

EFFECTS OF EXCHANGE RATE ON EXPORT PERFORMANCE:  
“A CASE STUDY OF TANZANIA”

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Approval of the Institute of Social Sciences

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## ABSTRACT

### EFFECTS OF EXCHANGE RATE ON EXPORT PERFORMANCE: “A CASE STUDY OF TANZANIA”

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This study analyses effects of exchange rate of Tanzanian shilling on the country's exports performance applying Vector Auto-Regressive (VAR) model covering the sample period from 1993Q1 to 2016Q4. The results show that; there is no long-run association between exchange rates and exports. Results of Granger Causality test shows that; exchange rate and foreign demand granger cause exports (each with unidirectional causality). The Impulse Response Function (IRF) shows that; a one-standard deviation positive shock to exchange rate (depreciation of local currency) increases the country's exports in nominal terms. And although the effect of shock is contemporaneous but it is not statistically significant at the 5% in the first four periods. Moreover, such effect of shocks is not permanent as it does not increase exports for all 10 periods. The same were observed when a one standard deviation positive shock to the foreign demand was applied. The variance decomposition shows that, the effects of exchange rates on Tanzania's exports are weak in the short run (less than 5%) but reaches 12.3% in the tenth period. And the variance brought by shocks in foreign demand remained weak (less than 5%) up to the tenth quarter. Hence, with these results, deliberate devaluation of shilling can do good towards boosting exports; this is in line with Marshall-Lerner Condition.

**Keywords:** *Exchange Rates, Exports, VAR, Granger Causality, IRF, Variance Decomposition.*

## ÖZET

### İHRACAT PERFORMANSI DÖVİZ KURUNUNUN ETKİSİ: "TANZANYA'NIN ÖRNEK BİR ARAŞTIRMASI"

OMAR, Haroub Hamad

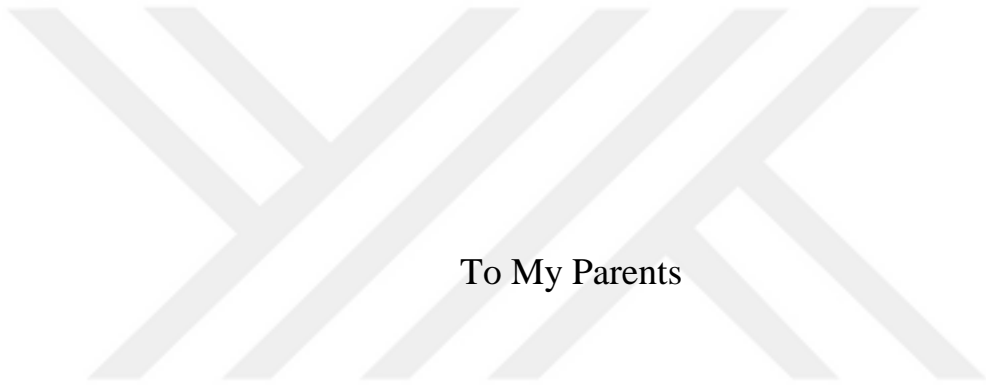
Yüksek Lisans, Bankacılık ve Finans Bölümü

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Bu çalışma, Tanzanya Şilininin, ülkenin ihracat performansına etkilerini 1993:01'den 2016:04'e kadar olan dönem için Vektör Otoregresif (VAR) modelini uygulayarak analiz etmektedir. Çalışmanın bulguları, döviz kurları ile ihracat arasında uzun dönemli bir ilişkinin bulunmadığını göstermektedir. Granger Nedensellik testinin sonuçları; döviz kuru ve dış talep değişkenleri ile ihracat değişkeni arasında tek yönlü nedensellik ilişkisi bulunduğunu göstermektedir. Etki tepki fonksiyonu (IRF), döviz kuru ve dış talebe verilen bir standart sapmalı şokun nominal ihracat üzerinde pozitif bir etkisi olduğunu göstermektedir. Şokun cari dönemde etkisi görülmekle birlikte bu etki istatistiksel olarak anlamlı değildir. Buna ek olarak, bu etki 10 dönem boyunca ihracatı artırmadığı için kalıcı değildir. Benzer sonuç, şok dış talebe verildiğinde de görülmektedir. Varyans ayrıştırması döviz kurunun Tanzanya'nın ihracatındaki etkisinin kısa vadede güçlü olmadığını göstermekte (%5'den az), 10. dönemde ise %12.3 olduğunu göstermektedir. Aynı şok yabancı talebe uygulandığında ise 10. döneme kadar etkinin zayıf kaldığı (%5'den az) görülmektedir. Tüm bu sonuçlar, şilinin değer kaybının ihracatı artırdığı ve Marshall-Lerner Şartı ile uyumlu olduğunu göstermektedir.

**Anahtar Kelimeler:** *Döviz Kurları, İhracat, VAR, Granger Nedensellik, IRF, Varyans Ayrıştırması.*



To My Parents

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## TABLE OF CONTENTS

<b>PLAGIARISM .....</b>	<b>iii</b>
<b>ABSTRACT .....</b>	<b>iv</b>
<b>ÖZET .....</b>	<b>v</b>
<b>DEDICATION .....</b>	<b>vi</b>
<b>ACKNOWLEDGEMENTS .....</b>	<b>vii</b>
<b>TABLE OF CONTENTS .....</b>	<b>viii</b>
<b>LIST OF TABLES.....</b>	<b>xi</b>
<b>LIST OF FIGURES.....</b>	<b>xii</b>
<b>LIST OF ABBREVIATIONS.....</b>	<b>xiii</b>

### CHAPTER 1

#### INTRODUCTION

1.1 Background of the Study .....	1
1.2 Foreign Exchange Market in Tanzania.....	2
1.3 Tanzania’s Export Performance .....	5
1.4 Organisation of the study.....	7

### CHAPTER 2

#### THEORETICAL BACKGROUND

2.1 Overview .....	8
2.2 Development of Trade and the Financial System.....	9
2.3 Exchange Rate Regimes and Trade .....	10
2.3.1 Fixed Exchange Rate Regime.....	11
2.3.2 Floating Exchange Rate Regime .....	13
2.4 Theories of International Trade .....	16
2.4.1 Mercantilism.....	17
2.4.2 Classical Theories of International Trade .....	19
2.4.3 Modern Theories of International Trade .....	22
2.4.4 New Theories of International Trade.....	23



**CHAPTER 3**  
**LITERATURE REVIEW**

3.0 Introduction .....	25
3.1 Theoretical Review.....	26
3.2 Determinants of Exports.....	27
3.3 Exchange Rate Level and Exports.....	29
3.4 Exchange Rate Volatility and Exports .....	30
3.4.1 The Cause of Exchange Rate Volatility .....	30
3.4.2 Theories on Exchange Rates-Exports Relationship.....	32
3.4.2.1 The Elasticity Approach (Marshall-Lerner Condition) .....	32
3.4.2.2 The J-Curve Effect.....	33
3.4.2.3 Exchange Rate Pass-Through.....	35
3.5 Empirical Review .....	36
3.5.1 Exchange Rate-Exports Relationship Findings .....	36
3.5.2 Exchange Rate Volatility-Exports Findings.....	37
3.5.2.1 The Negative Relationship Findings .....	37
3.5.2.2 The Positive Relationship Findings.....	39
3.5.2.3 The No-Relationship Findings .....	42
3.6 Globalisation and Trade.....	43
3.7 Regulations and Trade .....	44

**CHAPTER 4**  
**METHODOLOGY**

4.0 Overview .....	45
4.1 Research Problem, Research Questions and Objectives .....	46
4.2 The Existing Research Gap .....	47
4.3 Significance of the Study.....	47
4.4 Data, Sources and Collection .....	48
4.5 Data Analysis Techniques .....	51
4.5.1 Exploratory Data Analysis.....	51
4.5.2 Test for Stationarity (Unit Root Test) .....	52

