RCENGOVROBUST(-2))	0.415649	0.229224	1.813292	0.1127
D(ECENGOV)	2.739982	0.588771	4.653728	0.0023
D(ECENGOV(-1))	2.029065	0.941385	2.155404	0.0681
D(ECENGOVSQ)	-0.032801	0.011105	-2.953884	0.0213
D(ECENGOVSQ(-1))	-0.042140	0.017310	-2.434422	0.0451
CointEq(-1)*	-1.724663	0.143964	-11.97985	0.0000

R-squared	0.985569	Mean dependent var	-0.005711
Adjusted R-squared	0.963440	S.D. dependent var	6.230347
S.E. of regression	1.191278	Akaike info criterion	3.463189
Sum squared resid	21.28716	Schwarz criterion	4.486919
Log likelihood	-43.53218	Hannan-Quinn criter.	3.830494
Durbin-Watson stat	2.704493		

* p-value incompatible with t-Bounds distribution.





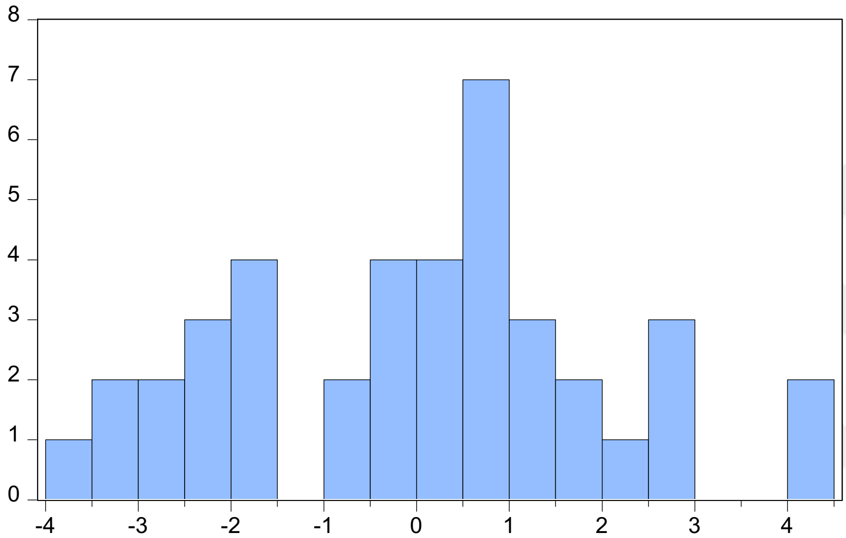
Model 2

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.057616	Prob. F(2,24)	0.9441
Obs*R-squared	0.191137	Prob. Chi-Square(2)	0.9089

Heteroskedasticity Test: White

F-statistic	1.121143	Prob. F(14,25)	0.3878
Obs*R-squared	15.42756	Prob. Chi-Square(14)	0.3496
Scaled explained SS	4.366449	Prob. Chi-Square(14)	0.9928



Series: Residuals	
Sample 1977 2016	
Observations 40	
Mean	0.031086
Median	0.346176
Maximum	4.225189
Minimum	-3.570313
Std. Dev.	1.999962
Skewness	0.064222
Kurtosis	2.335412
Jarque-Bera	0.763626
Probability	0.682623

Dependent Variable: GROWTH
Method: ARDL
Date: 04/26/19 Time: 22:35
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): INFCPI DCPS FDI_INFL_ EMP
DUMMY RCENGOVROBUST EE EESQ
Fixed regressors:
Number of models evaluated: 13122
Selected Model: ARDL(1, 0, 1, 2, 0, 0, 2, 0, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.068991	0.111878	-0.616662	0.5428
INFCPI	-0.021982	0.031849	-0.690181	0.4962
DCPS	0.526241	0.181812	2.894425	0.0076
DCPS(-1)	-0.403331	0.194033	-2.078669	0.0477
FDI_INFL_	-1.102247	1.142844	-0.964477	0.3437
FDI_INFL_(-1)	-1.018362	1.212903	-0.839607	0.4088
FDI_INFL_(-2)	-2.721100	1.122930	-2.423214	0.0226
EMP	-0.253912	0.106243	-2.389922	0.0244
DUMMY	-8.441879	1.446556	-5.835847	0.0000
RCENGOVROBUST	-0.276506	0.440631	-0.627524	0.5358
RCENGOVROBUST(-1)	-0.295728	0.478055	-0.618607	0.5416
RCENGOVROBUST(-2)	0.794640	0.403302	1.970337	0.0595
EE	13.82205	5.570551	2.481272	0.0199
EESQ	-2.500632	1.097016	-2.279486	0.0311

R-squared	0.786759	Mean dependent var	4.305062
Adjusted R-squared	0.680138	S.D. dependent var	4.331519
S.E. of regression	2.449747	Akaike info criterion	4.899064
Sum squared resid	156.0328	Schwarz criterion	5.490172
Log likelihood	-83.98127	Hannan-Quinn criter.	5.112790
Durbin-Watson stat	2.065859		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 0, 1, 2, 0, 0, 2, 0, 0)
Case 1: No Constant and No Trend
Date: 04/26/19 Time: 22:35
Sample: 1974 2016
Included observations: 40

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH(-1)*	-1.068991	0.111878	-9.554977	0.0000
INFCPI**	-0.021982	0.031849	-0.690181	0.4962
DCPS(-1)	0.122910	0.084198	1.459769	0.1563
FDI_INFL_(-1)	-4.841709	1.427238	-3.392362	0.0022
EMP**	-0.253912	0.106243	-2.389922	0.0244
DUMMY**	-8.441879	1.446556	-5.835847	0.0000
RCENGOVROBUST(-1)	0.222406	0.194559	1.143127	0.2634
EE**	13.82205	5.570551	2.481272	0.0199
EESQ**	-2.500632	1.097016	-2.279486	0.0311
D(DCPS)	0.526241	0.181812	2.894425	0.0076
D(FDI_INFL_)	-1.102247	1.142844	-0.964477	0.3437
D(FDI_INFL_(-1))	2.721100	1.122930	2.423214	0.0226
D(RCENGOVROBUST)	-0.276506	0.440631	-0.627524	0.5358
D(RCENGOVROBUST(-1))	-0.794640	0.403302	-1.970337	0.0595

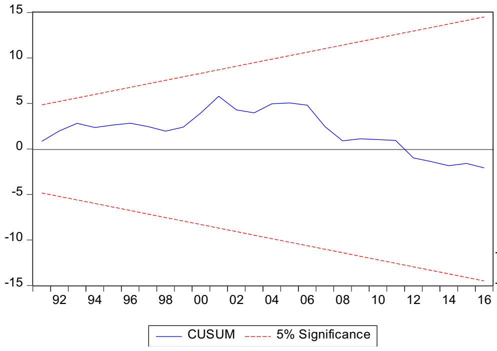
* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

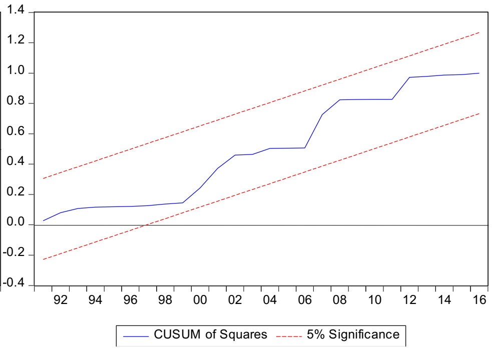
Levels Equation
Case 1: No Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.020563	0.029401	-0.699393	0.4905
DCPS	0.114977	0.077696	1.479833	0.1509
FDI_INFL_	-4.529233	1.408231	-3.216257	0.0035
EMP	-0.237525	0.100874	-2.354681	0.0264
DUMMY	-7.897055	1.617637	-4.881845	0.0000
RCENGOVROBUST	0.208052	0.187317	1.110695	0.2769
EE	12.93000	5.113279	2.528711	0.0179
EESQ	-2.339245	1.013274	-2.308601	0.0292

EC = GROWTH - (-0.0206*INFCPI + 0.1150*DCPS -4.5292*FDI_INFL_
-0.2375*EMP -7.8971*DUMMY + 0.2081*RCENGOVROBUST + 12.9300
*EE -2.3392*EESQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	21.16986	10%	1.66	2.79
k	8	5%	1.91	3.11
		2.5%	2.15	3.4
		1%	2.45	3.79





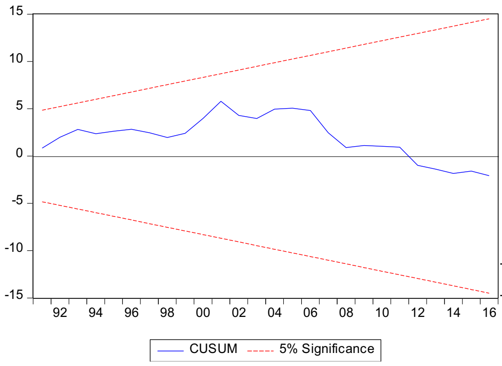
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 0, 1, 2, 0, 0, 2, 0, 0)
Case 1: No Constant and No Trend
Date: 04/26/19 Time: 22:36
Sample: 1974 2016
Included observations: 40

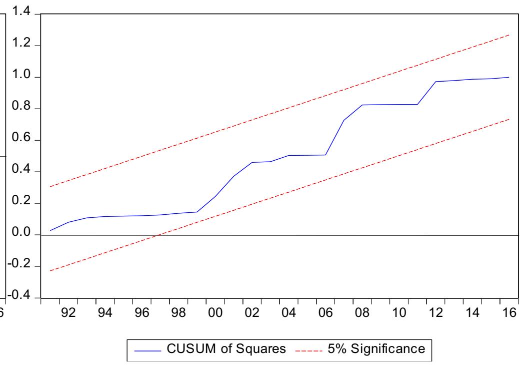
ECM Regression
Case 1: No Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DCPS)	0.526241	0.102100	5.154172	0.0000
D(FDI_INFL_)	-1.102247	0.674164	-1.634984	0.1141
D(FDI_INFL_(-1))	2.721100	0.679259	4.005986	0.0005
D(RCENGOVROBUST)	-0.276506	0.290849	-0.950686	0.3505
D(RCENGOVROBUST(-1))	-0.794640	0.281302	-2.824869	0.0090
CointEq(-1)*	-1.068991	0.067724	-15.78458	0.0000

R-squared	0.897583	Mean dependent var	-0.181936
Adjusted R-squared	0.882521	S.D. dependent var	6.250129
S.E. of regression	2.142242	Akaike info criterion	4.499064
Sum squared resid	156.0328	Schwarz criterion	4.752396
Log likelihood	-83.98127	Hannan-Quinn criter.	4.590661
Durbin-Watson stat	2.065859		

* p-value incompatible with t-Bounds distribution.





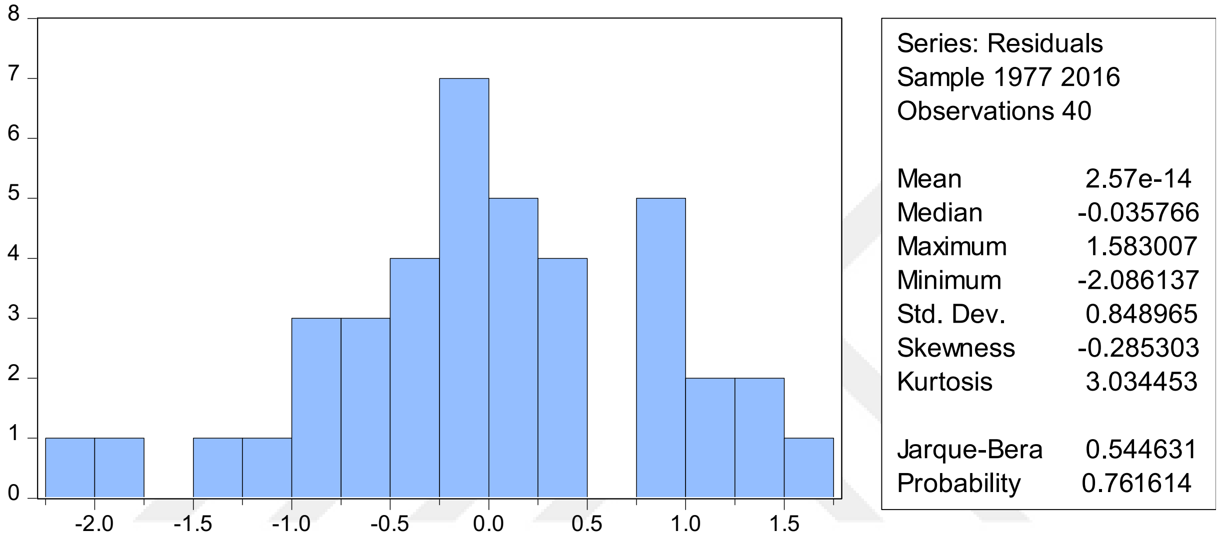
Model 3

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	5.726640	Prob. F(2,11)	0.0198
Obs*R-squared	20.40375	Prob. Chi-Square(2)	0.0000

Heteroskedasticity Test: White

F-statistic	0.931498	Prob. F(26,13)	0.5793
Obs*R-squared	26.02862	Prob. Chi-Square(26)	0.4615
Scaled explained SS	2.796634	Prob. Chi-Square(26)	1.0000



Dependent Variable: GROWTH
Method: ARDL
Date: 04/26/19 Time: 22:42
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY RCENGOVROBUST HE HESQ
Fixed regressors: C @TREND
Number of models evalulated: 13122
Selected Model: ARDL(2, 2, 2, 2, 2, 1, 2, 2, 2)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.522495	0.179440	-2.911808	0.0121
GROWTH(-2)	-0.237578	0.073220	-3.244708	0.0064
INFCPI	-0.043783	0.023047	-1.899715	0.0799
INFCPI(-1)	-0.029653	0.025881	-1.145773	0.2725
INFCPI(-2)	0.063220	0.027582	2.292076	0.0392
DCPS	0.587286	0.102733	5.716652	0.0001
DCPS(-1)	0.084931	0.191649	0.443160	0.6649
DCPS(-2)	0.198029	0.134708	1.470055	0.1653
FDI_INFL_	-0.474118	0.630871	-0.751529	0.4657
FDI_INFL_(-1)	-3.075967	0.892551	-3.446264	0.0043
FDI_INFL_(-2)	-3.400158	0.784548	-4.333905	0.0008
EMP	-0.907521	0.260158	-3.488351	0.0040
EMP(-1)	-0.906507	0.376872	-2.405343	0.0318
EMP(-2)	-2.362148	0.516527	-4.573136	0.0005
DUMMY	-7.692226	1.582742	-4.860063	0.0003
DUMMY(-1)	-2.716124	1.905242	-1.425605	0.1775
RCENGOVROBUST	-0.424436	0.283668	-1.496242	0.1585
RCENGOVROBUST(-1)	-0.039406	0.319214	-0.123446	0.9036
RCENGOVROBUST(-2)	0.470910	0.395239	1.191457	0.2548
HE	30.38671	8.651069	3.512481	0.0038
HE(-1)	51.36685	10.38800	4.944825	0.0003
HE(-2)	-18.50357	9.288710	-1.992050	0.0678
HESQ	-14.14261	4.129000	-3.425191	0.0045
HESQ(-1)	-22.82822	4.867472	-4.689953	0.0004
HESQ(-2)	9.490346	4.160827	2.280880	0.0401
C	255.0562	33.76985	7.552778	0.0000
@TREND	-2.802947	0.374121	-7.492093	0.0000

R-squared	0.961585	Mean dependent var	4.305062
Adjusted R-squared	0.884756	S.D. dependent var	4.331519
S.E. of regression	1.470450	Akaike info criterion	3.835084
Sum squared resid	28.10890	Schwarz criterion	4.975077
Log likelihood	-49.70168	Hannan-Quinn criter.	4.247269
F-statistic	12.51581	Durbin-Watson stat	2.430226
Prob(F-statistic)	0.000013		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(2, 2, 2, 2, 2, 1, 2, 2, 2)
Case 5: Unrestricted Constant and Unrestricted Trend
Date: 04/26/19 Time: 22:43
Sample: 1974 2016
Included observations: 40

Conditional Error Correction Regression

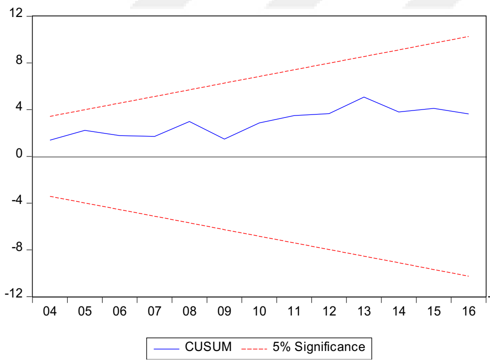
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	255.0562	42.81532	5.957126	0.0000
@TREND	-2.802947	0.536194	-5.227486	0.0002
GROWTH(-1)*	-1.760073	0.188387	-9.342851	0.0000
INFCPI(-1)	-0.010217	0.028751	-0.355359	0.7280
DCPS(-1)	0.870246	0.180842	4.812199	0.0003
FDI_INFL_(-1)	-6.950243	1.145524	-6.067304	0.0000
EMP(-1)	-4.176177	0.725380	-5.757229	0.0001
DUMMY(-1)	-10.40835	2.703870	-3.849427	0.0020
RCENGOVROBUST(-1)	0.007069	0.192219	0.036774	0.9712
HE(-1)	63.24999	14.97583	4.223471	0.0010
HESQ(-1)	-27.48048	7.161751	-3.837118	0.0021
D(GROWTH(-1))	0.237578	0.097330	2.440967	0.0297
D(INFCPI)	-0.043783	0.026584	-1.646960	0.1235
D(INFCPI(-1))	-0.063220	0.028861	-2.190482	0.0473
D(DCPS)	0.587286	0.135110	4.346740	0.0008
D(DCPS(-1))	-0.198029	0.169754	-1.166562	0.2643
D(FDI_INFL_)	-0.474118	0.796676	-0.595120	0.5620
D(FDI_INFL_(-1))	3.400158	0.846533	4.016569	0.0015
D(EMP)	-0.907521	0.346176	-2.621560	0.0211
D(EMP(-1))	2.362148	0.444098	5.318981	0.0001
D(DUMMY)	-7.692226	1.257450	-6.117321	0.0000
D(RCENGOVROBUST)	-0.424436	0.322906	-1.314426	0.2114
D(RCENGOVROBUST(-1))	-0.470910	0.289512	-1.626567	0.1278
D(HE)	30.38671	12.49006	2.432872	0.0302
D(HE(-1))	18.50357	10.26835	1.802001	0.0948
D(HESQ)	-14.14261	5.463346	-2.588636	0.0225
D(HESQ(-1))	-9.490346	4.430119	-2.142233	0.0517

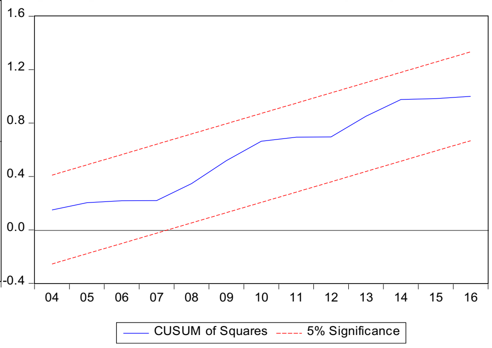
* p-value incompatible with t-Bounds distribution.

Levels Equation Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.005805	0.011975	-0.484742	0.6359
DCPS	0.494438	0.061591	8.027702	0.0000
FDI_INFL_	-3.948837	0.449576	-8.783467	0.0000
EMP	-2.372729	0.284776	-8.331903	0.0000
DUMMY	-5.913589	1.584498	-3.732153	0.0025
RCENGOVROBUST	0.004016	0.071354	0.056285	0.9560
HE	35.93600	7.950965	4.519703	0.0006
HESQ	-15.61326	3.913149	-3.989948	0.0015

EC = GROWTH - (-0.0058*INFCPI + 0.4944*DCPS -3.9488*FDI_INFL_ -2.3727*EMP -5.9136*DUMMY + 0.0040*RCENGOVROBUST + 35.9360 *HE -15.6133*HESQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	14.62206	10%	2.26	3.34
k	8	5%	2.55	3.68
		2.5%	2.82	4.02
		1%	3.15	4.43





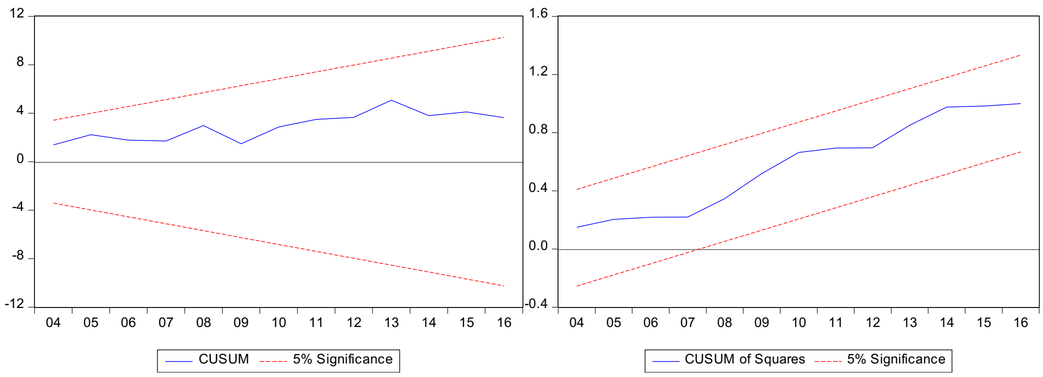
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(2, 2, 2, 2, 2, 1, 2, 2, 2)
Case 5: Unrestricted Constant and Unrestricted Trend
Date: 04/26/19 Time: 22:44
Sample: 1974 2016
Included observations: 40

ECM Regression
Case 5: Unrestricted Constant and Unrestricted Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	255.0562	17.52485	14.55398	0.0000
@TREND	-2.802947	0.191077	-14.66922	0.0000
D(GROWTH(-1))	0.237578	0.068472	3.469739	0.0041
D(INFCPI)	-0.043783	0.018271	-2.396280	0.0323
D(INFCPI(-1))	-0.063220	0.017952	-3.521564	0.0038
D(DCPS)	0.587286	0.090207	6.510444	0.0000
D(DCPS(-1))	-0.198029	0.100436	-1.971695	0.0703
D(FDI_INFL_)	-0.474118	0.464880	-1.019871	0.3264
D(FDI_INFL_(-1))	3.400158	0.537135	6.330173	0.0000
D(EMP)	-0.907521	0.195175	-4.649781	0.0005
D(EMP(-1))	2.362148	0.278625	8.477884	0.0000
D(DUMMY)	-7.692226	0.557418	-13.79974	0.0000
D(RCENGOVROBUST)	-0.424436	0.197171	-2.152624	0.0507
D(RCENGOVROBUST(-1))	-0.470910	0.174895	-2.692526	0.0185
D(HE)	30.38671	6.101564	4.980152	0.0003
D(HE(-1))	18.50357	6.581489	2.811457	0.0147
D(HESQ)	-14.14261	2.745461	-5.151271	0.0002
D(HESQ(-1))	-9.490346	2.873582	-3.302619	0.0057
CointEq(-1)*	-1.760073	0.120717	-14.58020	0.0000

R-squared	0.981550	Mean dependent var	-0.181936
Adjusted R-squared	0.965735	S.D. dependent var	6.250129
S.E. of regression	1.156944	Akaike info criterion	3.435084
Sum squared resid	28.10890	Schwarz criterion	4.237302
Log likelihood	-49.70168	Hannan-Quinn criter.	3.725140
F-statistic	62.06659	Durbin-Watson stat	2.430226
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.



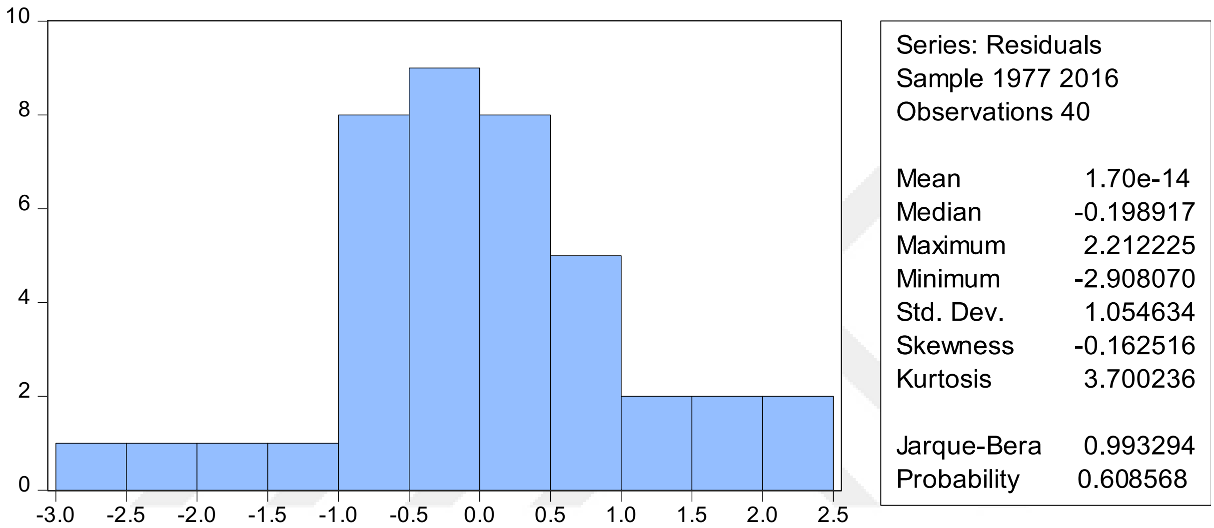
Model 4

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.592057	Prob. F(2,13)	0.2407
Obs*R-squared	7.869725	Prob. Chi-Square(2)	0.0195

Heteroskedasticity Test: White

F-statistic	0.988268	Prob. F(24,15)	0.5244
Obs*R-squared	24.50351	Prob. Chi-Square(24)	0.4331
Scaled explained SS	4.652244	Prob. Chi-Square(24)	1.0000



Dependent Variable: GROWTH
Method: ARDL
Date: 04/26/19 Time: 22:52
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY RCENGOVROBUST EHE EHESQ
Fixed regressors: C @TREND
Number of models evaluated: 13122
Selected Model: ARDL(2, 0, 2, 2, 2, 1, 2, 2, 2)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.466741	0.236755	-1.971404	0.0674
GROWTH(-2)	-0.277066	0.086619	-3.198653	0.0060
INFCPI	-0.007876	0.029344	-0.268409	0.7920
DCPS	0.719985	0.178704	4.028922	0.0011
DCPS(-1)	-0.206961	0.252849	-0.818518	0.4259
DCPS(-2)	0.236800	0.131503	1.800715	0.0919
FDI_INFL_	-1.013783	0.650502	-1.558463	0.1400
FDI_INFL_(-1)	-2.168278	0.870436	-2.491026	0.0249
FDI_INFL_(-2)	-4.981173	1.313208	-3.793132	0.0018
EMP	-0.643628	0.406386	-1.583786	0.1341
EMP(-1)	-0.796571	0.501192	-1.589352	0.1328
EMP(-2)	-1.969643	0.496184	-3.969580	0.0012
DUMMY	-8.681643	1.767615	-4.911500	0.0002
DUMMY(-1)	-3.903279	2.500681	-1.560886	0.1394
RCENGOVROBUST	-0.810508	0.459524	-1.763798	0.0981
RCENGOVROBUST(-1)	0.298766	0.461624	0.647208	0.5273
RCENGOVROBUST(-2)	0.792514	0.428546	1.849308	0.0842
EHE	5.628298	6.236077	0.902538	0.3810
EHE(-1)	17.78091	8.269416	2.150202	0.0483
EHE(-2)	-6.160814	4.075716	-1.511591	0.1514
EHESQ	-0.672242	0.754485	-0.890994	0.3870
EHESQ(-1)	-2.021212	0.952421	-2.122184	0.0509
EHESQ(-2)	0.657519	0.484014	1.358472	0.1944
C	193.2997	40.09463	4.821087	0.0002
@TREND	-2.093227	0.502069	-4.169200	0.0008

R-squared	0.940718	Mean dependent var	4.305062
Adjusted R-squared	0.845867	S.D. dependent var	4.331519
S.E. of regression	1.700546	Akaike info criterion	4.168947
Sum squared resid	43.37787	Schwarz criterion	5.224497
Log likelihood	-58.37894	Hannan-Quinn criter.	4.550601
F-statistic	9.917819	Durbin-Watson stat	2.365892
Prob(F-statistic)	0.000017		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(2, 0, 2, 2, 2, 1, 2, 2, 2)
Case 5: Unrestricted Constant and Unrestricted Trend
Date: 04/26/19 Time: 22:53
Sample: 1974 2016
Included observations: 40

Conditional Error Correction Regression

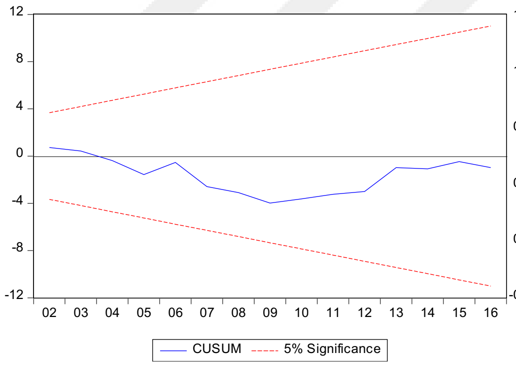
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	193.2997	40.60200	4.760841	0.0003
@TREND	-2.093227	0.526530	-3.975514	0.0012
GROWTH(-1)*	-1.743806	0.218947	-7.964500	0.0000
INFCPI**	-0.007876	0.031451	-0.250428	0.8057
DCPS(-1)	0.749823	0.224116	3.345691	0.0044
FDI_INFL_(-1)	-8.163233	1.426499	-5.722566	0.0000
EMP(-1)	-3.409842	0.763081	-4.468522	0.0005
DUMMY(-1)	-12.58492	2.839828	-4.431579	0.0005
RCENGOVROBUST(-1)	0.280772	0.223783	1.254663	0.2288
EHE(-1)	17.24840	7.850179	2.197198	0.0441
EHESQ(-1)	-2.035935	1.132591	-1.797591	0.0924
D(GROWTH(-1))	0.277066	0.109909	2.520867	0.0235
D(DCPS)	0.719985	0.164388	4.379801	0.0005
D(DCPS(-1))	-0.236800	0.201480	-1.175301	0.2582
D(FDI_INFL_)	-1.013783	1.030773	-0.983517	0.3410
D(FDI_INFL_(-1))	4.981173	1.473432	3.380659	0.0041
D(EMP)	-0.643628	0.438539	-1.467664	0.1628
D(EMP(-1))	1.969643	0.549323	3.585585	0.0027
D(DUMMY)	-8.681643	1.316801	-6.592983	0.0000
D(RCENGOVROBUST)	-0.810508	0.512608	-1.581146	0.1347
D(RCENGOVROBUST(-1))	-0.792514	0.424675	-1.866164	0.0817
D(EHE)	5.628298	4.505920	1.249089	0.2308
D(EHE(-1))	6.160814	4.747134	1.297797	0.2140
D(EHESQ)	-0.672242	0.557753	-1.205267	0.2468
D(EHESQ(-1))	-0.657519	0.683400	-0.962129	0.3512

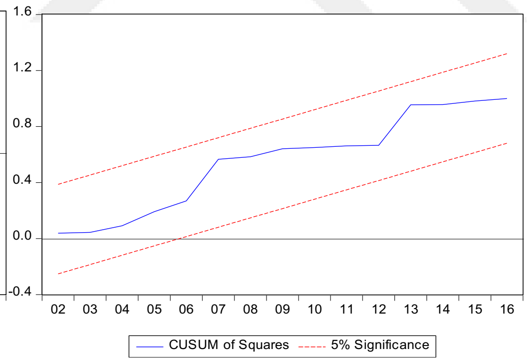
* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.004517	0.016525	-0.273326	0.7883
DCPS	0.429992	0.104784	4.103588	0.0009
FDI_INFL_	-4.681274	0.711372	-6.580624	0.0000
EMP	-1.955402	0.367777	-5.316811	0.0001
DUMMY	-7.216927	1.554712	-4.641972	0.0003
RCENGOVROBUST	0.161011	0.069516	2.316175	0.0351
EHE	9.891234	3.528324	2.803380	0.0134
EHESQ	-1.167523	0.510609	-2.286529	0.0372

EC = GROWTH - (-0.0045*INFCPI + 0.4300*DCPS -4.6813*FDI_INFL_
-1.9554*EMP -7.2169*DUMMY + 0.1610*RCENGOVROBUST + 9.8912
*EHE -1.1675*EHESQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	11.33498	10%	2.26	3.34
k	8	5%	2.55	3.68
		2.5%	2.82	4.02
		1%	3.15	4.43





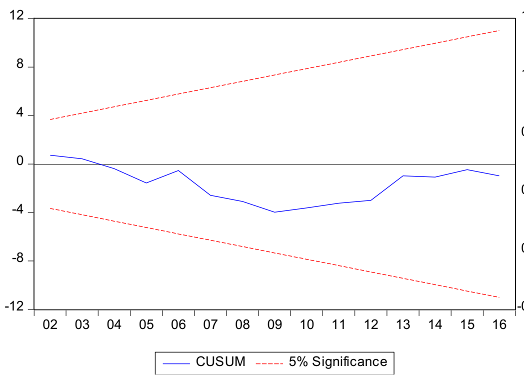
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(2, 0, 2, 2, 2, 1, 2, 2, 2)
Case 5: Unrestricted Constant and Unrestricted Trend
Date: 04/26/19 Time: 22:54
Sample: 1974 2016
Included observations: 40

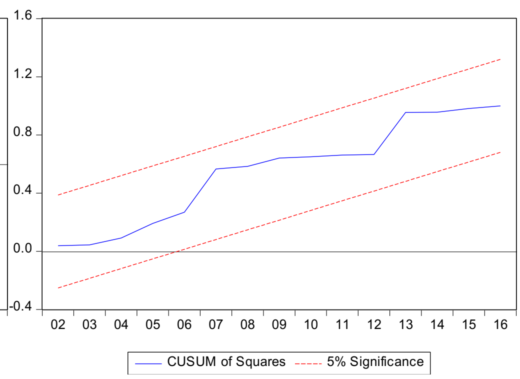
ECM Regression
Case 5: Unrestricted Constant and Unrestricted Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	193.2997	15.60281	12.38877	0.0000
@TREND	-2.093227	0.171354	-12.21582	0.0000
D(GROWTH(-1))	0.277066	0.068590	4.039446	0.0011
D(DCPS)	0.719985	0.105681	6.812807	0.0000
D(DCPS(-1))	-0.236800	0.103613	-2.285428	0.0373
D(FDI_INFL_)	-1.013783	0.571162	-1.774948	0.0962
D(FDI_INFL_(-1))	4.981173	0.766490	6.498678	0.0000
D(EMP)	-0.643628	0.238557	-2.698005	0.0165
D(EMP(-1))	1.969643	0.301821	6.525869	0.0000
D(DUMMY)	-8.681643	0.575497	-15.08547	0.0000
D(RCENGOVROBUST)	-0.810508	0.255595	-3.171063	0.0063
D(RCENGOVROBUST(-1))	-0.792514	0.218720	-3.623415	0.0025
D(EHE)	5.628298	2.738146	2.055514	0.0577
D(EHE(-1))	6.160814	2.786569	2.210896	0.0430
D(EHESQ)	-0.672242	0.359198	-1.871509	0.0809
D(EHESQ(-1))	-0.657519	0.350199	-1.877561	0.0800
CointEq(-1)*	-1.743806	0.139427	-12.50691	0.0000

R-squared	0.971527	Mean dependent var	-0.181936
Adjusted R-squared	0.951721	S.D. dependent var	6.250129
S.E. of regression	1.373315	Akaike info criterion	3.768947
Sum squared resid	43.37787	Schwarz criterion	4.486721
Log likelihood	-58.37894	Hannan-Quinn criter.	4.028471
F-statistic	49.04980	Durbin-Watson stat	2.365892
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.