4.6 Empirical Design (Model Specification and Estimation).....	53
4.6.1 Cointegration Test .....	53
4.6.2 Vector Auto-Regressive Model and Granger Causality Test .....	54
4.6.3 Impulse Response Function.....	55
4.6.4 Variance Decomposition .....	56

## **CHAPTER 5**

### **DATA ANALYSIS & INTERPRETATION**

5.0 Overview .....	57
5.1 Descriptive Statistics .....	57
5.2 Results of Unit Root Tests.....	58
5.3 Diagnostic Test Results .....	61
5.4 Cointegration Test .....	62
5.5 The VAR Granger Causality .....	63
5.6 Impulse Response Function.....	65
5.7 Variance Decomposition .....	67

## **CHAPTER 6**

### **CONCLUSION & RECOMMENDATIONS**

6.0 Overview .....	70
6.1 Summary.....	70
6.2 General Conclusion .....	72
6.3 Policy Recommendation.....	72
6.4 Future Studies .....	72

### **REFERENCES**

### **APPENDICES**

## LIST OF TABLES

### TABLES

Table 1.1 Foreign Exchange Windows by Mid-1980s.....	4
Table 2.1 World's Exchange Rate Regimes, As of 30 <sup>th</sup> April 2014.....	14
Table 2.2 Volatility Profile of Exchange Rate Regimes .....	16
Table 3.1 Summary of Past Empirical Studies and their Findings.....	41
Table 4.1 Tanzania's Top 10 Exports Destinations, 2007-2013 .....	50
Table 5.1 Descriptive Statistics .....	58
Table 5.2 Unit Root Test .....	59
Table 5.3 The Johansen-Juselius Cointegration Tests Results.....	63
Table 5.4 VAR Granger Causality/Block Exogeneity Wald Tests .....	64
Table 5.5 Variance Decomposition Results .....	68

## LIST OF FIGURES

### FIGURES

Figure 1.1 Quarterly Exchange Rate Trend, USD/TZS, 1993-2016 .....	5
Figure 1.2 Trend of Tanzania's Imports, Exports and Balance of Trade 2007-2013.....	6
Figure 3.1 Determinants of Exports .....	27
Figure 3.2 J-Curve .....	34
Figure 5.1 Unit Root Test Results, Graphical Illustration.....	60
Figure 5.2 AR Roots Graph.....	61
Figure 5.3 Response to Cholesky One S.D. Innovations $\pm 2$ S. E (ExRate) .....	66
Figure 5.4 Response to Cholesky One S.D. Innovations $\pm 2$ S. E (IPI) .....	67

## LIST OF ABBREVIATIONS

ADF	Augmented Dickey Fuller
J-B	Jarque-Bera
OLS	Ordinary Least Square
AIC	Akaike Information Criterion
TZS	Tanzania Shillings
USD	United States Dollar
VAR	Vector Autoregressive
SSA	Sub-Saharan Africa
BRICS	Brazil, Russia, India, China and South Africa
MINT	Mexico, Indonesia, Nigeria and Turkey
MENA	Middle East and Northern African Countries
ISI	Import Substitution Industrialisation
IMF	International Monetary Fund
NBS	National Bureau of Statistics (Tanzania)
WW1/WW2	World War One/World War Two

# CHAPTER 1

## INTRODUCTION

### 1.1 Background of the Study

While in the last touches of World War II, in 1944, when the world was resuming to normality, an international agreement commonly known as Bretton-Woods Agreement was signed for resetting a way through which countries can exchange their currencies and hence carry out trades between them. This came following the collapse of Gold Standard and the financial chaos in Europe and America (Great Depression of 1930s). Under Bretton-Woods system, countries could trade between them using exchange rates maintained within fixed values, once exchange rates between currencies established, governments were intervening to prevent them from deviating for more than one percent (1%) from the original set level. And most of currencies were pegged to either US Dollar or British Pound. Unfortunately, by 1971 it came to light that the US Dollar to which some of currencies were pegged had been overvalued and hence greatly suppressed its demand i.e. more dollars were in supply than what demanders could afford to buy because of overvaluation. This called for a review of the exchange rate regime and finally US Dollar devalued relative to other currencies, and currencies allowed to vary above the initial allowed interval of 1%, hence, this time currencies could vary up to 2.25 percent (2.25%). This was agreed in a common agreement known as Smithsonian Agreement by major trading countries. Very unfortunate, even after being allowed to vary for up to 2.25% below or above the set level, countries were struggling to keep their currencies within the margins of change. Hence, the fixed exchange rate regime proved failure and by March 1973 officially the world wrote a new history as a starting point of “Flexible Exchange Rate Regime” which is in practice until today. (Madura, 2011)

By such a new flexible exchange rate system just set in, officially exchange rates among currencies started to fluctuate in response to prevailing market demand and supply conditions – no longer fixed margins of change. The new system got a quick acceptance among many

countries fuelled by globalisation move. Countries started liberalising their economies and the trading among them increased in a vacuum. As a result, the level and variability at which one currency trade against such a free globalised world become of paramount importance to determine the country's competitiveness in the world business arena. Not alone to governments' policy makers, exchange rate became of the same importance to rest of actors who use foreign currencies such as investors, individual entities (importers and exporters) and multinational corporations. The fact that exchange rates are now freely adjusting to market conditions, means these stakeholders are not sure of exchange rate movements anymore, so uncertainty set in. The now new worries in the market i.e. uncertainty brought by level as well as frequency of fluctuation of exchange rates became a click to all stakeholders of international business and the same to the world of academia. Many studies so far have been taken but most focusing on effects of exchange rate volatility rather than level. And are based on developed countries and recently on BRICS countries as potential power houses of the world, MINT countries and MENA countries. Unfortunately, lesser has been studied regarding the impact of exchange rate fluctuation on exports performance of Sub-Sahara African (SSA) countries, and more so of Tanzania. Hence, that is the motive behind this study and the focus is on the effect of exchange rate level rather than volatility on exports performance.

## **1.2 Foreign Exchange Market in Tanzania**

Tanzania in her present state of the financial and trade regime, went through major three eras. And like many developing countries, SSA countries in particular, exchange rate regimes emerged in a controversial fashion. The country right after independence in 1961 (Mainland Tanzania) entered the first era of financial system, an interim-like phase, six-year period from 1961 – 1967. This is the period where the country was in deep analysis trying to define her way forward in economic direction. The practice during this time was import substitution industrialization (ISI) which aimed at boosting income growth. In this phase, private business venture and those foreign ones were given tariff protection and guaranteed against nationalization by the government. (Rweyemamu, 1973).