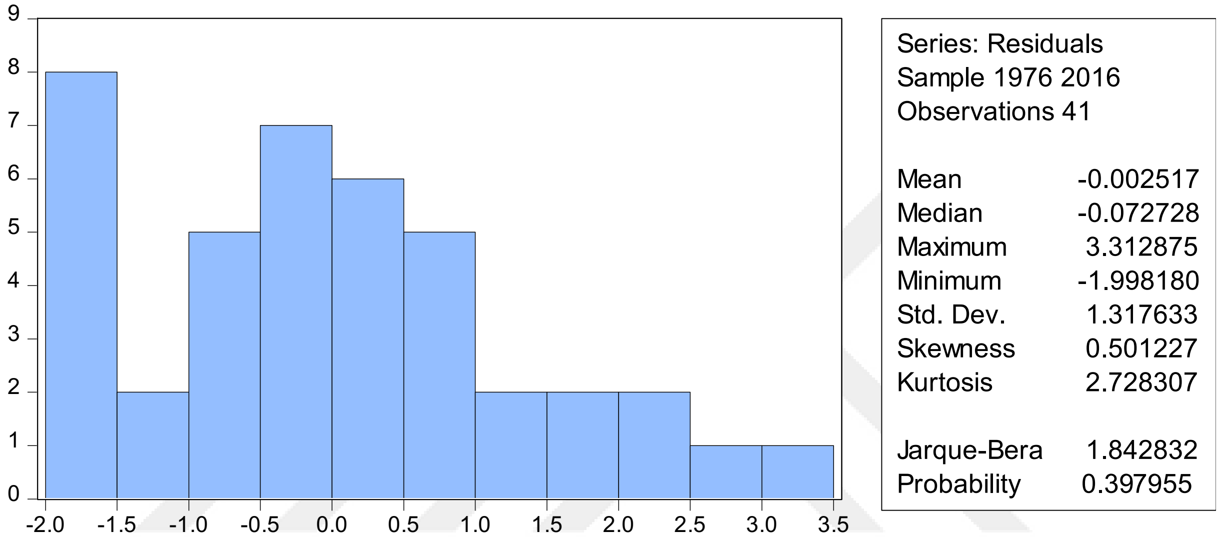
Model 5

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.780112	Prob. F(2,20)	0.0860
Obs*R-squared	8.918905	Prob. Chi-Square(2)	0.0116

Heteroskedasticity Test: White

F-statistic	0.467335	Prob. F(19,21)	0.9496
Obs*R-squared	12.18413	Prob. Chi-Square(19)	0.8776
Scaled explained SS	3.024740	Prob. Chi-Square(19)	1.0000



Dependent Variable: GROWTH
Method: ARDL
Date: 04/16/19 Time: 19:28
Sample (adjusted): 1976 2016
Included observations: 41 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY RCENGOV DE EDSQ
Fixed regressors:
Number of models evalulated: 13122
Selected Model: ARDL(1, 0, 2, 2, 0, 2, 0, 2, 2)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.334929	0.129161	-2.593120	0.0166
INFCPI	-0.055613	0.022636	-2.456803	0.0224
DCPS	0.444249	0.063720	6.971907	0.0000
DCPS(-1)	-0.165586	0.135090	-1.225745	0.2333
DCPS(-2)	-0.289980	0.101823	-2.847888	0.0094
FDI_INFL_	-2.167403	0.969081	-2.236554	0.0358
FDI_INFL_(-1)	0.686214	1.096910	0.625589	0.5380
FDI_INFL_(-2)	-2.707150	0.768980	-3.520442	0.0019
EMP	-0.195160	0.066250	-2.945823	0.0075
DUMMY	-8.774301	1.299768	-6.750665	0.0000
DUMMY(-1)	-3.705459	1.809417	-2.047875	0.0527
DUMMY(-2)	1.533956	1.020830	1.502656	0.1471
RCENGOV	0.157153	0.176234	0.891730	0.3822
DE	-20.52255	7.169326	-2.862549	0.0090
DE(-1)	32.03281	13.96660	2.293530	0.0317
DE(-2)	10.96553	10.57778	1.036657	0.3112
EDSQ	4.526944	1.333641	3.394424	0.0026
EDSQ(-1)	-6.306778	2.544693	-2.478405	0.0213
EDSQ(-2)	-3.985336	1.999947	-1.992721	0.0588

R-squared	0.909657	Mean dependent var	4.455213
Adjusted R-squared	0.835739	S.D. dependent var	4.383762
S.E. of regression	1.776699	Akaike info criterion	4.291691
Sum squared resid	69.44648	Schwarz criterion	5.085785
Log likelihood	-68.97966	Hannan-Quinn criter.	4.580856
Durbin-Watson stat	2.382960		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 0, 2, 2, 0, 2, 0, 2, 2)
Case 1: No Constant and No Trend
Date: 04/16/19 Time: 19:28
Sample: 1974 2016
Included observations: 41

Conditional Error Correction Regression

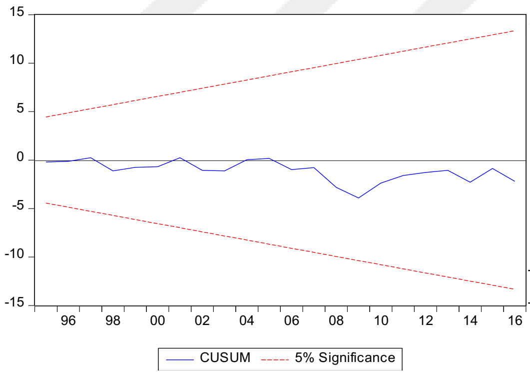
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH(-1)*	-1.334929	0.146601	-9.105874	0.0000
INFCPI**	-0.055613	0.021630	-2.571073	0.0174
DCPS(-1)	-0.011317	0.061795	-0.183136	0.8564
FDI_INFL_(-1)	-4.188339	0.964611	-4.341996	0.0003
EMP**	-0.195160	0.108579	-1.797397	0.0860
DUMMY(-1)	-10.94581	2.871534	-3.811832	0.0010
RCENGOV**	0.157153	0.230884	0.680658	0.5032
DE(-1)	22.47579	6.624391	3.392884	0.0026
EDSQ(-1)	-5.765170	1.317002	-4.377497	0.0002
D(DCPS)	0.444249	0.139879	3.175960	0.0044
D(DCPS(-1))	0.289980	0.145484	1.993217	0.0588
D(FDI_INFL_)	-2.167403	0.874317	-2.478968	0.0213
D(FDI_INFL_(-1))	2.707150	0.844699	3.204868	0.0041
D(DUMMY)	-8.774301	1.208148	-7.262602	0.0000
D(DUMMY(-1))	-1.533956	1.110113	-1.381801	0.1809
D(DE)	-20.52255	8.682668	-2.363623	0.0273
D(DE(-1))	-10.96553	10.04726	-1.091394	0.2869
D(EDSQ)	4.526944	1.778748	2.545018	0.0185
D(EDSQ(-1))	3.985336	2.157299	1.847373	0.0782

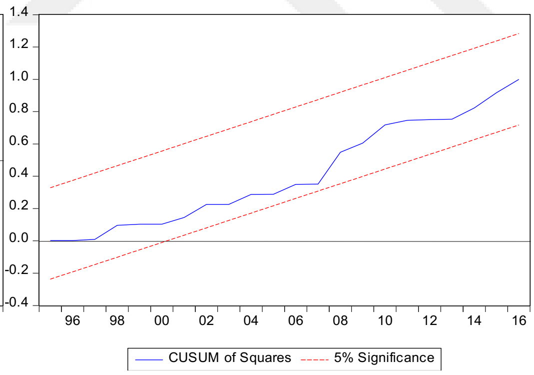
* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation Case 1: No Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.041660	0.015505	-2.686843	0.0135
DCPS	-0.008477	0.029748	-0.284973	0.7783
FDI_INFL_	-3.137499	0.554770	-5.655496	0.0000
EMP	-0.146195	0.048398	-3.020682	0.0063
DUMMY	-8.199541	0.900511	-9.105436	0.0000
RCENGOV	0.117724	0.133201	0.883807	0.3864
DE	16.83669	3.038807	5.540560	0.0000
EDSQ	-4.318709	0.523077	-8.256353	0.0000

EC = GROWTH - (-0.0417*INFCPI -0.0085*DCPS -3.1375*FDI_INFL_
-0.1462*EMP -8.1995*DUMMY + 0.1177*RCENGOV + 16.8367*DE
-4.3187*EDSQ)

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	10.77767	10%	1.66	2.79
k	8	5%	1.91	3.11
		2.5%	2.15	3.4
		1%	2.45	3.79





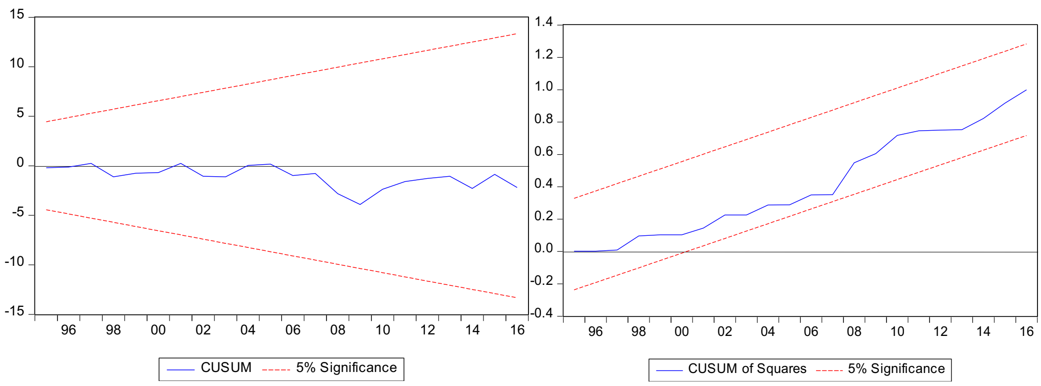
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 0, 2, 2, 0, 2, 0, 2, 2)
Case 1: No Constant and No Trend
Date: 04/16/19 Time: 19:29
Sample: 1974 2016
Included observations: 41

ECM Regression
Case 1: No Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DCPS)	0.444249	0.085883	5.172732	0.0000
D(DCPS(-1))	0.289980	0.106693	2.717902	0.0126
D(FDI_INFL_)	-2.167403	0.533727	-4.060884	0.0005
D(FDI_INFL_(-1))	2.707150	0.562504	4.812679	0.0001
D(DUMMY)	-8.774301	0.761050	-11.52921	0.0000
D(DUMMY(-1))	-1.533956	0.765030	-2.005091	0.0574
D(DE)	-20.52255	6.788061	-3.023330	0.0062
D(DE(-1))	-10.96553	7.840655	-1.398547	0.1759
D(EDSQ)	4.526944	1.439192	3.145476	0.0047
D(EDSQ(-1))	3.985336	1.718428	2.319176	0.0301
CointEq(-1)*	-1.334929	0.116071	-11.50093	0.0000

R-squared	0.954765	Mean dependent var	-0.097324
Adjusted R-squared	0.939687	S.D. dependent var	6.195243
S.E. of regression	1.521474	Akaike info criterion	3.901447
Sum squared resid	69.44648	Schwarz criterion	4.361186
Log likelihood	-68.97966	Hannan-Quinn criter.	4.068858
Durbin-Watson stat	2.382960		

* p-value incompatible with t-Bounds distribution.



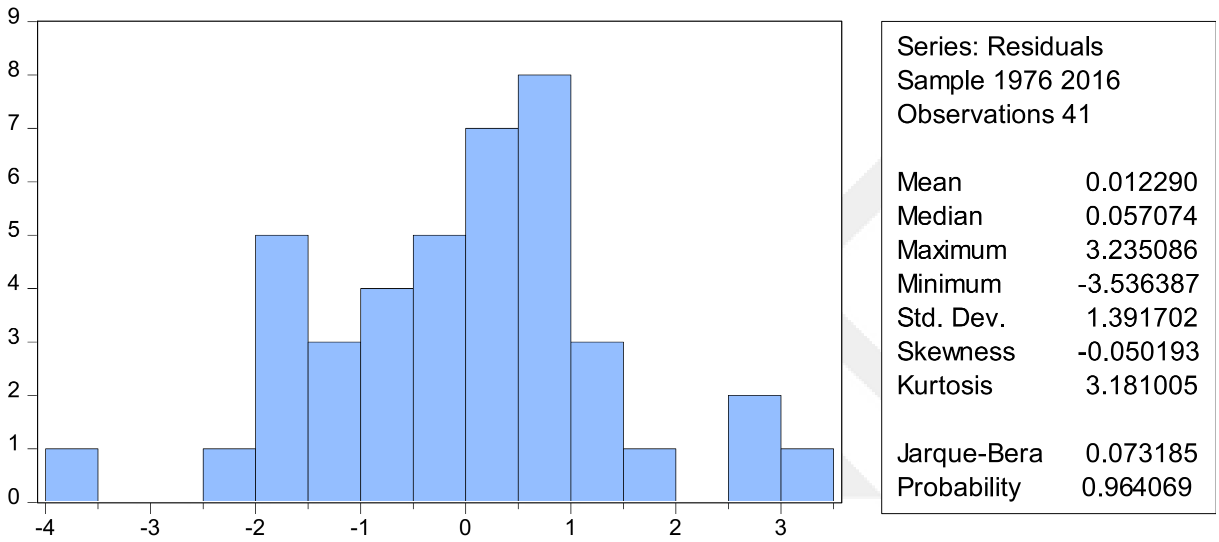
Model 6

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.635001	Prob. F(2,16)	0.5428
Obs*R-squared	3.015057	Prob. Chi-Square(2)	0.2215

Heteroskedasticity Test: White

F-statistic	1.496830	Prob. F(23,17)	0.1987
Obs*R-squared	27.44683	Prob. Chi-Square(23)	0.2374
Scaled explained SS	5.764119	Prob. Chi-Square(23)	0.9999



Dependent Variable: GROWTH
Method: ARDL
Date: 04/16/19 Time: 02:13
Sample (adjusted): 1976 2016
Included observations: 41 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY RCENGOV CE CESQ
Fixed regressors:
Number of models evaluated: 13122
Selected Model: ARDL(2, 1, 2, 2, 2, 2, 2, 0, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	0.033478	0.180815	0.185152	0.8552
GROWTH(-2)	-0.313875	0.176273	-1.780618	0.0919
INFCPI	-0.125541	0.040481	-3.101225	0.0062
INFCPI(-1)	0.067769	0.041669	1.626392	0.1212
DCPS	0.845742	0.206230	4.100958	0.0007
DCPS(-1)	-0.629332	0.287079	-2.192186	0.0418
DCPS(-2)	-0.196852	0.185314	-1.062267	0.3022
FDI_INFL_	-2.971490	1.053744	-2.819937	0.0113
FDI_INFL_(-1)	3.163393	1.460980	2.165253	0.0440
FDI_INFL_(-2)	-4.480438	1.141545	-3.924890	0.0010
EMP	0.045542	0.427328	0.106574	0.9163
EMP(-1)	1.629416	0.582736	2.796148	0.0119
EMP(-2)	-2.047642	0.503042	-4.070516	0.0007
DUMMY	0.194718	2.377335	0.081906	0.9356
DUMMY(-1)	-6.917073	2.685122	-2.576074	0.0190
DUMMY(-2)	-3.622309	2.218783	-1.632566	0.1199
RCENGOV	-0.450818	0.477549	-0.944025	0.3577
RCENGOV(-1)	1.051848	0.487049	2.159635	0.0445
RCENGOV(-2)	-0.671333	0.423857	-1.583865	0.1306
CE	7.164311	2.159000	3.318346	0.0038
CESQ	-0.446549	0.100503	-4.443149	0.0003
CESQ(-1)	0.184057	0.052899	3.479430	0.0027
CESQ(-2)	-0.093989	0.034870	-2.695407	0.0148

R-squared	0.899206	Mean dependent var	4.455213
Adjusted R-squared	0.776014	S.D. dependent var	4.383762
S.E. of regression	2.074710	Akaike info criterion	4.596271
Sum squared resid	77.47959	Schwarz criterion	5.557543
Log likelihood	-71.22355	Hannan-Quinn criter.	4.946313
Durbin-Watson stat	1.892948		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(2, 1, 2, 2, 2, 2, 2, 0, 2)
Case 1: No Constant and No Trend
Date: 04/16/19 Time: 02:14
Sample: 1974 2016
Included observations: 41

Conditional Error Correction Regression

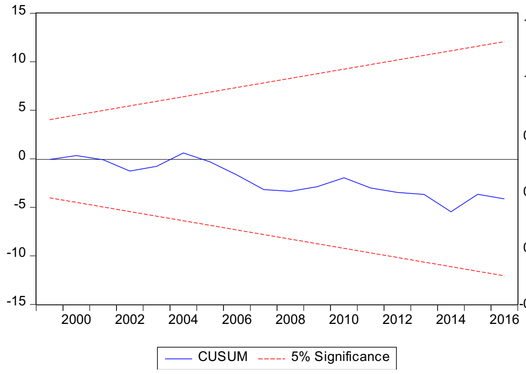
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH(-1)*	-1.280397	0.277577	-4.612768	0.0002
INFCPI(-1)	-0.057771	0.034811	-1.659563	0.1143
DCPS(-1)	0.019558	0.043149	0.453267	0.6558
FDI_INFL_(-1)	-4.288536	1.312336	-3.267865	0.0043
EMP(-1)	-0.372684	0.144655	-2.576366	0.0190
DUMMY(-1)	-10.34466	4.677930	-2.211376	0.0402
RCENGOV(-1)	-0.070303	0.271976	-0.258490	0.7990
CE**	7.164311	2.159000	3.318346	0.0038
CESQ(-1)	-0.356481	0.094640	-3.766699	0.0014
D(GROWTH(-1))	0.313875	0.176273	1.780618	0.0919
D(INFCPI)	-0.125541	0.040481	-3.101225	0.0062
D(DCPS)	0.845742	0.206230	4.100958	0.0007
D(DCPS(-1))	0.196852	0.185314	1.062267	0.3022
D(FDI_INFL_)	-2.971490	1.053744	-2.819937	0.0113
D(FDI_INFL_(-1))	4.480438	1.141545	3.924890	0.0010
D(EMP)	0.045542	0.427328	0.106574	0.9163
D(EMP(-1))	2.047642	0.503042	4.070516	0.0007
D(DUMMY)	0.194718	2.377335	0.081906	0.9356
D(DUMMY(-1))	3.622309	2.218783	1.632566	0.1199
D(RCENGOV)	-0.450818	0.477549	-0.944025	0.3577
D(RCENGOV(-1))	0.671333	0.423857	1.583865	0.1306
D(CESQ)	-0.446549	0.100503	-4.443149	0.0003
D(CESQ(-1))	0.093989	0.034870	2.695407	0.0148

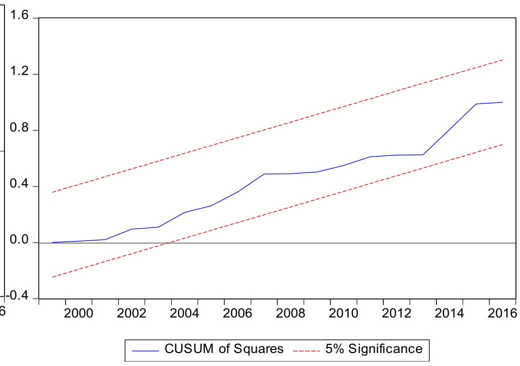
* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation Case 1: No Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.045120	0.030015	-1.503219	0.1501
DCPS	0.015275	0.033996	0.449311	0.6586
FDI_INFL_	-3.349380	1.319143	-2.539058	0.0206
EMP	-0.291069	0.131086	-2.220439	0.0395
DUMMY	-8.079264	2.518739	-3.207663	0.0049
RCENGOV	-0.054907	0.215399	-0.254909	0.8017
CE	5.595383	2.007201	2.787655	0.0122
CESQ	-0.278414	0.089917	-3.096334	0.0062

EC = GROWTH - (-0.0451*INFCPI + 0.0153*DCPS -3.3494*FDI_INFL_
-0.2911*EMP -8.0793*DUMMY -0.0549*RCENGOV + 5.5954*CE -0.2784
*CESQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	6.433690	10%	1.66	2.79
k	8	5%	1.91	3.11
		2.5%	2.15	3.4
		1%	2.45	3.79





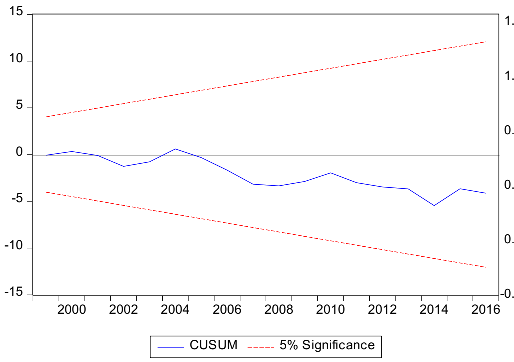
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(2, 1, 2, 2, 2, 2, 2, 0, 2)
Case 1: No Constant and No Trend
Date: 04/16/19 Time: 02:15
Sample: 1974 2016
Included observations: 41

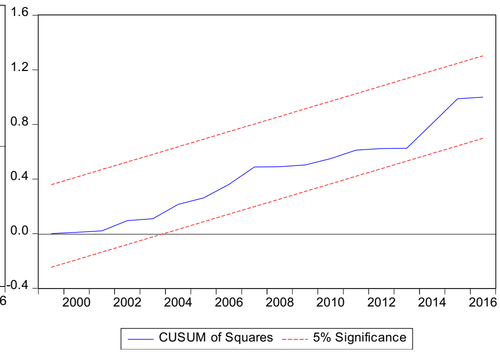
ECM Regression
Case 1: No Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GROWTH(-1))	0.313875	0.111151	2.823855	0.0112
D(INFCPI)	-0.125541	0.026140	-4.802603	0.0001
D(DCPS)	0.845742	0.123903	6.825832	0.0000
D(DCPS(-1))	0.196852	0.133183	1.478058	0.1567
D(FDI_INFL_)	-2.971490	0.653119	-4.549690	0.0002
D(FDI_INFL_(-1))	4.480438	0.835924	5.359865	0.0000
D(EMP)	0.045542	0.260919	0.174544	0.8634
D(EMP(-1))	2.047642	0.336888	6.078105	0.0000
D(DUMMY)	0.194718	1.354989	0.143704	0.8873
D(DUMMY(-1))	3.622309	1.348222	2.686730	0.0151
D(RCENGOV)	-0.450818	0.257605	-1.750036	0.0971
D(RCENGOV(-1))	0.671333	0.242858	2.764304	0.0128
D(CESQ)	-0.446549	0.044831	-9.960632	0.0000
D(CESQ(-1))	0.093989	0.020738	4.532091	0.0003
CointEq(-1)*	-1.280397	0.140005	-9.145380	0.0000

R-squared	0.949533	Mean dependent var	-0.097324
Adjusted R-squared	0.922358	S.D. dependent var	6.195243
S.E. of regression	1.726263	Akaike info criterion	4.206027
Sum squared resid	77.47959	Schwarz criterion	4.832944
Log likelihood	-71.22355	Hannan-Quinn criter.	4.434315
Durbin-Watson stat	1.892948		

* p-value incompatible with t-Bounds distribution.





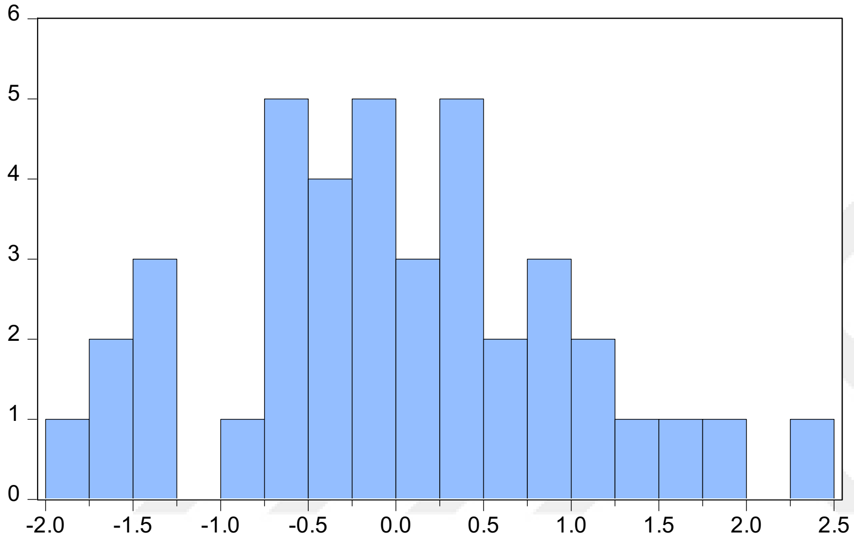
Model 7

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.511974	Prob. F(3,8)	0.6852
Obs*R-squared	6.442680	Prob. Chi-Square(3)	0.0920

Heteroskedasticity Test: White

F-statistic	0.862982	Prob. F(29,10)	0.6437
Obs*R-squared	28.58007	Prob. Chi-Square(29)	0.4871
Scaled explained SS	1.905408	Prob. Chi-Square(29)	1.0000



Series: Residuals	
Sample 1977 2016	
Observations 40	
Mean	0.002181
Median	-0.037941
Maximum	2.377119
Minimum	-1.788355
Std. Dev.	0.973515
Skewness	0.215331
Kurtosis	2.761194
Jarque-Bera	0.404164
Probability	0.817028

Dependent Variable: GROWTH
Method: ARDL
Date: 04/16/19 Time: 00:49
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY RCENGOV IE IESQ
Fixed regressors:
Number of models evaluated: 196608
Selected Model: ARDL(3, 3, 3, 2, 2, 2, 3, 0, 3)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.452527	0.213288	-2.121672	0.0574
GROWTH(-2)	-0.431408	0.248619	-1.735219	0.1106
GROWTH(-3)	0.131683	0.086702	1.518796	0.1570
INFCPI	0.080914	0.023886	3.387575	0.0061
INFCPI(-1)	-0.017349	0.035225	-0.492511	0.6320
INFCPI(-2)	0.016425	0.052454	0.313126	0.7600
INFCPI(-3)	-0.056649	0.029139	-1.944068	0.0779
DCPS	0.673534	0.093830	7.178274	0.0000
DCPS(-1)	-0.241575	0.144804	-1.668294	0.1234
DCPS(-2)	-0.044803	0.233341	-0.192006	0.8512
DCPS(-3)	-0.364736	0.232640	-1.567816	0.1452
FDI_INFL_	-1.131973	0.950992	-1.190307	0.2590
FDI_INFL_(-1)	-1.249332	1.161502	-1.075617	0.3051
FDI_INFL_(-2)	-4.339411	1.156782	-3.751279	0.0032
EMP	-0.085095	0.313224	-0.271674	0.7909
EMP(-1)	1.156026	0.426293	2.711811	0.0202
EMP(-2)	-1.134650	0.572067	-1.983422	0.0728
DUMMY	-7.183850	0.842694	-8.524866	0.0000
DUMMY(-1)	-3.418966	2.981704	-1.146649	0.2759
DUMMY(-2)	-2.186875	3.218992	-0.679366	0.5109
RCENGOV	-0.122045	0.466897	-0.261395	0.7986
RCENGOV(-1)	-0.367502	0.469257	-0.783158	0.4501
RCENGOV(-2)	0.223713	0.547029	0.408960	0.6904
RCENGOV(-3)	0.888638	0.440617	2.016803	0.0688
IE	8.487612	4.022648	2.109956	0.0586
IESQ	-0.755126	0.603488	-1.251270	0.2368
IESQ(-1)	-0.547152	0.248548	-2.201398	0.0500
IESQ(-2)	-0.419134	0.266539	-1.572506	0.1441
IESQ(-3)	-0.559446	0.327848	-1.706418	0.1160

R-squared	0.949487	Mean dependent var	4.305062
Adjusted R-squared	0.820907	S.D. dependent var	4.331519
S.E. of regression	1.833072	Akaike info criterion	4.208880
Sum squared resid	36.96169	Schwarz criterion	5.433317
Log likelihood	-55.17759	Hannan-Quinn criter.	4.651598
Durbin-Watson stat	2.201815		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 3, 2, 2, 2, 3, 0, 3)
Case 1: No Constant and No Trend
Date: 04/16/19 Time: 00:49
Sample: 1974 2016
Included observations: 40

Conditional Error Correction Regression

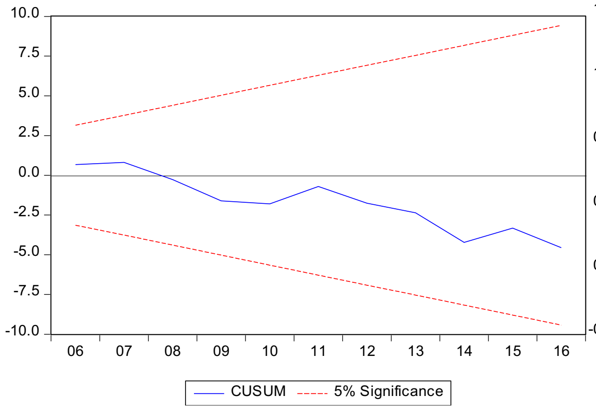
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH(-1)*	-1.752252	0.428164	-4.092476	0.0018
INFCPI(-1)	0.023341	0.046554	0.501384	0.6260
DCPS(-1)	0.022420	0.056544	0.396500	0.6993
FDI_INFL_(-1)	-6.720716	1.405011	-4.783391	0.0006
EMP(-1)	-0.063719	0.141416	-0.450580	0.6610
DUMMY(-1)	-12.78969	4.826657	-2.649804	0.0226
RCENGOV(-1)	0.622804	0.197404	3.154963	0.0092
IE**	8.487612	3.944237	2.151902	0.0545
IESQ(-1)	-2.280858	0.564111	-4.043279	0.0019
D(GROWTH(-1))	0.299725	0.287519	1.042454	0.3196
D(GROWTH(-2))	-0.131683	0.114501	-1.150057	0.2745
D(INFCPI)	0.080914	0.038783	2.086347	0.0610
D(INFCPI(-1))	0.040224	0.046191	0.870814	0.4025
D(INFCPI(-2))	0.056649	0.036959	1.532745	0.1536
D(DCPS)	0.673534	0.165689	4.065042	0.0019
D(DCPS(-1))	0.409539	0.192221	2.130560	0.0565
D(DCPS(-2))	0.364736	0.186156	1.959302	0.0759
D(FDI_INFL_)	-1.131973	1.093198	-1.035469	0.3227
D(FDI_INFL_(-1))	4.339411	1.260165	3.443525	0.0055
D(EMP)	-0.085095	0.408760	-0.208178	0.8389
D(EMP(-1))	1.134650	0.501454	2.262721	0.0449
D(DUMMY)	-7.183850	1.600868	-4.487472	0.0009
D(DUMMY(-1))	2.186875	2.457296	0.889952	0.3925
D(RCENGOV)	-0.122045	0.548249	-0.222608	0.8279
D(RCENGOV(-1))	-1.112351	0.565715	-1.966273	0.0750
D(RCENGOV(-2))	-0.888638	0.528638	-1.680995	0.1209
D(IESQ)	-0.755126	0.696669	-1.083909	0.3016
D(IESQ(-1))	0.978580	0.407394	2.402050	0.0351
D(IESQ(-2))	0.559446	0.396422	1.411239	0.1858

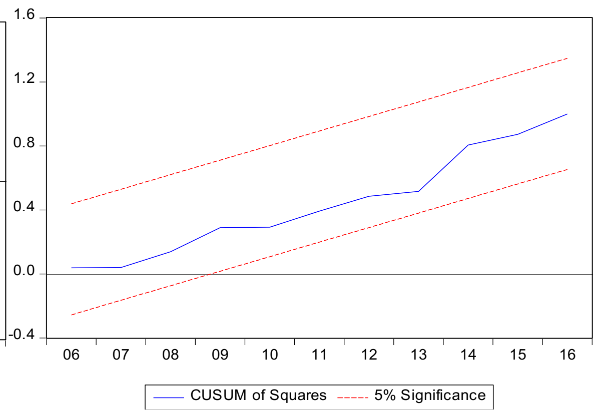
* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation Case 1: No Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	0.013321	0.031987	0.416439	0.6851
DCPS	0.012795	0.017244	0.742010	0.4736
FDI_INFL_	-3.835473	0.855201	-4.484879	0.0009
EMP	-0.036364	0.092161	-0.394572	0.7007
DUMMY	-7.299002	1.685710	-4.329928	0.0012
RCENGOV	0.355430	0.085921	4.136723	0.0017
IE	4.843830	2.659220	1.821523	0.0958
IESQ	-1.301672	0.407053	-3.197796	0.0085

EC = GROWTH - (0.0133*INFCPI + 0.0128*DCPS -3.8355*FDI_INFL_
-0.0364*EMP -7.2990*DUMMY + 0.3554*RCENGOV + 4.8438*IE -1.3017
*IESQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.392810	10%	1.66	2.79
k	8	5%	1.91	3.11
		2.5%	2.15	3.4
		1%	2.45	3.79





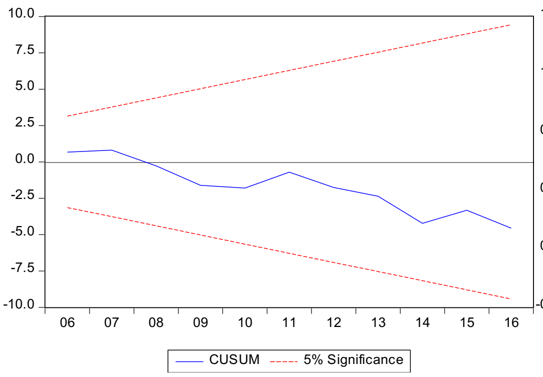
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 3, 3, 2, 2, 2, 3, 0, 3)
Case 1: No Constant and No Trend
Date: 04/16/19 Time: 00:49
Sample: 1974 2016
Included observations: 40