In 1967, the country passed the so called “Arusha Declaration” where socialist principles of the economy were official born and put into action. With such a socialist blueprint, the ventures which were once guaranteed against nationalization were nationalized, public sector expanded and allocation of resources were then centrally controlled. The new socialist principles took place from 1967 all the way to 1985 and during the period, exchange rate of Tanzanian Shilling (TZS) with respect to other foreign currencies were highly controlled. As Rutasitara (2004) reported that, although the economy remained mixed during this period, but private sector was severely wounded. Other instruments of control specifically designed for the implementation of Arusha Declaration, a socialist blueprint, were Finance and Credit Plan which started from 1971/2 and The Foreign Exchange Plan. The plans were specifically for the allocation of credits in the economy and control of foreign exchange respectively. With these two instruments, foreign exchange and interest rates were made immaterial for the economy. Due to these policies, in the period from 1979 to 1985 earnings from real exports were declining although it is reported by Lipumba, Ndulu, Horton, and Plourde (1988) that other external factors also played a role behind lower revenues from real exports. Moreover, foreign reserves reached all time lower during 1980-85. (Hanak, 1982)



**Table 1.1: Foreign exchange windows by mid-1980s**

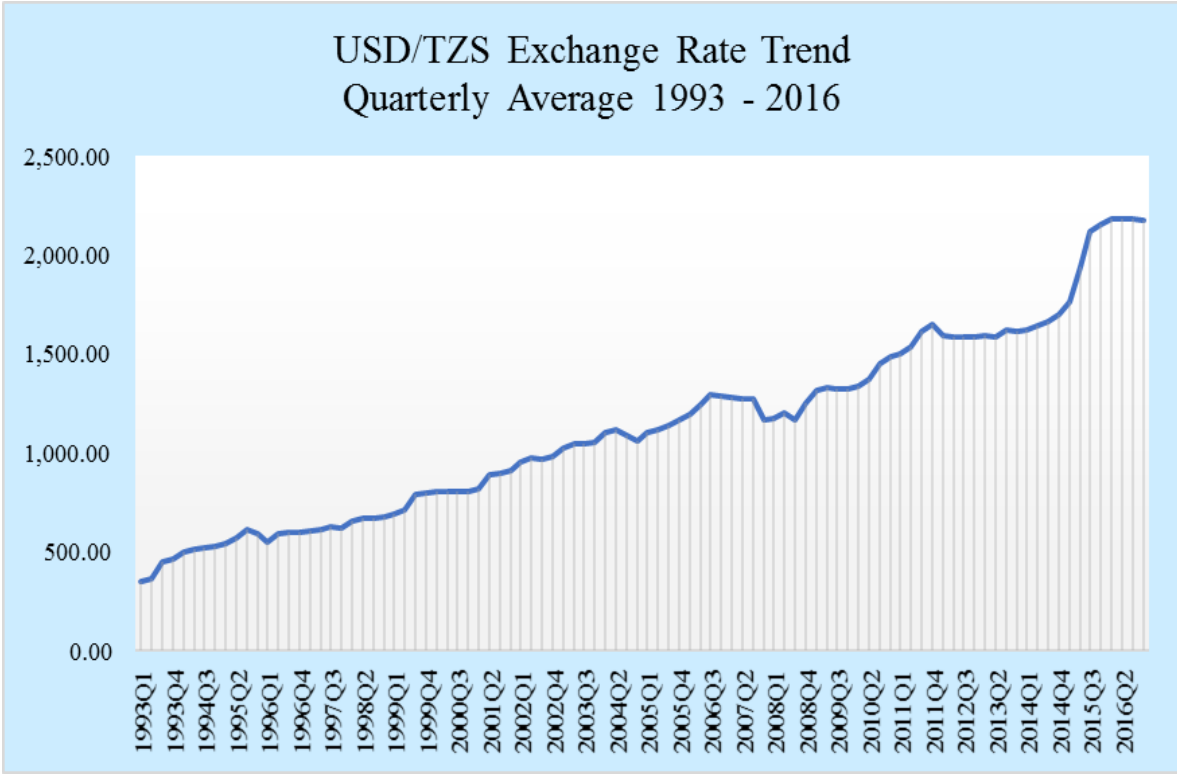
<b>Window</b>	<b>Source of foreign exchange</b>	<b>Degree of control</b>	<b>Rate applying</b>
Central Bank free resources	Official export earnings surrendered to Bank of Tanzania and limited commercial loans	High: By Bank of Tanzania	Official
Import support	Bilateral donor support	High: Treasury with donors	Official
Open General Licence (OGL)	World Bank and bilateral donors	Less control; more leaning towards market forces	Official
Export retention	Export proceeds retained by exporters	Low: Exporters' own decision	Mainly parallel rate
Own funded imports	Unofficial exports and foreign exchange transactions and private external capital	Low: Market forces, dominated by private business	Parallel rate
Project loans and grants	Various commodity exports	High; Government with foreign banks	Mainly official
Suppliers' credits	Supplier	Low: Involving suppliers and private business	Higher than the parallel rate to cover risk premium

**Source:** Adopted from Rutasitara (2004), compiled from different sources.

As seen above, Tanzania experienced physical inefficiency and a total failure of her socialist model of the economy which was named “Socialism and Self-reliance” and reaching the year 1986, the country changed from controlled to market exchange rate system. But the on-going parallel exchange rate premium kept diminishing gradually from 1986 onwards and eventually disappeared in 1992. From 1986 going forward, the country embarked on bold steps towards economic reforms. Reforms involved unification of exchange rates, trade liberalization and institutional reforms of banking system which is now comprised by central bank; Bank of Tanzania, an apex institution and regulator of banking system and economic policy formulator, commercial banks and other financial institutions. From April 1992, private bureau de change was allowed in the country, foreign exchange auctions were established in

June 1993. Moreover, as reforms continued, the inter-bank foreign exchange market (IFEM) was established in June 1994. Hence, from 1993 onward, there has been a perfectly fluctuating exchange rate regime in the country, and for this reason, the study covers the interval from 1993 to 2016.

**Figure 1.1: Quarterly Exchange Rate Trend, USD/TZS, 1993 - 2016**



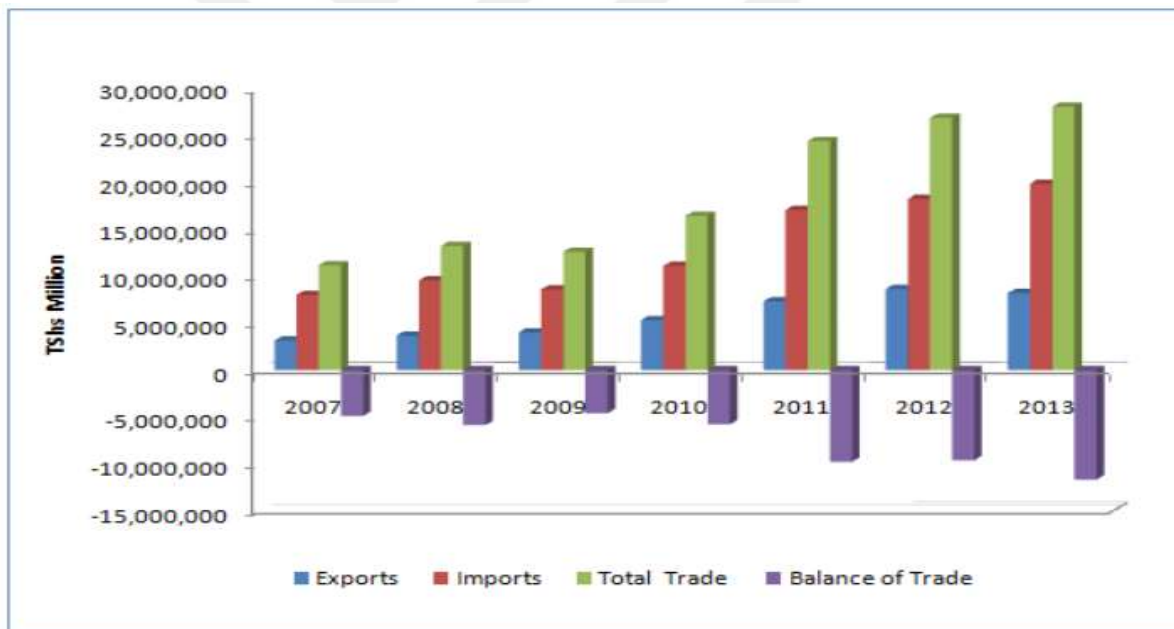
**Source:** Data from the IMF and author’s own calculations.

**1.3 Tanzania’s Export Performance**

According to Foreign Trade Statistics 2013 which was published in 2014 by Tanzania’s National Bureau of Statistics (NBS, 2016), it is reported that in 2013, Tanzania's total trade with the rest of the world increased by 4.5 percent to TZS. 28,127,678 million from TZS. 26,929,265 million recorded in 2012. Total exports declined by 5.0 percent to TZS. 8,223,206 million from TZS. 8,653,372 million while imports grew by 8.9 percent to TZS. 19,904,472 million from TZS. 18,275,893 million. As result, trade deficit widened by 21.4 percent to TZS.

11,681,266 million compared to the deficit of TZS. 9,622,522 million in 2012. On the other hand, looking on recent economic records of Tanzania, in the year 2015 the country recorded a growth in real GDP of 7% and was expected to record a growth of 7.2% in the year 2016 and the country remain in the list of top ten fastest growing economies in the world. (IMF, 2006). Hence, for a sustainability of such a good start, there must be sound policies in place, and to attain so, closer and curious look on exchange rate and exports is crucial. But as a matter of cursory look on trends, both exchange rate and exports seems to be sharply rising. So, does that enough for analysis and policy formulation? No! absolutely not. Empirical analysis must be done to establish the relationship between the two macroeconomic variables.

**Figure 1.2 Trend of Tanzania’s Imports, Exports and Balance of Trade 2007 -2013**



**Source:** Adopted from Tanzania National Bureau of Statistics’ (NBS) Foreign Trade Statistics 2013 publication. Accessed via [www.nbs.go.tz](http://www.nbs.go.tz), retrieved 11<sup>th</sup> November 2016.

The exchange rates movement and exports movement for the period from 1993 to 2016, both seems to be going up. But what that means in economic terms? What is the relationship between the two? Those are the questions this study tried to find out the empirical answers.

#### **1.4 Organisation of the Study**

To uncover the question of what is the impact of Tanzanian Shilling's exchange rate on country's exports and how does the risk involved affect export earnings and like, is the motive behind this study. This will assist in formulating best trade policies, which would address the economic disturbances created by the exchange rate level to boost the overall economic performance of Tanzania as a promising, fast growing economy. Exchange rate in general creates two effects, i.e., deficiency in domestic markets and riskiness which exporters face. As Malik, Hassan, Shah, and Ghafoor (2016) defined; The exchange rate movement is a measure that intends to capture the uncertainty faced by exporters, due to unpredictable fluctuations in the exchange rates. These effects are transmitted into the economy by means of trade imbalances which could affect the economic growth of the country. The theory is that appreciation of domestic currency leads to increased trade deficits and vice versa is true. The early proponents of flexible exchange rates, therefore, stressed that it would take care of trade imbalances, thereby allowing policy makers to address the domestic objectives. However, the reality has not been consistent with those predictions (Todani & Munyama, 2005).

This study started by a thorough introduction of key variables and the direction of the whole study (Chapter 1). Next, follows a grasp of fundamental theories for better understanding of the subject matter where exchange rate regimes are discussed then follows a review of important theories of international trade. Why countries trade among themselves? (Chapter 2). Chapter 3 critically reviews the past findings on studies of the same topic, both theoretical and empirical findings (Literature Review). Moving further, Chapter 4 discuss the methodology applied in the analysis of the study. Chapter 5 presents the data analysis, estimation results and their interpretation. Finally, Chapter 6 presents the conclusion and recommendations to policy makers and for further studies.

## **CHAPTER 2**

### **THEORETICAL BASE**

#### **2.1 Overview**

As human beings struggle to produce goods and services to cover their far wide and variety of needs due to their nature of having unlimited wants, what is obvious here is the fact that throughout history no single country or nation evolved to be self-sufficient i.e. producing everything for her citizens and needs nothing from abroad – never happened. And if such is the reality, that means countries need to trade among themselves to supplement what they cannot produce locally or say what they cannot efficiently produce. Looking at 200 plus countries around the globe, it is seen that while other countries are super rich in natural resources like oil, gas, minerals, water bodies and livestock, other countries are blessed with entrepreneurial know how and managed to set a strong platform for technological advancements from automobile production to ship building, from agricultural technology to space research, to mention a few. Hence, with this kind of setup, trade among countries makes things balanced or in other words, trade between countries is something inevitable. The imbalance nature of natural wealth among countries in the world or as being generally called “natural endowment of factors of production” is considered by some as the key reason for countries to fail to attain self-sufficiency and so remain with no other choice except to trade with other countries in the world. Although the reason is logical but is not the only one, Kusi (2002) wrote that; other factors behind the massive growth of international trade nowadays are liberalisation and globalisation. In this case, Tanzania like most of SSA countries, from mid-1980s to mid-1990s embarked on trade liberalization policies and opening her economy to reap from the opportunities presented by free trade movement across the globe. By the end of 1990s the country’s trade doors were open and tariffs relaxed. (Kanaan, 2000)

The chapter shades light on how trade especially the case of international trade (imports and exports) is linked to the financial system of the country in question and more so to the exchange rate regime in play. Two broad classification of exchange rate regimes – fixed and fluctuating; are looked. Thereafter, various theories of international trade are explained to build a strong theoretical understanding of the topic. Mercantilism, classical and modern theories are discussed. Also, the newly evolving theories of international trade are discussed.

## **2.2 Development of Trade and the Financial System**

Trade evolves hand by hand with the financial system in any community. In the past, before invention of today's money, goods were exchanged for other goods, there were no money we all know today. If someone has abundant of food but short of say clothes, then the person could give food in return for clothes to someone else who has got extra clothes and willing to offer for food. This system is commonly known as “barter trade” in business language. With such a system of old times, came problems with it; if one is to exchange what he/she has for what he/she need then must find someone who possess the needed good or one who can offer the needed service and willing to exchange. This way, there was a problem of double coincidence of wants. (Khosa, Botha, & Pretorius, 2015; Pikoulakis, 1995). Not alone the problem of double coincidence of wants, Grimwade (2003) pointed out other problems of barter trade such as lack of efficient transport facilities to move goods around and the problem of lack of clear measure of values i.e. how much of one product must be exchanged for an amount or number of another product. This means, there were immovability of goods for search of another party to trade with. Also, an unjust way of measuring values while transacting between parties.

Out of effort to find a way to solve the problem of measuring equal values of two commodities to be transacted and others associated with barter trade, came in money. Money started as simply something generally accepted for exchange like sea shells in some communities and then gold emerged as mostly accept form of currency through which people could trade goods and services among them. And with gold as accepted currency, the problem of double coincidence of wants was no more. And the issue of difficulty in measuring values and fair

quantities of goods to be exchanged, got a remedy using gold as currency. But gold system though successfully curbed the problems of barter trade of double coincidence of wants, it had problems of its own. Notably, the gold is heavy to carry around and another problem, for that it was heavy, so couldn't be carried in privacy. Everyone could simply know if someone carries gold and so posed risk to the carrier. Hence, gold was all heavy, expensive and risky to carry around for transacting purpose.

In another attempt to get rid of problems brought about by gold currency, paper money came in. Easy to carry around and can be carried privately without making those around aware of. With paper money, the world continued to base on the prevailing values of an ounce of gold (gold standard) for long time until the end world war one (WWI). This equally happened all over the globe and so was Tanzania which passed through various stages until now with her modern trade and financial system as explained in the first chapter above.

### **2.3 Exchange Rate Regimes and Trade**

Exchange rate regimes refers to a way through which the value of country's currency in respect to other currencies of the world (exchange rate) is determined by the authorities of a country. Authorities here normally are central banks, the same for the case of Tanzania, where Bank of Tanzania (BOT) which is the central bank of the country oversee the system that determines exchange rate of Tanzanian shilling. It should be noted that, exchange rate regimes are different and can be applied at different degrees. Countries on the other hand are free to choose and apply any of the regimes in existence as far as it suits her economic expectations and political views. Countries does implement the exchange rate regime selected normally using the monetary policy but sometimes fiscal policy also can be used to implement the exchange rate regime in place.