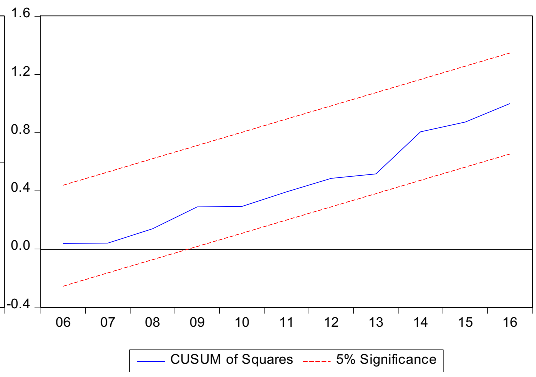
ECM Regression
Case 1: No Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GROWTH(-1))	0.299725	0.119219	2.514072	0.0288
D(GROWTH(-2))	-0.131683	0.056404	-2.334623	0.0395
D(INFCPI)	0.080914	0.021711	3.726812	0.0033
D(INFCPI(-1))	0.040224	0.023677	1.698878	0.1174
D(INFCPI(-2))	0.056649	0.022688	2.496901	0.0297
D(DCPS)	0.673534	0.104914	6.419854	0.0000
D(DCPS(-1))	0.409539	0.115347	3.550498	0.0045
D(DCPS(-2))	0.364736	0.111657	3.266589	0.0075
D(FDI_INFL_)	-1.131973	0.628423	-1.801292	0.0991
D(FDI_INFL_(-1))	4.339411	0.787726	5.508785	0.0002
D(EMP)	-0.085095	0.231195	-0.368066	0.7198
D(EMP(-1))	1.134650	0.251637	4.509078	0.0009
D(DUMMY)	-7.183850	0.800327	-8.976138	0.0000
D(DUMMY(-1))	2.186875	1.091740	2.003110	0.0704
D(RCENGOV)	-0.122045	0.278005	-0.439002	0.6692
D(RCENGOV(-1))	-1.112351	0.270056	-4.118962	0.0017
D(RCENGOV(-2))	-0.888638	0.286331	-3.103533	0.0100
D(IESQ)	-0.755126	0.172040	-4.389249	0.0011
D(IESQ(-1))	0.978580	0.196268	4.985933	0.0004
D(IESQ(-2))	0.559446	0.196345	2.849302	0.0158
CointEq(-1)*	-1.752252	0.175772	-9.968909	0.0000

R-squared	0.975739	Mean dependent var	-0.181936
Adjusted R-squared	0.950201	S.D. dependent var	6.250129
S.E. of regression	1.394759	Akaike info criterion	3.808880
Sum squared resid	36.96169	Schwarz criterion	4.695541
Log likelihood	-55.17759	Hannan-Quinn criter.	4.129468
Durbin-Watson stat	2.201815		

* p-value incompatible with t-Bounds distribution.





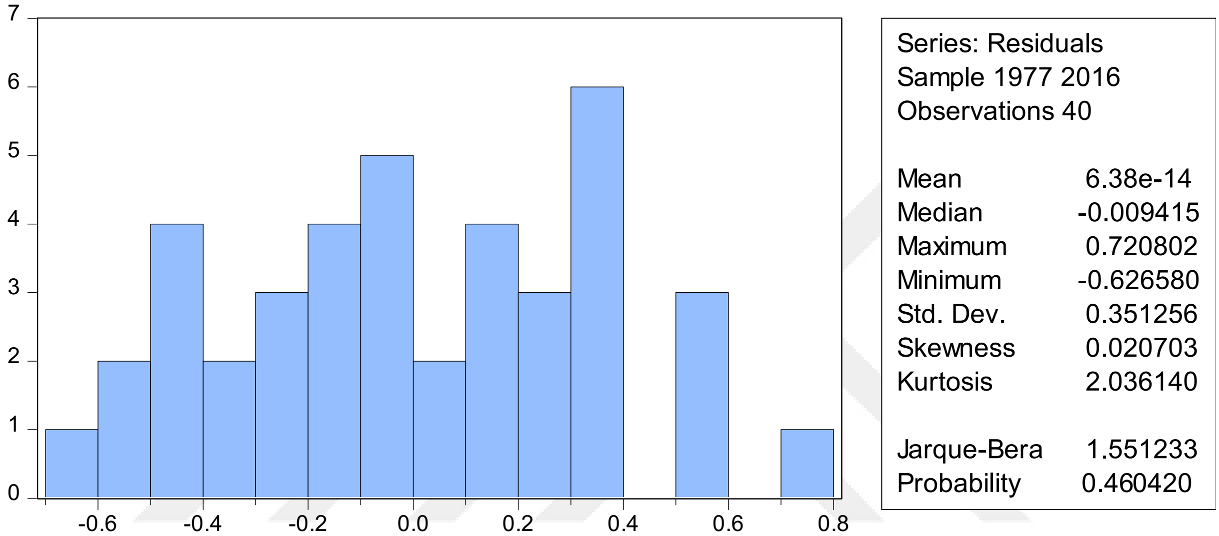
Model 8

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.529125	Prob. F(3,5)	0.6816
Obs*R-squared	9.638895	Prob. Chi-Square(3)	0.0219

Heteroskedasticity Test: White

F-statistic	1.767816	Prob. F(31,8)	0.2025
Obs*R-squared	34.90465	Prob. Chi-Square(31)	0.2876
Scaled explained SS	0.723322	Prob. Chi-Square(31)	1.0000



Dependent Variable: GROWTH
Method: ARDL
Date: 04/16/19 Time: 00:53
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY RCENGOV CIE CIESQ
Fixed regressors: C @TREND
Number of models evaluated: 196608
Selected Model: ARDL(1, 3, 3, 2, 3, 3, 3, 2, 2)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.287463	0.053980	-5.325404	0.0007
INFCPI	0.034004	0.020427	1.664697	0.1345
INFCPI(-1)	0.072956	0.013106	5.566658	0.0005
INFCPI(-2)	-0.006416	0.020003	-0.320771	0.7566
INFCPI(-3)	-0.092655	0.017798	-5.205821	0.0008
DCPS	0.853178	0.113006	7.549864	0.0001
DCPS(-1)	-0.308255	0.138232	-2.229985	0.0563
DCPS(-2)	0.660282	0.080466	8.205709	0.0000
DCPS(-3)	-0.240438	0.137452	-1.749251	0.1184
FDI_INFL_	-3.241643	0.857258	-3.781409	0.0054
FDI_INFL_(-1)	-2.570173	0.852365	-3.015344	0.0167
FDI_INFL_(-2)	-5.546656	1.121719	-4.944780	0.0011
EMP	-1.746495	0.255484	-6.836037	0.0001
EMP(-1)	-0.902292	0.269805	-3.344237	0.0102
EMP(-2)	-1.799462	0.238333	-7.550202	0.0001
EMP(-3)	-0.291033	0.262679	-1.107940	0.3001
DUMMY	-6.765386	0.878699	-7.699323	0.0001
DUMMY(-1)	-1.938199	0.969748	-1.998662	0.0807
DUMMY(-2)	4.300653	0.656881	6.547085	0.0002
DUMMY(-3)	-1.993971	1.194517	-1.669270	0.1336
RCENGOV	0.330399	0.246143	1.342305	0.2163
RCENGOV(-1)	-0.734670	0.319122	-2.302162	0.0503
RCENGOV(-2)	0.216562	0.206789	1.047259	0.3256
RCENGOV(-3)	1.149947	0.239914	4.793165	0.0014
CIE	6.847515	1.790206	3.824987	0.0051
CIE(-1)	11.35091	1.580244	7.183013	0.0001
CIE(-2)	-9.566135	1.340340	-7.137094	0.0001
CIESQ	-0.204457	0.060538	-3.377332	0.0097
CIESQ(-1)	-0.335832	0.051184	-6.561329	0.0002
CIESQ(-2)	0.254582	0.042049	6.054406	0.0003
C	232.5146	31.79880	7.312056	0.0001
@TREND	-2.774239	0.336339	-8.248334	0.0000

R-squared	0.993424	Mean dependent var	4.305062
Adjusted R-squared	0.967942	S.D. dependent var	4.331519
S.E. of regression	0.775552	Akaike info criterion	2.320078
Sum squared resid	4.811846	Schwarz criterion	3.671182
Log likelihood	-14.40157	Hannan-Quinn criter.	2.808595
F-statistic	38.98488	Durbin-Watson stat	2.372158
Prob(F-statistic)	0.000006		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 3, 3, 2, 3, 3, 3, 2, 2)
Case 5: Unrestricted Constant and Unrestricted Trend
Date: 04/16/19 Time: 00:54
Sample: 1974 2016
Included observations: 40

Conditional Error Correction Regression

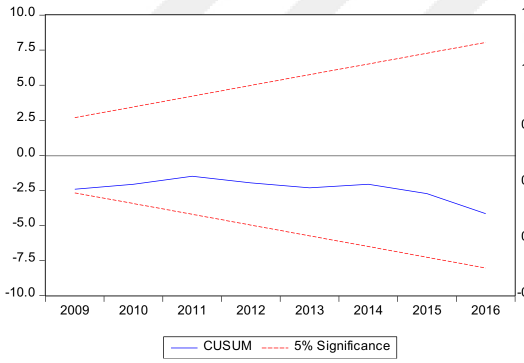
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	232.5146	33.35766	6.970352	0.0001
@TREND	-2.774239	0.396860	-6.990471	0.0001
GROWTH(-1)*	-1.287463	0.070154	-18.35205	0.0000
INFCPI(-1)	0.007889	0.026505	0.297644	0.7736
DCPS(-1)	0.964767	0.145766	6.618578	0.0002
FDI_INFL_(-1)	-11.35847	1.107593	-10.25509	0.0000
EMP(-1)	-4.739282	0.609047	-7.781474	0.0001
DUMMY(-1)	-6.396903	2.182037	-2.931619	0.0190
RCENGOV(-1)	0.962237	0.173643	5.541456	0.0005
CIE(-1)	8.632289	2.963663	2.912709	0.0195
CIESQ(-1)	-0.285708	0.107178	-2.665724	0.0286
D(INFCPI)	0.034004	0.019624	1.732804	0.1214
D(INFCPI(-1))	0.099071	0.022876	4.330742	0.0025
D(INFCPI(-2))	0.092655	0.019898	4.656473	0.0016
D(DCPS)	0.853178	0.101538	8.402573	0.0000
D(DCPS(-1))	-0.419844	0.149897	-2.800891	0.0232
D(DCPS(-2))	0.240438	0.108756	2.210795	0.0580
D(FDI_INFL_)	-3.241643	0.752434	-4.308206	0.0026
D(FDI_INFL_(-1))	5.546656	0.605314	9.163271	0.0000
D(EMP)	-1.746495	0.258068	-6.767579	0.0001
D(EMP(-1))	2.090495	0.291598	7.169105	0.0001
D(EMP(-2))	0.291033	0.248912	1.169219	0.2760
D(DUMMY)	-6.765386	0.968033	-6.988798	0.0001
D(DUMMY(-1))	-2.306682	1.515596	-1.521963	0.1665
D(DUMMY(-2))	1.993971	1.118479	1.782752	0.1125
D(RCENGOV)	0.330399	0.233552	1.414670	0.1949
D(RCENGOV(-1))	-1.366509	0.258981	-5.276480	0.0007
D(RCENGOV(-2))	-1.149947	0.214406	-5.363411	0.0007
D(CIE)	6.847515	2.208027	3.101191	0.0146
D(CIE(-1))	9.566135	1.640102	5.832647	0.0004
D(CIESQ)	-0.204457	0.072286	-2.828459	0.0222
D(CIESQ(-1))	-0.254582	0.056235	-4.527143	0.0019

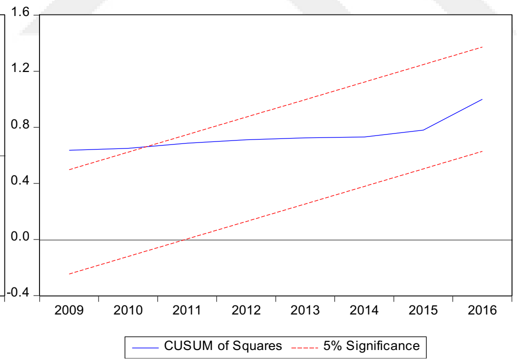
* p-value incompatible with t-Bounds distribution.

Levels Equation Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	0.006128	0.022524	0.272057	0.7925
DCPS	0.749355	0.108279	6.920568	0.0001
FDI_INFL_	-8.822367	1.339619	-6.585731	0.0002
EMP	-3.681101	0.481314	-7.648018	0.0001
DUMMY	-4.968611	1.006131	-4.938333	0.0011
RCENGOV	0.747390	0.137063	5.452895	0.0006
CIE	6.704883	1.935684	3.463831	0.0085
CIESQ	-0.221915	0.070494	-3.148014	0.0136

EC = GROWTH - (0.0061*INFCPI + 0.7494*DCPS -8.8224*FDI_INFL_
-3.6811*EMP -4.9686*DUMMY + 0.7474*RCENGOV + 6.7049*CIE
-0.2219*CIESQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	52.52113	10%	2.26	3.34
k	8	5%	2.55	3.68
		2.5%	2.82	4.02
		1%	3.15	4.43





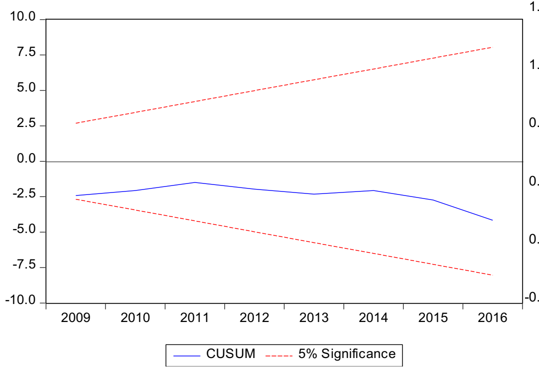
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 3, 3, 2, 3, 3, 3, 2, 2)
Case 5: Unrestricted Constant and Unrestricted Trend
Date: 04/16/19 Time: 00:55
Sample: 1974 2016
Included observations: 40

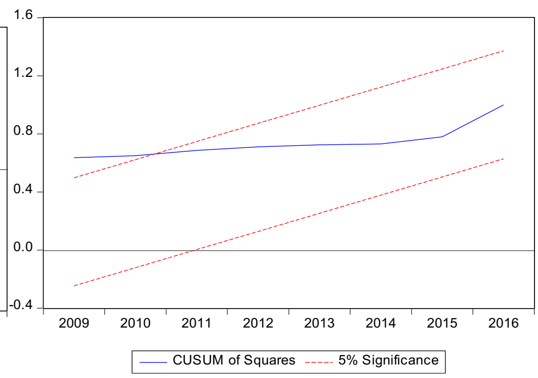
ECM Regression
Case 5: Unrestricted Constant and Unrestricted Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	232.5146	7.650959	30.39026	0.0000
@TREND	-2.774239	0.093501	-29.67081	0.0000
D(INFCPI)	0.034004	0.010662	3.189340	0.0128
D(INFCPI(-1))	0.099071	0.009251	10.70964	0.0000
D(INFCPI(-2))	0.092655	0.010633	8.714083	0.0000
D(DCPS)	0.853178	0.049525	17.22726	0.0000
D(DCPS(-1))	-0.419844	0.053431	-7.857740	0.0000
D(DCPS(-2))	0.240438	0.051029	4.711801	0.0015
D(FDI_INFL_)	-3.241643	0.284758	-11.38385	0.0000
D(FDI_INFL_(-1))	5.546656	0.319154	17.37927	0.0000
D(EMP)	-1.746495	0.119710	-14.58937	0.0000
D(EMP(-1))	2.090495	0.125406	16.66985	0.0000
D(EMP(-2))	0.291033	0.136156	2.137503	0.0650
D(DUMMY)	-6.765386	0.418523	-16.16492	0.0000
D(DUMMY(-1))	-2.306682	0.514555	-4.482867	0.0020
D(DUMMY(-2))	1.993971	0.445137	4.479452	0.0021
D(RCENGOV)	0.330399	0.121019	2.730147	0.0258
D(RCENGOV(-1))	-1.366509	0.102583	-13.32100	0.0000
D(RCENGOV(-2))	-1.149947	0.092086	-12.48775	0.0000
D(CIE)	6.847515	0.786974	8.701070	0.0000
D(CIE(-1))	9.566135	0.796977	12.00303	0.0000
D(CIESQ)	-0.204457	0.026155	-7.817057	0.0001
D(CIESQ(-1))	-0.254582	0.027187	-9.363949	0.0000
CointEq(-1)*	-1.287463	0.041873	-30.74704	0.0000

R-squared	0.996842	Mean dependent var	-0.181936
Adjusted R-squared	0.992301	S.D. dependent var	6.250129
S.E. of regression	0.548398	Akaike info criterion	1.920078
Sum squared resid	4.811846	Schwarz criterion	2.933406
Log likelihood	-14.40157	Hannan-Quinn criter.	2.286466
F-statistic	219.5579	Durbin-Watson stat	2.372158
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.





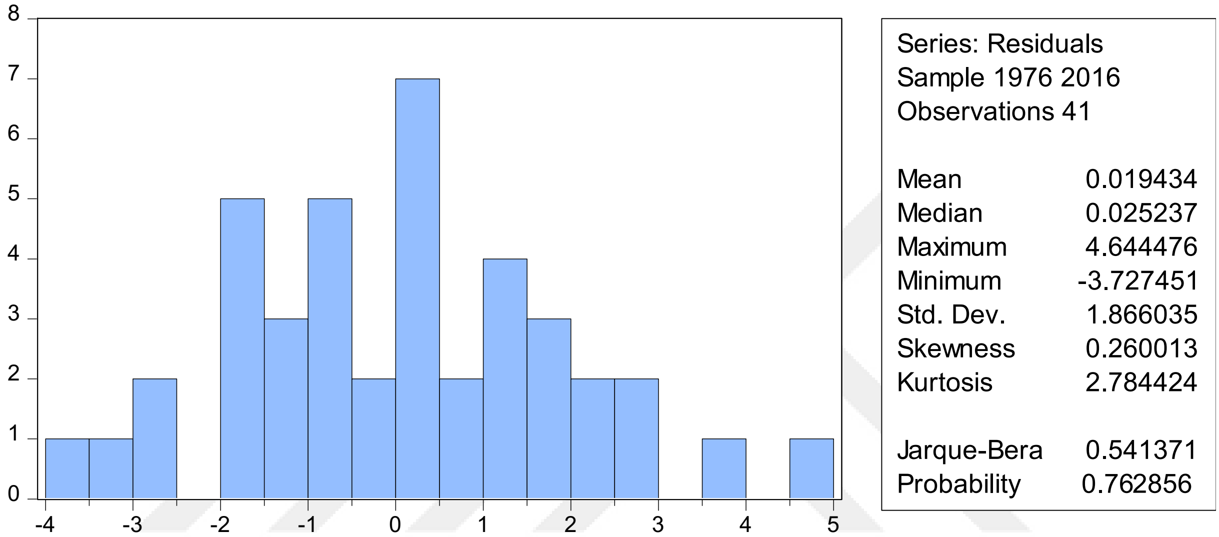
Model 9

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	4.081366	Prob. F(2,21)	0.0318
Obs*R-squared	11.47602	Prob. Chi-Square(2)	0.0032

Heteroskedasticity Test: White

F-statistic	0.901066	Prob. F(18,22)	0.5845
Obs*R-squared	17.39929	Prob. Chi-Square(18)	0.4958
Scaled explained SS	4.915405	Prob. Chi-Square(18)	0.9990



Dependent Variable: GROWTH
Method: ARDL
Date: 04/27/19 Time: 00:31
Sample (adjusted): 1976 2016
Included observations: 41 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY ECENGOVROBUST RCENGOV RCENGOVSQ
Fixed regressors:
Number of models evaluated: 13122
Selected Model: ARDL(2, 0, 2, 2, 2, 2, 0, 0, 0)
Note: final equation sample is larger than selection sample
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.214058	0.211234	-1.013368	0.3214
GROWTH(-2)	-0.289164	0.154052	-1.877048	0.0733
INFCPI	-0.032858	0.034976	-0.939424	0.3573
DCPS	0.722841	0.177714	4.067443	0.0005
DCPS(-1)	-0.294943	0.199196	-1.480669	0.1523
DCPS(-2)	-0.511500	0.183306	-2.790420	0.0104
FDI_INFL_	0.091429	0.740969	0.123391	0.9029
FDI_INFL_(-1)	-0.500862	0.795611	-0.629532	0.5352
FDI_INFL_(-2)	-3.798572	0.978622	-3.881551	0.0008
EMP	0.507231	0.518952	0.977415	0.3385
EMP(-1)	-0.110595	0.752592	-0.146953	0.8845
EMP(-2)	-0.609517	0.477904	-1.275396	0.2149
DUMMY	-7.778518	1.734050	-4.485751	0.0002
DUMMY(-1)	-4.948414	2.289837	-2.161033	0.0413
DUMMY(-2)	-7.340176	2.244877	-3.269745	0.0034
ECENGOVROBUST	0.789001	0.300227	2.628011	0.0150
RCENGOV	2.370904	1.263571	1.876352	0.0734
RCENGOVSQ	-0.095897	0.046548	-2.060160	0.0509

R-squared	0.818785	Mean dependent var	4.455213
Adjusted R-squared	0.684844	S.D. dependent var	4.383762
S.E. of regression	2.460991	Akaike info criterion	4.938976
Sum squared resid	139.2990	Schwarz criterion	5.691276
Log likelihood	-83.24901	Hannan-Quinn criter.	5.212922
Durbin-Watson stat	2.427164		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(2, 0, 2, 2, 2, 2, 0, 0, 0)
Case 1: No Constant and No Trend
Date: 04/27/19 Time: 00:31
Sample: 1974 2016
Included observations: 41

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH(-1)*	-1.503221	0.312795	-4.805772	0.0001
INFCPI**	-0.032858	0.029562	-1.111479	0.2778
DCPS(-1)	-0.083602	0.046376	-1.802690	0.0846
FDI_INFL_(-1)	-4.208006	1.187658	-3.543113	0.0017
EMP(-1)	-0.212881	0.133668	-1.592620	0.1249
DUMMY(-1)	-20.06711	5.561005	-3.608540	0.0015
ECENGOVROBUST**	0.789001	0.262049	3.010890	0.0062
RCENGOV**	2.370904	1.309865	1.810036	0.0834
RCENGOVSQ**	-0.095897	0.044455	-2.157168	0.0417
D(GROWTH(-1))	0.289164	0.200397	1.442953	0.1625
D(DCPS)	0.722841	0.180867	3.996520	0.0006
D(DCPS(-1))	0.511500	0.200093	2.556306	0.0176
D(FDI_INFL_)	0.091429	1.009643	0.090556	0.9286
D(FDI_INFL_(-1))	3.798572	1.205513	3.151001	0.0045
D(EMP)	0.507231	0.500007	1.014448	0.3209
D(EMP(-1))	0.609517	0.445187	1.369128	0.1842
D(DUMMY)	-7.778518	1.820679	-4.272317	0.0003
D(DUMMY(-1))	7.340176	2.815962	2.606632	0.0158

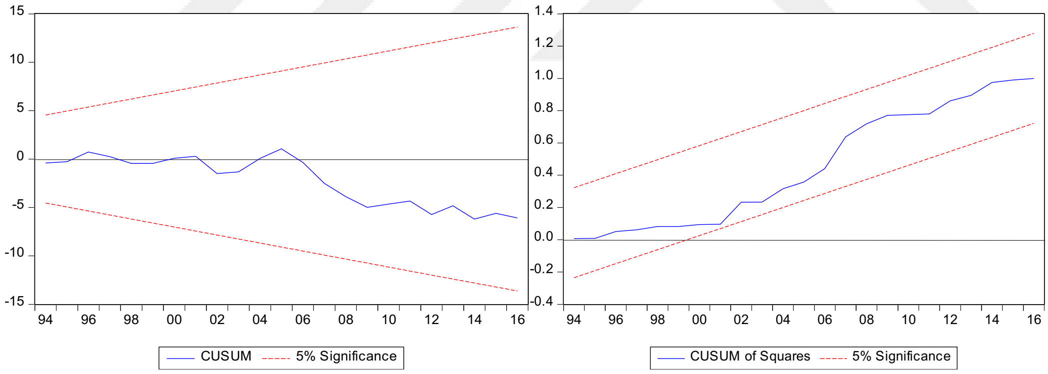
* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation Case 1: No Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.021858	0.023450	-0.932129	0.3610
DCPS	-0.055615	0.019937	-2.789487	0.0104
FDI_INFL_	-2.799326	0.719331	-3.891567	0.0007
EMP	-0.141617	0.089182	-1.587949	0.1260
DUMMY	-13.34940	1.060582	-12.58686	0.0000
ECENGOVROBUST	0.524873	0.226053	2.321907	0.0294
RCENGOV	1.577215	0.838183	1.881708	0.0726
RCENGOVSQ	-0.063794	0.031795	-2.006398	0.0567

EC = GROWTH - (-0.0219*INFCPI -0.0556*DCPS -2.7993*FDI_INFL_
-0.1416*EMP -13.3494*DUMMY + 0.5249*ECENGOVROBUST + 1.5772
*RCENGOV -0.0638*RCENGOVSQ)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	4.591271	10%	1.66	2.79
k	8	5%	1.91	3.11
		2.5%	2.15	3.4
		1%	2.45	3.79



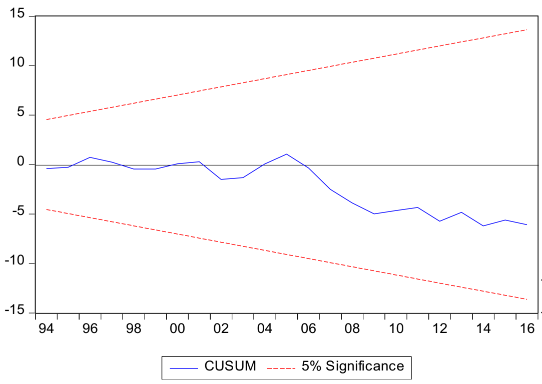
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(2, 0, 2, 2, 2, 2, 0, 0, 0)
Case 1: No Constant and No Trend
Date: 04/27/19 Time: 00:33
Sample: 1974 2016
Included observations: 41

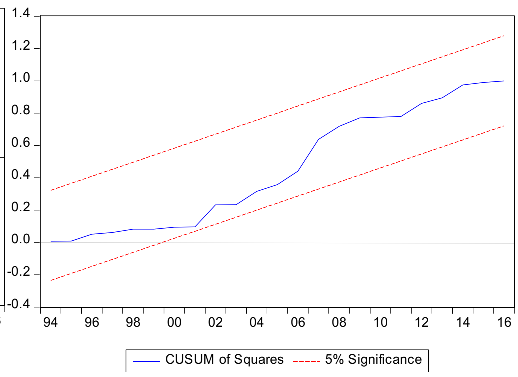
ECM Regression
Case 1: No Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GROWTH(-1))	0.289164	0.136847	2.113049	0.0457
D(DCPS)	0.722841	0.125251	5.771116	0.0000
D(DCPS(-1))	0.511500	0.152580	3.352331	0.0028
D(FDI_INFL_)	0.091429	0.680127	0.134429	0.8942
D(FDI_INFL_(-1))	3.798572	0.955017	3.977491	0.0006
D(EMP)	0.507231	0.351090	1.444732	0.1620
D(EMP(-1))	0.609517	0.324979	1.875559	0.0735
D(DUMMY)	-7.778518	1.009600	-7.704553	0.0000
D(DUMMY(-1))	7.340176	1.909314	3.844405	0.0008
CointEq(-1)*	-1.503221	0.201427	-7.462849	0.0000

R-squared	0.909266	Mean dependent var	-0.097324
Adjusted R-squared	0.882924	S.D. dependent var	6.195243
S.E. of regression	2.119791	Akaike info criterion	4.548732
Sum squared resid	139.2990	Schwarz criterion	4.966677
Log likelihood	-83.24901	Hannan-Quinn criter.	4.700925
Durbin-Watson stat	2.427164		

* p-value incompatible with t-Bounds distribution.





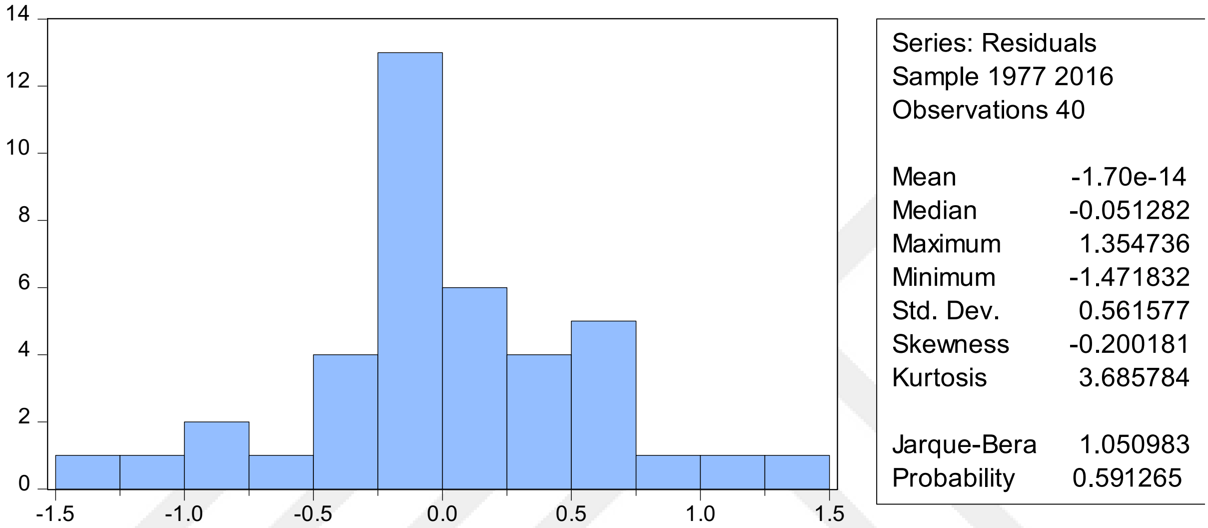
Model 10

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.694094	Prob. F(3,3)	0.3378
Obs*R-squared	25.15271	Prob. Chi-Square(3)	0.0000

Heteroskedasticity Test: White

F-statistic	0.744052	Prob. F(33,6)	0.7340
Obs*R-squared	32.14498	Prob. Chi-Square(33)	0.5095
Scaled explained SS	0.971263	Prob. Chi-Square(33)	1.0000



Dependent Variable: GROWTH
Method: ARDL
Date: 04/16/19 Time: 01:01
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY ECENGOV RNONT RNONTSQ
Fixed regressors: C
Number of models evaluluated: 196608
Selected Model: ARDL(3, 2, 3, 3, 2, 3, 3, 3, 3)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.882470	0.210950	-4.183311	0.0058
GROWTH(-2)	-1.041728	0.144754	-7.196521	0.0004
GROWTH(-3)	0.345802	0.319612	1.081943	0.3208
INFCPI	0.122136	0.043995	2.776128	0.0322
INFCPI(-1)	-0.106567	0.041579	-2.563029	0.0427
INFCPI(-2)	0.036068	0.027365	1.318046	0.2356
DCPS	0.938599	0.305481	3.072524	0.0219
DCPS(-1)	-0.372020	0.581768	-0.639464	0.5461
DCPS(-2)	-0.086083	0.433840	-0.198422	0.8493
DCPS(-3)	-0.983318	0.136210	-7.219152	0.0004
FDI_INFL_	4.310872	2.201542	1.958115	0.0980
FDI_INFL_(-1)	2.097935	1.456310	1.440583	0.1998
FDI_INFL_(-2)	-10.81473	2.770748	-3.903180	0.0080
FDI_INFL_(-3)	-3.462052	2.513591	-1.377333	0.2176
EMP	0.869129	0.298510	2.911561	0.0269
EMP(-1)	0.696417	0.881597	0.789949	0.4596
EMP(-2)	-1.059433	0.707133	-1.498209	0.1847
DUMMY	-9.327814	3.005125	-3.103969	0.0210
DUMMY(-1)	-13.92084	3.133229	-4.442968	0.0044
DUMMY(-2)	-24.62320	2.864954	-8.594623	0.0001
DUMMY(-3)	-11.78140	3.922624	-3.003449	0.0239
ECENGOV	0.720572	0.407947	1.766338	0.1278
ECENGOV(-1)	0.631483	0.239860	2.632709	0.0389
ECENGOV(-2)	1.873876	0.728121	2.573577	0.0421
ECENGOV(-3)	0.606946	0.663372	0.914941	0.3955
RNONT	-5.322668	2.814809	-1.890952	0.1075
RNONT(-1)	-5.133996	1.760214	-2.916689	0.0267
RNONT(-2)	2.443813	1.880518	1.299543	0.2415
RNONT(-3)	6.939381	3.992843	1.737955	0.1329
RNONTSQ	-0.609322	0.338954	-1.797657	0.1223
RNONTSQ(-1)	-0.386270	0.202208	-1.910256	0.1047
RNONTSQ(-2)	-1.096729	0.332049	-3.302913	0.0163
RNONTSQ(-3)	-1.002888	0.767801	-1.306183	0.2393
C	-55.89915	19.48553	-2.868751	0.0285

R-squared	0.983191	Mean dependent var	4.305062
Adjusted R-squared	0.890742	S.D. dependent var	4.331519
S.E. of regression	1.431746	Akaike info criterion	3.358546
Sum squared resid	12.29938	Schwarz criterion	4.794094
Log likelihood	-33.17092	Hannan-Quinn criter.	3.877595
F-statistic	10.63499	Durbin-Watson stat	2.821065
Prob(F-statistic)	0.003478		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 2, 3, 3, 2, 3, 3, 3, 3)
Case 3: Unrestricted Constant and No Trend
Date: 04/16/19 Time: 01:05
Sample: 1974 2016
Included observations: 40

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-55.89915	38.58733	-1.448640	0.1976
GROWTH(-1)*	-2.578396	0.420886	-6.126115	0.0009
INFCPI(-1)	0.051637	0.059789	0.863654	0.4210
DCPS(-1)	-0.502822	0.147734	-3.403570	0.0144
FDI_INFL_(-1)	-7.867975	2.504143	-3.141983	0.0200
EMP(-1)	0.506114	0.394570	1.282697	0.2469
DUMMY(-1)	-59.65325	11.21582	-5.318668	0.0018
ECENGOV(-1)	3.832877	1.062006	3.609090	0.0112
RNONT(-1)	-1.073470	5.661418	-0.189612	0.8559
RNONTSQ(-1)	-3.095209	1.659804	-1.864804	0.1115
D(GROWTH(-1))	0.695926	0.354541	1.962893	0.0973
D(GROWTH(-2))	-0.345802	0.367857	-0.940044	0.3835
D(INFCPI)	0.122136	0.080256	1.521827	0.1789
D(INFCPI(-1))	-0.036068	0.032227	-1.119182	0.3059
D(DCPS)	0.938599	0.249242	3.765810	0.0093
D(DCPS(-1))	1.069401	0.282061	3.791379	0.0091
D(DCPS(-2))	0.983318	0.237256	4.144543	0.0060
D(FDI_INFL_)	4.310872	2.923719	1.474448	0.1908
D(FDI_INFL_(-1))	14.27678	2.584284	5.524463	0.0015
D(FDI_INFL_(-2))	3.462052	2.005185	1.726550	0.1350
D(EMP)	0.869129	0.512823	1.694793	0.1410
D(EMP(-1))	1.059433	0.471988	2.244616	0.0659
D(DUMMY)	-9.327814	2.274761	-4.100569	0.0064
D(DUMMY(-1))	36.40460	7.249445	5.021708	0.0024
D(DUMMY(-2))	11.78140	3.246574	3.628872	0.0110
D(ECENGOV)	0.720572	0.436089	1.652349	0.1496
D(ECENGOV(-1))	-2.480822	0.719872	-3.446199	0.0137
D(ECENGOV(-2))	-0.606946	0.466616	-1.300741	0.2411
D(RNONT)	-5.322668	4.523788	-1.176595	0.2839
D(RNONT(-1))	-9.383194	7.742930	-1.211840	0.2711
D(RNONT(-2))	-6.939381	5.164380	-1.343701	0.2276
D(RNONTSQ)	-0.609322	0.476571	-1.278556	0.2483
D(RNONTSQ(-1))	2.099617	1.475361	1.423120	0.2046
D(RNONTSQ(-2))	1.002888	0.861912	1.163561	0.2888

* p-value incompatible with t-Bounds distribution.