In the world, today where the roots of globalization get stronger and stronger, countries are becoming much more connected than ever before. This brings to the country external shocks like imported inflation, fall of exports volume and the like. Therefore, a proper exchange rate regime to curb down the shocks from abroad must be well defined and properly working. Such

a system carefully determines the rate at which the country's currency can be bought or sold using foreign currencies. (Côté, 1994). And as trade between countries is done using foreign currencies, then how much it cost to buy a required amount of a foreign currency (exchange rate level) is of paramount importance. Moreover, frequency of change of the rate at which a currency can be exchanged (exchange rate volatility) again adds to the uncertainty of trade decisions among importers and exporters. This can take both expansionary and contractionary trend depending on whether a country is importer or exporter at a time.

Although exchange rate regimes are generally categorized into two major umbrella groups; Fixed and Flexible exchange rate regimes, the sub-divisions are there as well and worthy revising. Different opinions regarding effectiveness of those regimes has been put forward with no consensus. Some studies found that flexible exchange rate regime does wonderful job to reduce financial shocks, but other studies refuse that hypothesis. Below, are explanations regarding different exchange rate regimes all over the world and the roles they play in influencing trade patterns of countries.

### **2.3.1 Fixed Exchange Rate Regime**

This regime is sometimes called “Pegged” exchange rate system. With this system, the value of country's currency in respect to other currencies (exchange rate) is put fixed by pegging it to either a currency of another country, e.g. attaching the value of Tanzanian shilling to say US Dollar, pegging to a basket of other currencies, e.g. attaching the value of Tanzanian shilling to say US Dollar, British Pound and Euro in their combination, an index like or even pegging the currency to a value of valuable minerals example gold such that as the price of an ounce of gold moves so is the value/exchange rate of the country's currency in respect to other foreign currencies. (Khosa et al., 2015). Others say, the governments manipulate the value of currency.

History shows that, the beginning of fixed exchange rate regime is the beginning of gold standard all the way back since 1876 when values of paper money started to be pegged to the value of an ounce of gold. The system played role until 1913 when it was suspended because



of an outbreak of world war one (WW1). When WW1 finished in 1944, countries tried to bring back the system by signing of an agreement commonly known as Bretton-Woods Agreement to continue maintaining the gold standard. But as most of countries were struggling to rebuild their destroyed, high capital public properties, so was very difficult to keep the agreement alive. Thus, in 1971 they sat down to review and modify the terms of Bretton-Woods Agreement and more relaxed terms were finally agreed in what later came to be known as Smithsonian Agreement. Unfortunately, this second agreement lasted only for two years up to 1973 where countries surrendered and left most of the world currencies free to flow as per the forces of demand and supply in the market. This marked the birth of quite a different regime known as “flexible exchange rate regime”.

The pegged or fixed exchange rate system can be applied at different degrees. It can be “hard peg” or “soft peg”. With hard peg, the country completely fixes her national currency to other respected foreign currency (Currency board) or can even abandon her own currency and start using foreign currency (Currency Union/Dollarization). On the other hand, soft peg takes in when the national currency not 100% pegged to a foreign currency rather, it allows margins of changes or bands within which national currency can move, but not beyond the given band. This can be in a form of any of the following; Crawling narrow band (+/- 1%), Crawling peg (+/- 2%), Pegged within bands, Crawling broad peg and Fixed peg. (Levy-Yeyati & Sturzenegger, 2003).

Theoretically at least, the fixed exchange rate regime is said to stabilize foreign trade movements in the country as it makes business predictable; no need for insurance against profit loss and protection policies. Moreover, it curbs down imported inflation especially when the currency is pegged strong compared to capital importation, administrative expenses of the system are low, financial sector becomes sound, inflation and interest rates becomes low and risk associated with exchange rate becomes mitigated. And as there are advantages so are disadvantages for a country to use this system of foreign exchange. First, it calls for great deal of backup of foreign reserves, it distorts financial markets by rendering authorities with less control over money supply in the economy (less autonomy) and domestic banks can severely suffer from liquidity problems during times of depression and recession.

### **2.3.2 Floating Exchange Rate Regime**

By floating or as also known as flexible exchange rate regime it means a system of determining the rate at which the national currency will be exchanged for other foreign currencies but basing on market forces. And by market forces here it means interplay of demand and supply movements in the global forex market. Floating exchange rate regime can take one of the two forms; managed floating exchange rate regime or free-floating exchange rate regime. In a freely floating system, the authorities commonly central banks, completely leaves the market forces of demand and supply to determine a rate at which a national currency can be traded. On the other hand, managed floating exchange rate system, is regarded as a hybrid system that borrow features from both fixed and floating exchange rate regimes. With managed floating system, occasionally, the government through authorities like central bank becomes an important player in the foreign exchange market. The authority buys and sells foreign currencies in order to affect demand and supply in the country, but this is especially done to avoid exchange rates going far extreme, both low and upper levels. This way authority creates price stability and proper flow of trade activities in the country. And as IMF (2014) put it, the intervention by the authorities can be direct or indirect and the purpose is to moderate the rate at which exchange rate moves. Also, it is meant to prevent undue fluctuations in price of local currency without putting in place a kind of policies that will predefine the exchange rates in economy.

There are several indicators for managing exchange rates and are broadly judgmental. Examples of those indicators are balance of payment, international reserves and parallel market developments (As was the case in Tanzania from 1986 to 1992). Although authorities occasionally intervenes the movement of exchange rates to avoid far extreme movements that can drug the country into severe economic problems, still it is regarded as floating if intervention occurs only exceptionally and targeting on addressing disorderly market conditions and if the authorities have provided information or data confirming that intervention has been limited to at most three instances in the previous six months period, and each intervention done, must be lasting no more than three business days. (IMF, 2014).

With floating exchange rate regime widely accepted today all over the world, contrary to the practice during the days of gold standard, plus the tremendous growth of international trade in the past two decades, it makes price movements unpredictable because prices are directly affected by movements of exchange rates. If a country's currency appreciates it directly affects export prices and if export prices are elastic can easily pull down the exports volume of a country because the country's domestically produced goods and services will be expensive and importers abroad can easily switch and buy from other supplier countries. Meanwhile, if the country's currency depreciates against a counterpart foreign currency, domestically produced goods and services becomes cheap to buyers abroad and hence can boost export volume and improves country's exports performance and balance of payment.

**Table 2.1 World's Exchange Rate Regimes, As of 30th April 2014**

<b>Regime</b>		<b>% of IMF members</b>
<b>Hard peg:</b>	No separate legal tender	6.8
	Currency board	6.3
		<b>13.1</b>
<b>Soft peg:</b>	Conventional peg	23.0
	Stabilized arrangement	11.0
	Crawling peg	1.0
	Crawling-like arrangement	7.9
	Pegged exchange rate within horizontal bands	0.5
		<b>43.4</b>
<b>Floating:</b>	Floating	18.8
	Free floating	15.2
		<b>34.0</b>
<b>Residual:</b>	Other managed arrangement	9.4
		<b>9.4</b>

**Source:** Exchange Arrangements and Exchange Restrictions Report, (IMF, 2014), from AREAER database.

Floating exchange rate system like fixed one has got both goodies and bitter consequences into the economy. Those pro-free markets believe that, for a country to be effectively free-market economy, a floating exchange rate regime should be in place for that it allows exchange rate

equilibrium to adjust itself without intervention from the government. The floating regime also helps the economy smoothly absorb exogenous shocks brought about by the nature of interconnectedness of the world today. Another good side of floating regime is that, it automatically adjusts balance of payments because it reduces the need to use trade restrictions and capital control to attain exchange rate equilibrium. (Brada & Méndez, 1988). On the other hand, the floating exchange rate regime intensify uncertainty which is something of paramount importance for decisions of businesspersons especially in SSA countries. Exchange rate can quickly jump to far extreme levels, above the accustomed ranges. This way, if most of exporters in the countries are risk averse, they can easily cut down production levels and hence pull down the country's exports performance track. Such extreme moves of exchange rates (upward) are normally experienced during economic boom. Also, the floating exchange rate regime comes with a risk of imported inflation. If the national currency drastically dropped, it poses a risk of imported inflation and hence calls for the government to intervene. Imported inflations creates danger of affecting other economic variables in the economy and so the authorities necessitated to take action to control the phenomenon. Imported inflation is a serious case and so taken with due care especially by the inflation-targeting countries. Inflation-targeting economies adjusts the rate of interest in order to mitigate imported inflation, and although proves successfully in the short run, but in the long run tends to suppress profitability of domestic businesses. (Khosa et al., 2015).

Tanzania on her case, implements a floating exchange rate system, whereas from 1986 to 1992 there were parallel exchange rates but now officially over, and only one exchange rate is in play. The country from 1993 to date, is steadily progressing in financial development. Now has got well united, connected and efficient foreign currency market with the target being not inflation, rather monetary aggregate. With such a target, the central bank (BOT) focus on attaining the intended monetary aggregate rate of growth using different instruments. Such a target is normally the national anchor of the official exchange rate regime in play. By monetary aggregate, it refers to variables such as reserve money, quick money supply (M1) and broad money supply (M2).

**Table 2.2: Volatility Profile of Exchange Rate Regimes**

<b>Regime</b>	<b>Exchange Rate Volatility</b>	<b>Volatility of Foreign Currency Reserves</b>
Float	High	Low
Soft Peg	Medium	Medium
Hard Peg	Low	High

*Source:* Levy-Yeyati and Sturzenegger (2003)

In the first three parts of this chapter above, a clear flow of theory on how money came about and how trade boosted were clearly drawn. Invention of money completely revolutionized trading practices especially by easing payment and valuation of good and services. Moreover, gold standard on its own played a great deal in stabilizing exchange rate which was the birth of fixed exchange rate regime in the world. The failure of gold standard made it necessary for most countries to let their local currencies float in response to demand and supply forces in the global forex market. Countries while allowing their currencies to flow, they tend to focus on special aspect of the economy as the anchor for exchange rate regimes. There are those inflation-targeting and those monetary-aggregate targeting like Tanzania. In the following parts below, reasons as to why countries must trade has been put forward in several theories. The package for each of the most prominent theories of international trade are revised.

#### **2.4 Theories of International Trade**

Starting back at least from 1700s to current time, countries has been and still trading. Traditionally traded goods involve textiles, food items, spices, metals, special stones, objects of arts etc. but with a fast of globalization move, today companies are multinational (MNCs). And with high-tech products, trade agreements, tariffs and like, the question of imports and exports gained more momentum.

International economics has got both micro and macro aspects. The micro aspect of international economics is represented by international trade theories and policies. On the other hand, the macro aspect of international economics is represented by balance of payment

(BOP). Understanding of international trade theories and policies provides a solid foundation of studying balance of payment (BOP) and how it evolved overtime. In tackling the question why countries trade, various theories and policies have been put forward. The core attention is on the use and relevance of economic models in explaining international trade and evaluating international trade policies. Those various international trade theories are generally based on three views existing as to why countries should trade:

- Economic View; holds that there must be economic gains to both parties in the trade deal.
- Resource-Based View; holds that nations trade because in each country there produced goods that are unique and hard to be imitated by others.
- Institution-Based View; holds that different rules governs trade and those rules determine how gains are shared among trading nations.

Categoric classification of various international trade theories is as follows:

- Mercantilism
- Classical theories of international trade (Absolute and Comparative Advantage Theories)
- Modern theories of international trade (Heckscher-Ohlin Theory), and
- New theories of international trade (Various)

#### **2.4.1 Mercantilism**

Basically, the term refers to trade and commercial activities, and in some literature the term “mercantilism” refers to an economic system in which a mother country controls the trade of its colonies. It is the 16th century economic philosophy which maintained that a country’s wealth is measured by its holding of gold and silver. Same to say that the theory of mercantilism was centred on a belief that the country’s wealth is determined by her stock of precious metals (specie) notably gold and silver as those were the currencies exchanged in

times of cross-border transactions. This required country to maximize exports and minimize imports. The logic backing the policy was that; if foreigners buys more from the country than what the country bought from them, then foreigners must pay the difference in gold and silver and this way the country could collect more wealth of treasure. The system pressed on attaining favourable balance of trade/payment.

Under this system, the key focus of international trade was to achieve more exports and less imports (favourable BOP). Trade surplus involved not only visible exports and imports rather invisible exports and imports as well. By invisible positive balance of trade, is meant to give more credit to foreign countries (inflow of gold), in other words, capital exports. This theory is more patriotic in perspective favouring centralisation of international trade activities and strong government regulation and control.

Regarding the birth of mercantilism theory, it is reported that throughout 17th and 18th centuries several players like businessmen, government, philosophy gurus and bankers were writing on international trade and marked the birth of the term mercantilism. But was only after 1776 onwards that this term officially got wide acceptance in the literature of international economics following the publication of “The Wealth of Nation” by Adam Smith. (Garegnani, 2005).

The history of mercantilism shows that, ever since 1752, this system has been severely criticized in the economic literature – everything criticized from gains from trade to motive behind the theory and all the rest. Criticism against the mercantilist outlook on international finance came from the very famous and trusted economists like Adam Smith, David Ricardo and David Hume. they were the pioneer to changing the move and developing economics as a well-arranged field of study. Criticism based on two main points; One, considering exports surplus as the focus for economic welfare seemed to be a fallacy. Two, viewing international trade as a zero-sum game proved to be wrong by Adam Smith. Under mercantilism, a country had to export more and import less to pile up her stock of gold and silver. The more the stock of gold and silver, the more wealthy and influential the country is. The governments were required to do whatever comes in hand to boost exports up and curb down the imports. The practise took a shape of zero-sum game. But because all the countries cannot have positive

balance of payment (BOP) at the same time, meaning that, if a country enjoys favourable BOP, the counterpart on the other angle of the world is suffering a negative BOP. Hence, gold and silver were at all time limited. In fact, although the theory proved wrong, but new form of that system, termed “New Mercantilism” is existing today. With new mercantilism or as sometimes called “Protectionism”, the supporters are those who wants higher production through full employment leading to favourable balance of payment. Still the focus is on favourable balance of payment.

#### **2.4.2 Classical Theories of International Trade**

Three issues; Trade gains, Pattern of International Trade and Terms of Trade regarding mercantilism evoked quite a hot discussion amongst economists. These issues could not be well addressed by mercantilism theory and hence questioning of them gave birth to new truth in the economic literature. The following questions came up:

- Trade Gains: With international trade, do countries gain? How the gain come about and how is it distributed among countries?
- Pattern of International Trade: Which country exports what and imports what? And is there any law behind resources allocation and trade movement between countries?
- Terms of Trade: At what price cross-border goods and services should be bought and sold?

To come up with answers to those questions, classical economists like Robert Torrens, David Ricardo, John Stuart Mill and Adam Smith explained a lot in their writings and as such, two major theories which can be grouped under classical theories of international trade came out, those are: Theory of Absolute Advantage and Theory of Comparative Advantage. Both theories under this category are basically made up of two costs arguments: 1) Country will produce per its natural endowment i.e. according to what it is more suited for based on the country’s climatic quality, soil, means of transport, capital etc. and 2) Country will produce based on cost differences in production;



- Absolute Cost Difference: (Adam Smith's Wealth of Nation) argued that international trade is advantageous to all participants only if they enjoy differences in the cost of production of commodity in which they specialized.
- Equal Cost Difference: Adam Smith to strengthen the above argument, argued that international trade is not advantageous if countries operate under equal difference in cost of production instead of absolute difference.