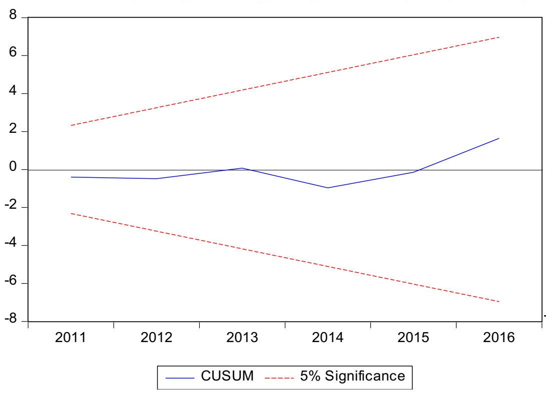
Levels Equation
Case 3: Unrestricted Constant and No Trend

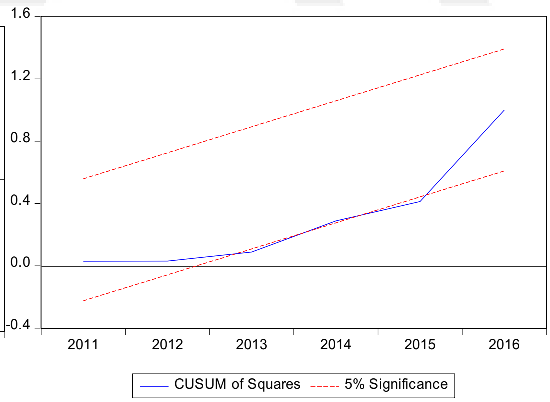
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	0.020027	0.015928	1.257357	0.2553
DCPS	-0.195013	0.052111	-3.742236	0.0096
FDI_INFL_	-3.051500	0.731698	-4.170434	0.0059
EMP	0.196290	0.105232	1.865305	0.1114
DUMMY	-23.13580	3.180722	-7.273757	0.0003
ECENGOV	1.486535	0.350087	4.246185	0.0054
RNONT	-0.416333	2.011789	-0.206946	0.8429
RNONTSQ	-1.200439	0.569828	-2.106670	0.0797

EC = GROWTH - (0.0200*INFCPI -0.1950*DCPS -3.0515*FDI_INFL_ +
0.1963*EMP -23.1358*DUMMY + 1.4865*ECENGOV -0.4163*RNONT
-1.2004*RNONTSQ)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	9.389636	10%	1.95	3.06
k	8	5%	2.22	3.39
		2.5%	2.48	3.7
		1%	2.79	4.1





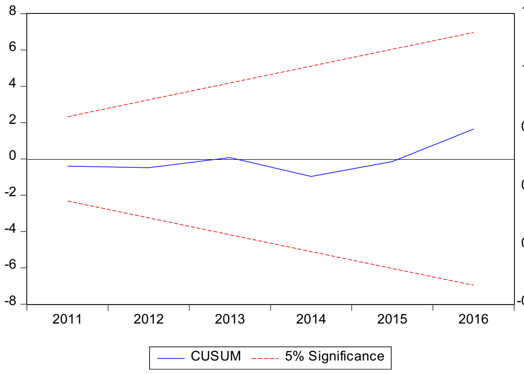
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 2, 3, 3, 2, 3, 3, 3, 3)
Case 3: Unrestricted Constant and No Trend
Date: 04/16/19 Time: 01:06
Sample: 1974 2016
Included observations: 40

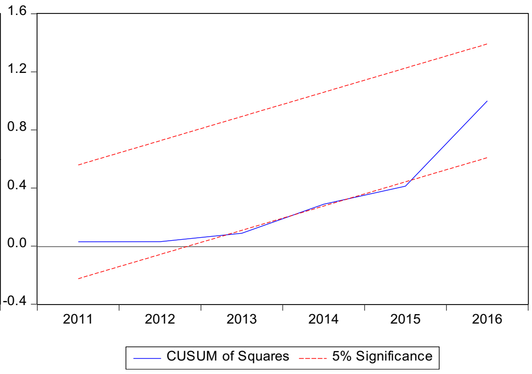
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-55.89915	3.936925	-14.19868	0.0000
D(GROWTH(-1))	0.695926	0.128072	5.433876	0.0016
D(GROWTH(-2))	-0.345802	0.073263	-4.720029	0.0033
D(INFCPI)	0.122136	0.015579	7.839783	0.0002
D(INFCPI(-1))	-0.036068	0.013297	-2.712446	0.0350
D(DCPS)	0.938599	0.093466	10.04214	0.0001
D(DCPS(-1))	1.069401	0.122848	8.705060	0.0001
D(DCPS(-2))	0.983318	0.113653	8.651913	0.0001
D(FDI_INFL_)	4.310872	0.650490	6.627117	0.0006
D(FDI_INFL_(-1))	14.27678	1.153831	12.37337	0.0000
D(FDI_INFL_(-2))	3.462052	0.748393	4.625981	0.0036
D(EMP)	0.869129	0.224106	3.878199	0.0082
D(EMP(-1))	1.059433	0.230071	4.604818	0.0037
D(DUMMY)	-9.327814	0.667559	-13.97302	0.0000
D(DUMMY(-1))	36.40460	3.267128	11.14269	0.0000
D(DUMMY(-2))	11.78140	1.633940	7.210423	0.0004
D(ECENGOV)	0.720572	0.109576	6.575970	0.0006
D(ECENGOV(-1))	-2.480822	0.232417	-10.67403	0.0000
D(ECENGOV(-2))	-0.606946	0.188946	-3.212281	0.0183
D(RNONT)	-5.322668	1.240792	-4.289736	0.0052
D(RNONT(-1))	-9.383194	1.350834	-6.946221	0.0004
D(RNONT(-2))	-6.939381	1.124634	-6.170346	0.0008
D(RNONTSQ)	-0.609322	0.220437	-2.764158	0.0327
D(RNONTSQ(-1))	2.099617	0.242105	8.672346	0.0001
D(RNONTSQ(-2))	1.002888	0.183766	5.457419	0.0016
CointEq(-1)*	-2.578396	0.183618	-14.04216	0.0000

R-squared	0.991927	Mean dependent var	-0.181936
Adjusted R-squared	0.977511	S.D. dependent var	6.250129
S.E. of regression	0.937298	Akaike info criterion	2.958546
Sum squared resid	12.29938	Schwarz criterion	4.056318
Log likelihood	-33.17092	Hannan-Quinn criter.	3.355466
F-statistic	68.80614	Durbin-Watson stat	2.821065
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.





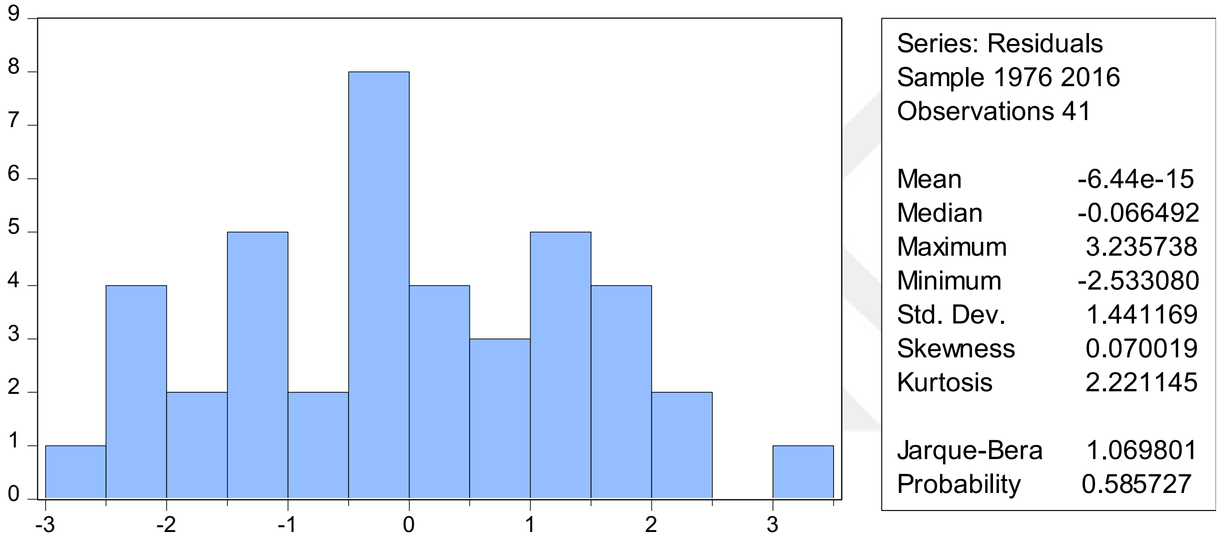
Model 11

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.046783	Prob. F(2,20)	0.3695
Obs*R-squared	3.885121	Prob. Chi-Square(2)	0.1433

Heteroskedasticity Test: White

F-statistic	0.886955	Prob. F(18,22)	0.5979
Obs*R-squared	17.24139	Prob. Chi-Square(18)	0.5066
Scaled explained SS	3.031010	Prob. Chi-Square(18)	1.0000



Dependent Variable: GROWTH
Method: ARDL
Date: 04/16/19 Time: 01:11
Sample (adjusted): 1976 2016
Included observations: 41 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY ECENGOV TDIR RDIRTSQ
Fixed regressors: C
Number of models evalulated: 13122
Selected Model: ARDL(1, 2, 2, 2, 0, 0, 1, 1, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.392641	0.121965	-3.219285	0.0039
INFCPI	-0.075611	0.030994	-2.439553	0.0232
INFCPI(-1)	-0.016811	0.037225	-0.451606	0.6560
INFCPI(-2)	0.073114	0.035349	2.068357	0.0506
DCPS	0.278665	0.160135	1.740191	0.0958
DCPS(-1)	0.096936	0.228965	0.423365	0.6761
DCPS(-2)	-0.404984	0.161164	-2.512871	0.0198
FDI_INFL_	-0.258912	0.968488	-0.267337	0.7917
FDI_INFL_(-1)	0.233523	0.977667	0.238857	0.8134
FDI_INFL_(-2)	-2.911434	0.825741	-3.525842	0.0019
EMP	0.056184	0.169475	0.331519	0.7434
DUMMY	-6.004272	1.339001	-4.484142	0.0002
ECENGOV	-0.136476	0.175317	-0.778451	0.4446
ECENGOV(-1)	0.268200	0.180279	1.487694	0.1510
TDIR	2.104899	6.884218	0.305757	0.7627
TDIR(-1)	25.12973	7.133035	3.523007	0.0019
RDIRTSQ	-0.283222	0.624614	-0.453435	0.6547
RDIRTSQ(-1)	-2.439534	0.650095	-3.752579	0.0011
C	-61.74686	26.51477	-2.328772	0.0295

R-squared	0.891922	Mean dependent var	4.455213
Adjusted R-squared	0.803495	S.D. dependent var	4.383762
S.E. of regression	1.943271	Akaike info criterion	4.470922
Sum squared resid	83.07867	Schwarz criterion	5.265017
Log likelihood	-72.65391	Hannan-Quinn criter.	4.760088
F-statistic	10.08652	Durbin-Watson stat	2.263971
Prob(F-statistic)	0.000001		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 2, 2, 2, 0, 0, 1, 1, 1)
Case 3: Unrestricted Constant and No Trend
Date: 04/16/19 Time: 01:11
Sample: 1974 2016
Included observations: 41

Conditional Error Correction Regression

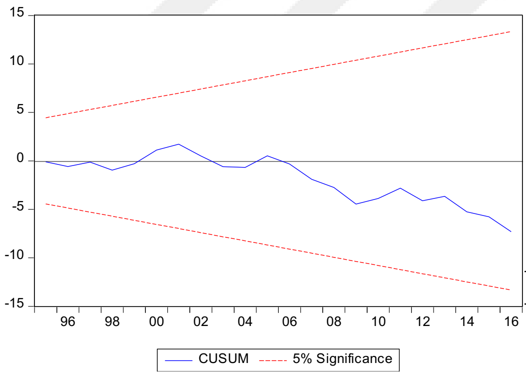
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-61.74686	26.51477	-2.328772	0.0295
GROWTH(-1)*	-1.392641	0.121965	-11.41834	0.0000
INFCPI(-1)	-0.019308	0.022754	-0.848563	0.4053
DCPS(-1)	-0.029383	0.031695	-0.927047	0.3640
FDI_INFL_(-1)	-2.936823	1.053881	-2.786675	0.0108
EMP**	0.056184	0.169475	0.331519	0.7434
DUMMY**	-6.004272	1.339001	-4.484142	0.0002
ECENGOV(-1)	0.131724	0.146496	0.899165	0.3783
TDIR(-1)	27.23463	9.022470	3.018533	0.0063
RDIRTSQ(-1)	-2.722756	0.829117	-3.283923	0.0034
D(INFCPI)	-0.075611	0.030994	-2.439553	0.0232
D(INFCPI(-1))	-0.073114	0.035349	-2.068357	0.0506
D(DCPS)	0.278665	0.160135	1.740191	0.0958
D(DCPS(-1))	0.404984	0.161164	2.512871	0.0198
D(FDI_INFL_)	-0.258912	0.968488	-0.267337	0.7917
D(FDI_INFL_(-1))	2.911434	0.825741	3.525842	0.0019
D(ECENGOV)	-0.136476	0.175317	-0.778451	0.4446
D(TDIR)	2.104899	6.884218	0.305757	0.7627
D(RDIRTSQ)	-0.283222	0.624614	-0.453435	0.6547

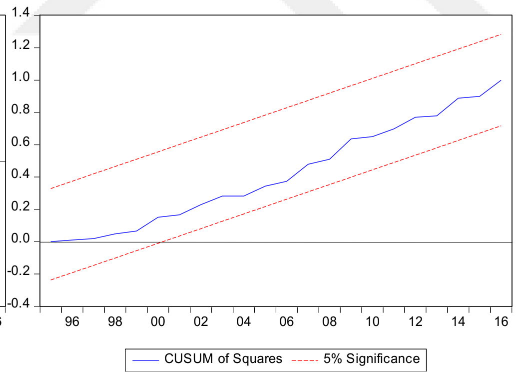
* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.013865	0.016187	-0.856544	0.4009
DCPS	-0.021099	0.022966	-0.918699	0.3682
FDI_INFL_	-2.108816	0.799864	-2.636466	0.0151
EMP	0.040344	0.121189	0.332899	0.7424
DUMMY	-4.311428	1.082107	-3.984289	0.0006
ECENGOV	0.094586	0.105687	0.894963	0.3805
TDIR	19.55610	6.382492	3.064023	0.0057
RDIRTSQ	-1.955103	0.581467	-3.362361	0.0028

EC = GROWTH - (-0.0139*INFCPI -0.0211*DCPS -2.1088*FDI_INFL_ +
0.0403*EMP -4.3114*DUMMY + 0.0946*ECENGOV + 19.5561*TDIR
-1.9551*RDIRTSQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	25.70333	10%	1.95	3.06
k	8	5%	2.22	3.39
		2.5%	2.48	3.7
		1%	2.79	4.1





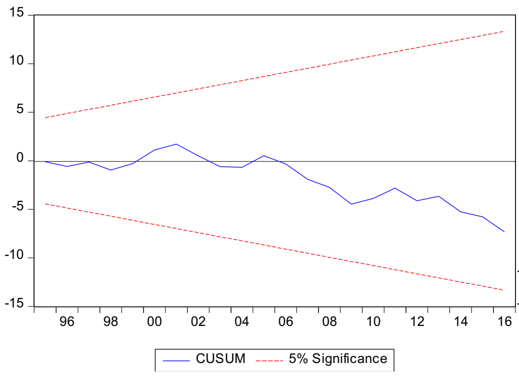
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(1, 2, 2, 2, 0, 0, 1, 1, 1)
Case 3: Unrestricted Constant and No Trend
Date: 04/16/19 Time: 01:12
Sample: 1974 2016
Included observations: 41

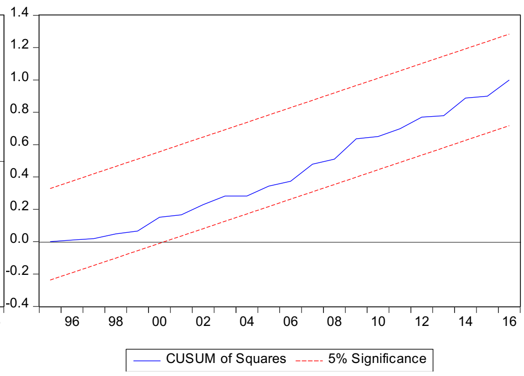
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-61.74686	3.462439	-17.83335	0.0000
D(INFCPI)	-0.075611	0.018703	-4.042795	0.0005
D(INFCPI(-1))	-0.073114	0.021539	-3.394401	0.0026
D(DCPS)	0.278665	0.100708	2.767058	0.0112
D(DCPS(-1))	0.404984	0.102374	3.955935	0.0007
D(FDI_INFL_)	-0.258912	0.539392	-0.480008	0.6360
D(FDI_INFL_(-1))	2.911434	0.548299	5.309936	0.0000
D(ECENGOV)	-0.136476	0.128790	-1.059680	0.3008
D(TDIR)	2.104899	4.359222	0.482861	0.6340
D(RDIRTSQ)	-0.283222	0.392838	-0.720964	0.4785
CointEq(-1)*	-1.392641	0.078410	-17.76091	0.0000

R-squared	0.945886	Mean dependent var	-0.097324
Adjusted R-squared	0.927847	S.D. dependent var	6.195243
S.E. of regression	1.664118	Akaike info criterion	4.080678
Sum squared resid	83.07867	Schwarz criterion	4.540417
Log likelihood	-72.65391	Hannan-Quinn criter.	4.248090
F-statistic	52.43811	Durbin-Watson stat	2.263971
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.