### ***Theory of Absolute Advantage***

Adam Smith argued that mutually beneficial trade between two countries is based on the principle of *absolute advantage*. The theory says that, the real wealth of a country consists of goods and services available to its citizens. If a country can produce goods and services at cheapest cost than any other country, then it is said to have an absolute advantage over that product. Absolute advantage of a country can be a result of natural advantage, climate, area and resources. This theory is based on labour theory of value i.e. labour is the only factor of production, in a closed economy and goods exchange for one another based on the relative amounts of labour employed to produce each product. The principle of absolute cost advantage points out that a country will specialize and export a commodity in which it has an absolute cost advantage.

### ***Limitations***

- Developing countries lack technology to gain absolute advantage and hence cannot benefit from global trade because they cannot compete.
- More than one factor of production; Production involves more inputs at the same time e.g. various types of labour, land, and capital. Goods are not ranked per absolute advantage because it can be produced using more of one input (say labour) in one country but using less of another input (say land) in another country

### *Ricardo's Theory of Comparative Advantage*

Other things constant, a country tends to specialize and exports those commodities in production of which it has maximum comparative cost advantage or minimum comparative disadvantage i.e. the country's imports will be those products productions of which the country has less comparative advantage or greater cost comparative disadvantage. Ricardo argued, it is not the absolute but the comparative differences in costs that determine trade relations between two countries. Differences in comparative costs form the basis of international trade. Ricardo's Assumptions are:

- Two countries, two commodities
- Perfect competition both in commodity and factor market
- Cost of production is expressed in terms of labour i.e. value of commodity is measured as labour hours/days required to produce it. Commodities also are exchanged based on labour content of each good.
- Labour is the only factor of production other than natural resources
- Labour is homogenous i.e. identically efficient in a country
- Perfect mobility of labour within the country but perfectly immobile between countries
- Free trade i.e. movement of goods/services not hindered
- Production subject to constant returns to scale
- No technological change
- Trade between countries goes through barter system
- Full employment in both countries
- No transport costs

### *Limitations*

The theory is not complete, and hence severely criticized by economists especially on its unrealistic assumptions. The theory does not explain why there are differences in costs. Not explaining the ratios at which the two commodities would be exchanged (terms of trade). John Mill answered the issue of terms of trade above in his theory of reciprocal demand, that country's demand for one commodity in terms of the quantities of the other commodity is what it is prepared to give up in exchange. Hence, reciprocal demand determines the terms of trade which, in turn, determines the relative share of each country. Equilibrium point will be at that ratio of exchange between the two commodities at which quantities demanded by each country of the commodity which it imports from the other, becomes exactly sufficient to pay for one another. The terms of trade here refer to 'the barter terms of trade' between the two countries. Professor Bertil Ohlin on the other hand, critically pointed out that the principle of comparative advantage is not only to international trade, rather to all trade. Hence, this theory, though based on several wrong assumptions, is being considered as strong foundation in the development of the modern and new theories of international trade. (Ohlin, 1967).

### **2.4.3 Modern Theories of International Trade**

The question of why there are cost differences did not get a clear answer from Ricardo's theory of comparative cost advantage. Hence, in 1919 Heckscher argued that factor endowment is the reason behind cost differences. In 1933 Professor Ohlin continued the argument further and both economists, used most of the assumptions suggested by their classical fellows. Out of their efforts, came two theories: "Heckscher-Ohlin Theory" and "Factor Price Equalization Theory".

#### ***Heckscher-Ohlin Theory***

The theory suggests that factor endowment is the reason for cost differences explained by Ricardo. This means, different countries are endowed with different magnitude of factors of production. Some are richer in capital while others are richer in labour and the like. The factor endowment is looked on two angles of "Physical perspective" and "Price perspective"

Price Perspective – Considering both demand and supply, a country is capital abundant when it has a ratio  $PK/PL$  lower than other country such that P-price, K-Capital and L-labour.

Physical Perspective – Considering only supply, a country is capital abundant if the ratio  $K/L$  is higher than other country. K – Capital and L – Labour.

Hence, per H-O theory a country exports the commodity whose production requires the intensive use of the country's relatively abundant and cheap factor and import the commodity whose production requires the intensive use of the country's relatively scarce and expensive factor". But Limitation of H-O theory is that; it does not take into consideration the dynamic nature of factor and endowment and advancement of technology.

### ***Factor Price Equalization Theory***

This is the development of H-O theory above which state that free international trade will ultimately lead to equalization of commodity prices and factor prices.

### ***Stolper-Samuelson Theory***

In further development of H-O theory, comes this theory which tries to explain the effect of change in relative product prices on factor allocation and income distribution. According to this theory, an increase in the relative price of a commodity raises the return of the factor used intensively in the production of that commodity i.e. an increase in the relative price of labour intensive commodity will increase wages. Similarly, an increase in the relative price of capital intensive commodity will increase the price of capital. This implies that free trade would raise the returns to the abundant factor and reduce the returns to the scarce factor.

## **2.4.4 New Theories of International Trade**

From the second half of the 20th century, economists started to think that the classical and modern theories of international trade are obsolete to explain the complete picture of trade structure of the current times. This belief mainly came because of empirical studies that showed results inconsistent to traditional theories. Assumptions used in H-O theory like static form of technology, perfect market and constant returns to scale seemed invalid under the

current situation. Hence, the H-O theory were modified, and new trade theories (complimentary to H-O theory) were put forward. This time H-O was relaxed, and the complimentary theories addressed issues pertaining to economies of scale, (and product differentiation), imperfection nature of the current markets as well as technological differences among countries in the world today.

These new theories are best to explaining the patterns of trade between developed countries as well as trade between developed and developing countries at any given point of time in static terms. The new trade theories are broadly classified into three:

- 1) *Intra-industry Trade Models*: These theories address identical countries importing and exporting similar products but differentiate ones. Most of these theories were developed after 1970s onwards. They include Krugman's Model (P. Krugman, 1983) and Brander – Krugman Model (J. Brander & Krugman, 1983).
- 2) *Neo-technological Trade Theories*: Emphasizing technological innovations and technological gap between companies and countries. This include theories like Kravis' Theory of Availability, Linder's Theory of Volume of Trade and Demand Pattern, Posner's Imitation Gap or Technological Gap Theory and Vernon's Product Cycle Theory.
- 3) *Strategic Trade Policy Models*: A distinct category of new trade theory that justify domestic market protection, and provision of exports subsidies for the betterment of the economy. This include theories like Krugman's Model and Brander & Spencer's Model (J. A. Brander & Spencer, 1985).