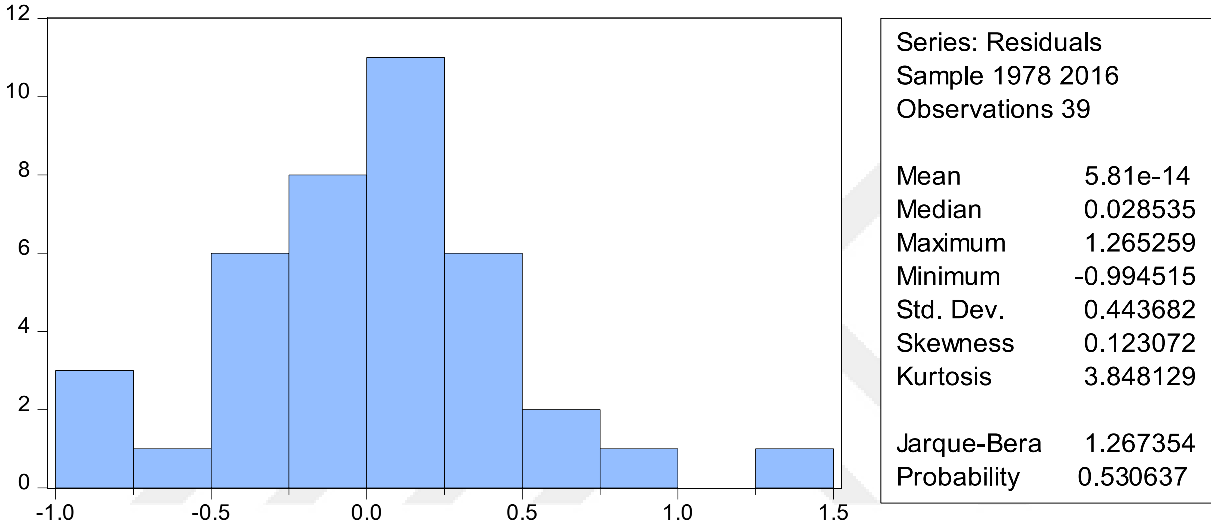
Model 12

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	47.34392	Prob. F(3,2)	0.0208
Obs*R-squared	38.45845	Prob. Chi-Square(3)	0.0000

Heteroskedasticity Test: White

F-statistic	0.676904	Prob. F(33,5)	0.7762
Obs*R-squared	31.86703	Prob. Chi-Square(33)	0.5234
Scaled explained SS	0.745902	Prob. Chi-Square(33)	1.0000



Dependent Variable: GROWTH
Method: ARDL
Date: 04/27/19 Time: 00:58
Sample (adjusted): 1978 2016
Included observations: 39 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): INFCPI DCPS FDI_INFL_ EMP DUMMY ECENGOVROBUST TIND RINDTSQ
Fixed regressors: C
Number of models evalulated: 196608
Selected Model: ARDL(3, 2, 3, 2, 3, 3, 3, 3, 3)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.548490	0.303569	-1.806806	0.1306
GROWTH(-2)	-0.856532	0.323674	-2.646279	0.0456
GROWTH(-3)	-0.430135	0.308270	-1.395321	0.2217
INFCPI	0.068523	0.027815	2.463531	0.0570
INFCPI(-1)	-0.025196	0.028008	-0.899598	0.4096
INFCPI(-2)	-0.244107	0.086992	-2.806093	0.0377
DCPS	1.977035	0.359642	5.497226	0.0027
DCPS(-1)	-1.099224	0.584498	-1.880629	0.1188
DCPS(-2)	-0.952844	0.320722	-2.970930	0.0311
DCPS(-3)	0.293973	0.184619	1.592325	0.1722
FDI_INFL_	-10.69258	3.407558	-3.137902	0.0257
FDI_INFL_(-1)	2.594333	1.420787	1.825983	0.1274
FDI_INFL_(-2)	-5.985612	2.571189	-2.327955	0.0674
EMP	-0.923261	0.436051	-2.117320	0.0878
EMP(-1)	-1.278726	1.346096	-0.949951	0.3858
EMP(-2)	-2.073036	0.909708	-2.278793	0.0716
EMP(-3)	2.639535	0.594086	4.443015	0.0067
DUMMY	-11.68391	2.816610	-4.148219	0.0089
DUMMY(-1)	-14.77841	3.097668	-4.770816	0.0050
DUMMY(-2)	-5.783889	1.881868	-3.073482	0.0277
DUMMY(-3)	-14.54009	3.128864	-4.647084	0.0056
ECENGOVROBUST	0.071509	0.403092	0.177402	0.8662
ECENGOVROBUST(-1)	-1.625894	0.888817	-1.829279	0.1269
ECENGOVROBUST(-2)	0.269012	0.324135	0.829937	0.4444
ECENGOVROBUST(-3)	0.689268	0.267841	2.573424	0.0498
TIND	2.377236	2.575427	0.923045	0.3983
TIND(-1)	-4.318368	2.849595	-1.515432	0.1901
TIND(-2)	4.994134	4.035662	1.237500	0.2708
TIND(-3)	18.10923	4.023623	4.500728	0.0064
RINDTSQ	-0.166843	0.222374	-0.750280	0.4869
RINDTSQ(-1)	0.070439	0.165151	0.426515	0.6875
RINDTSQ(-2)	0.085233	0.174042	0.489726	0.6451
RINDTSQ(-3)	-1.329440	0.260301	-5.107327	0.0037
C	61.82574	26.23546	2.356572	0.0650

R-squared	0.989765	Mean dependent var	4.328100
Adjusted R-squared	0.922216	S.D. dependent var	4.385659
S.E. of regression	1.223148	Akaike info criterion	2.930198
Sum squared resid	7.480450	Schwarz criterion	4.380483
Log likelihood	-23.13886	Hannan-Quinn criter.	3.450548
F-statistic	14.65257	Durbin-Watson stat	2.806280
Prob(F-statistic)	0.003513		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 2, 3, 2, 3, 3, 3, 3, 3)
Case 3: Unrestricted Constant and No Trend
Date: 04/27/19 Time: 00:58
Sample: 1974 2016
Included observations: 39

Conditional Error Correction Regression

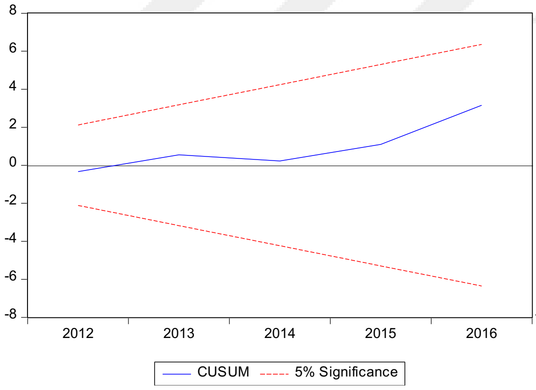
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	61.82574	35.40579	1.746204	0.1412
GROWTH(-1)*	-2.835157	1.038146	-2.730979	0.0412
INFCPI(-1)	-0.200779	0.092509	-2.170387	0.0821
DCPS(-1)	0.218940	0.185913	1.177650	0.2919
FDI_INFL_(-1)	-14.08386	7.705101	-1.827862	0.1271
EMP(-1)	-1.635488	0.598168	-2.734160	0.0411
DUMMY(-1)	-46.78630	7.997772	-5.849917	0.0021
ECENGOVROBUST(-1)	-0.596104	1.325892	-0.449587	0.6718
TIND(-1)	21.16223	8.467502	2.499230	0.0545
RINDTSQ(-1)	-1.340610	0.401560	-3.338503	0.0206
D(GROWTH(-1))	1.286667	0.743278	1.731071	0.1440
D(GROWTH(-2))	0.430135	0.325281	1.322348	0.2433
D(INFCPI)	0.068523	0.038222	1.792774	0.1330
D(INFCPI(-1))	0.244107	0.102682	2.377314	0.0634
D(DCPS)	1.977035	0.352545	5.607900	0.0025
D(DCPS(-1))	0.658871	0.287395	2.292559	0.0704
D(DCPS(-2))	-0.293973	0.228586	-1.286052	0.2548
D(FDI_INFL_)	-10.69258	4.414131	-2.422353	0.0599
D(FDI_INFL_(-1))	5.985612	3.033324	1.973284	0.1055
D(EMP)	-0.923261	0.419088	-2.203024	0.0788
D(EMP(-1))	-0.566499	0.866306	-0.653924	0.5420
D(EMP(-2))	-2.639535	0.912000	-2.894228	0.0340
D(DUMMY)	-11.68391	3.162545	-3.694466	0.0141
D(DUMMY(-1))	20.32398	3.575013	5.685010	0.0023
D(DUMMY(-2))	14.54009	3.407514	4.267068	0.0080
D(ECENGOVROBUST)	0.071509	0.508437	0.140646	0.8936
D(ECENGOVROBUST(-1))	-0.958280	0.350665	-2.732752	0.0411
D(ECENGOVROBUST(-2))	-0.689268	0.286871	-2.402710	0.0614
D(TIND)	2.377236	3.880813	0.612561	0.5670
D(TIND(-1))	-23.10337	6.458005	-3.577477	0.0159
D(TIND(-2))	-18.10923	4.434095	-4.084088	0.0095
D(RINDTSQ)	-0.166843	0.294705	-0.566133	0.5958
D(RINDTSQ(-1))	1.244207	0.300763	4.136839	0.0090
D(RINDTSQ(-2))	1.329440	0.260390	5.105563	0.0038

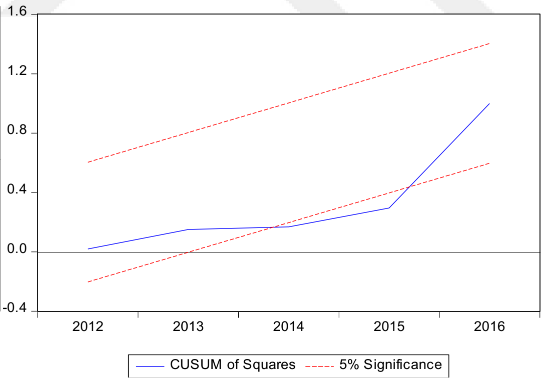
* p-value incompatible with t-Bounds distribution.

Levels Equation Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFCPI	-0.070818	0.012865	-5.504734	0.0027
DCPS	0.077223	0.073559	1.049812	0.3419
FDI_INFL_	-4.967578	0.611178	-8.127873	0.0005
EMP	-0.576860	0.117083	-4.926933	0.0044
DUMMY	-16.50219	3.094558	-5.332648	0.0031
ECENGOVROBUST	-0.210254	0.292667	-0.718409	0.5047
TIND	7.464220	1.140894	6.542430	0.0012
RINDTSQ	-0.472852	0.108935	-4.340681	0.0074

EC = GROWTH - (-0.0708*INFCPI + 0.0772*DCPS -4.9676*FDI_INFL_ -0.5769*EMP -16.5022*DUMMY -0.2103*ECENGOVROBUST + 7.4642 *TIND -0.4729*RINDTSQ)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	11.47772	10%	1.95	3.06
k	8	5%	2.22	3.39
		2.5%	2.48	3.7
		1%	2.79	4.1





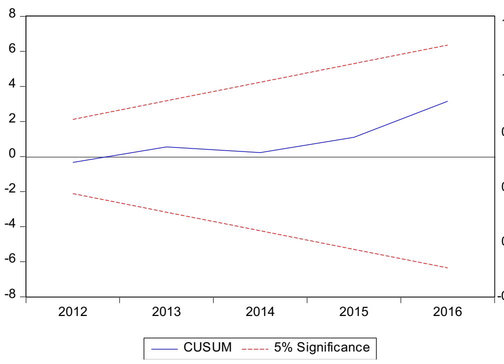
ARDL Error Correction Regression
Dependent Variable: D(GROWTH)
Selected Model: ARDL(3, 2, 3, 2, 3, 3, 3, 3, 3)
Case 3: Unrestricted Constant and No Trend
Date: 04/27/19 Time: 01:00
Sample: 1974 2016
Included observations: 39

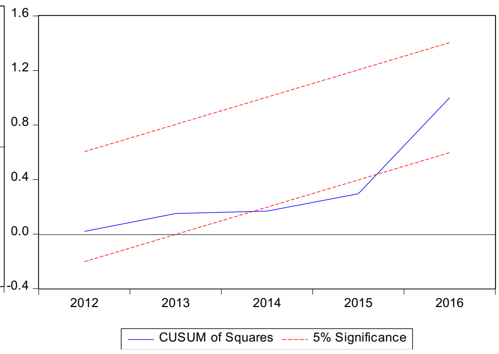
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	61.82574	3.899047	15.85663	0.0000
D(GROWTH(-1))	1.286667	0.120442	10.68284	0.0001
D(GROWTH(-2))	0.430135	0.067479	6.374317	0.0014
D(INFCPI)	0.068523	0.011787	5.813473	0.0021
D(INFCPI(-1))	0.244107	0.017768	13.73822	0.0000
D(DCPS)	1.977035	0.125503	15.75285	0.0000
D(DCPS(-1))	0.658871	0.080668	8.167693	0.0004
D(DCPS(-2))	-0.293973	0.085039	-3.456917	0.0181
D(FDI_INFL_)	-10.69258	0.772852	-13.83523	0.0000
D(FDI_INFL_(-1))	5.985612	0.637468	9.389670	0.0002
D(EMP)	-0.923261	0.170158	-5.425912	0.0029
D(EMP(-1))	-0.566499	0.216942	-2.611288	0.0476
D(EMP(-2))	-2.639535	0.184367	-14.31673	0.0000
D(DUMMY)	-11.68391	0.608703	-19.19478	0.0000
D(DUMMY(-1))	20.32398	1.707825	11.90051	0.0001
D(DUMMY(-2))	14.54009	1.309916	11.10002	0.0001
D(ECENGOVROBUST)	0.071509	0.125963	0.567699	0.5948
D(ECENGOVROBUST(-1))	-0.958280	0.125655	-7.626303	0.0006
D(ECENGOVROBUST(-2))	-0.689268	0.098544	-6.994507	0.0009
D(TIND)	2.377236	0.877534	2.708997	0.0423
D(TIND(-1))	-23.10337	1.635717	-14.12431	0.0000
D(TIND(-2))	-18.10923	1.186229	-15.26622	0.0000
D(RINDTSQ)	-0.166843	0.059769	-2.791457	0.0384
D(RINDTSQ(-1))	1.244207	0.088846	14.00401	0.0000
D(RINDTSQ(-2))	1.329440	0.079431	16.73708	0.0000
CointEq(-1)*	-2.835157	0.172998	-16.38837	0.0000

R-squared	0.994929	Mean dependent var	-0.005711
Adjusted R-squared	0.985176	S.D. dependent var	6.230347
S.E. of regression	0.758564	Akaike info criterion	2.519942
Sum squared resid	7.480450	Schwarz criterion	3.628983
Log likelihood	-23.13886	Hannan-Quinn criter.	2.917856
F-statistic	102.0177	Durbin-Watson stat	2.806280
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.





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[viii] Group I: Japan, US, Australia, Spain, Iceland, Greece, Portugal; Group II: Ireland, Canada, UK, Finland, Germany; Group III: Norway, Italy, Austria, France, The Netherlands, Belgium, Sweden.

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