## **CHAPTER 3**

### **LITERATURE REVIEW**

#### **3.0 Introduction**

In this chapter, the existing literature regarding the relationship between exchange rate and exports has been extensively perused. Both theoretical arguments and empirical findings has been careful reviewed and sad to say but the fact is; there is no confirmed empirical findings that support any of proposed direction of relationship between the two variables (whether negative, positive or no-relationship). Although many of relevant empirical studies found negative relationship to be existing, also a good number of studies showed a positive relationship between exchange rate (both level and volatility) and exports (See Table 3.1 below for a summary). Moreover, other empirical findings show that the two variables are not related anyhow. This is same as to say, although the theoretical side of the relationship seems to be somewhat straight forward, but so far, the empirical literature on the topic is vague and remain a puzzle yet to be solved. Another thing worthy noting here is the fact that, the said empirical findings are based on studies undertaken in developed countries or at least in emerging economies, but for the case of Tanzania, the relationship is not yet extensively studied. (Khosa et al., 2015; Nkurunziza, 2016; Yazidi, 2013). Also, different measures of exchange rates (level and volatility measures) were applied without uniformity and various models of analysis used with no consensus. Looking at the study problem at large, the pioneer work was the paper by IMF (1984) then a stream of prominent studies followed. Those included; Chowdhury (1993), Côté (1994), (McKenzie, 1999) and the recent one by Bahmani-Oskooee and Hegerty (2007). The last three studies were review of previous empirical findings, they provided a very good summary and showing how vague the relationship still is. And based on these studies, this literature review was a success. The first part of this chapter looks on theoretical literature trying to analyse different views on how exchange rate relates to exports. This part started by looking on the determinants of exports, and how levels of exchange rates drives exports.

Also, looks at the cause of exchange rate movement, and the first part ends by looking on the three theories that explain how exchange rate uncertainty affects exports; Marshall-Lerner (ML) condition, J-Curve and the Exchange rate Pass-Through. The second and final part of this chapter looked on the empirical side of the literature by careful analysing various empirical findings on the effect of exchange rate on exports. Negative and positive relationship findings were looked and summed up. Also, the no-relationship empirical results were consulted.

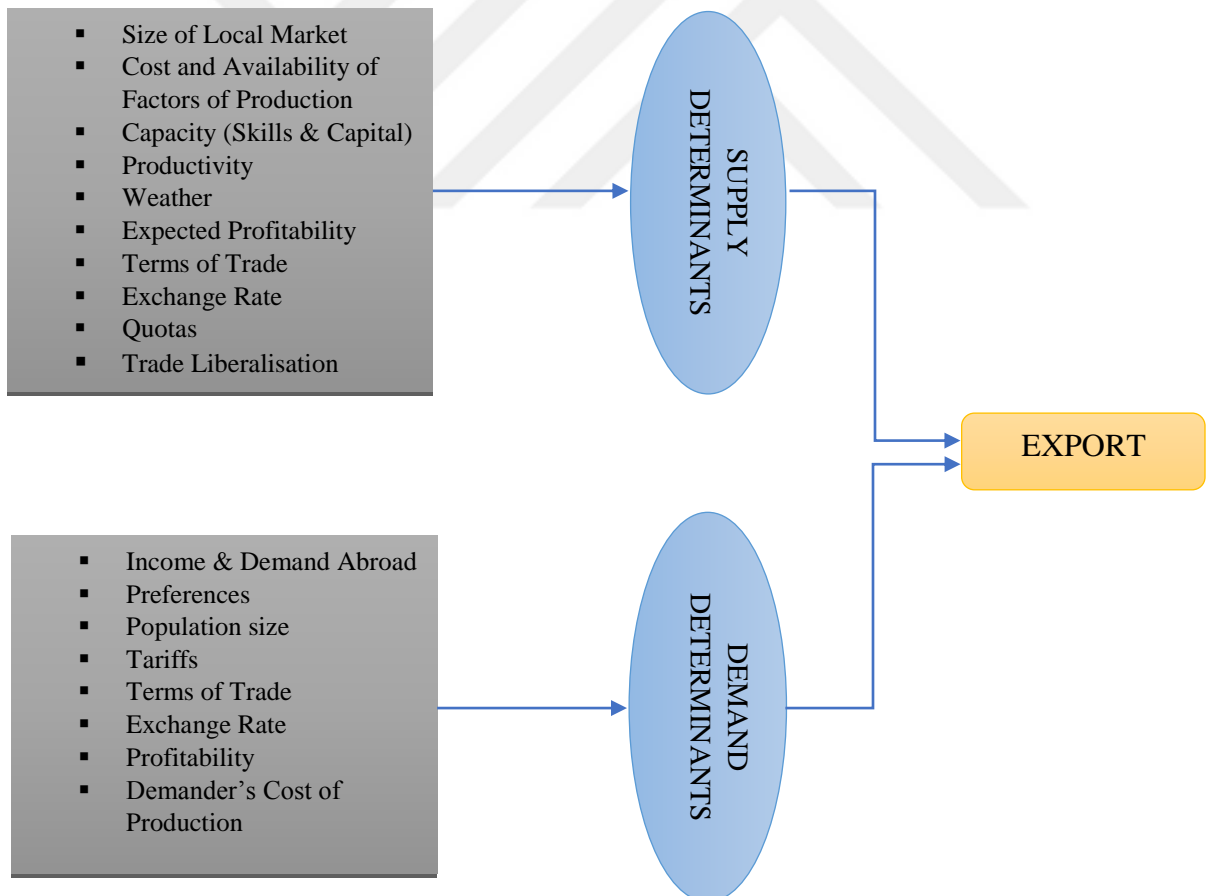
### **3.1 Theoretical Review**

Proponents of managed flexible exchange rate regime and those of fixed exchange rate regime are often of the view that; frequent change of the country's currency tends to depress the exports volume. This means that, the more frequent the exchange rate keeps on changing the more negatively the exports performance of a country is affected. This comes because of increased riskiness in the business transactions and hence negatively influence the allocation of resources. When the local currency increase in value (appreciation of local currency) the price of exports to importers abroad increases compared to their previous price position, hence it is causing a contraction in foreigners' demand to buy locally produced goods and services. And when the local currency decrease in value (depreciation of local currency) the demand of foreigners abroad to buy locally produced goods becomes stimulated as those goods and services becomes pricewise competitive. Although both theories and empirical findings failed to provide a clear answer to this long-term debate, but the widespread view is as explained above being the view of those who supports managed flexible and fixed exchange rate regimes. Baum, Caglayan, and Ozkan (2004) in their efforts to study the effects of exchange rate uncertainty on trade indicated that, there have been a huge number of theoretical analysis regarding this topic. Among them, the notable ones are: Ethier (1973), Clark (1973), Baron (1976), Cushman (1986), Perée and Steinherr (1989) etc. Unlike the empirical side, at least the theoretical analysis of the topic is not so much ambiguous. There are several theories used to explain the impact of exchange rate changes in relation to exports performance and below are few of them. (Section 3.4).

### 3.2 Determinants of Exports

Behind the movement of Tanzania's exports levels as it changes overtime, the drivers behind can be grouped into two major groups; Demand factors and supply factors (of course the same applies to the rest of the world not alone Tanzania). These two groups of factors are as depicted in the Figure 3.1 below. And on top of the two categories of factors that influence the movement of exports of a country, there are other factors which falls under economic policies like trade liberalisation and exchange rate system in play in any specific economy. These also call for a special attention to understand the movement of exports in the economy. S. N. Ngandu (2009).

**Figure 3.1:** Determinants of Exports



**Source:** Smith (2007)



As depicted, the performance of exports from the country to the rest of the world (demand and supply of exports) is driven by a considerable number of factors and among them, exchange rate and profitability, as seen above, are common to both sides. Exchange rate is of special purpose and emphasize in this study as goods and services in international trade deals are priced based on prevailing exchange rate at any period. Hence, exchange rate to greater extent determines the amount to be paid for the goods and services being imported. (Égert & Morales-Zumaquero, 2008). On the other hand, the factor profitability being another common factor both sides; when domestic producers (exporters) expect an increment in profitability, likely they will expand production to sell more and hence earn more. Not alone exporters, importers on their side as well if they expect the goods and services to be bought from abroad promise more profits, then definitely they will order more to reap the thought after potential profit. As this study focused on aggregate figures, it is worth noting here that, demand and supply factors at macro level are a little bit different from micro level because trade across borders unlike domestic ones are prone to so many control policies like quotas, exchange rate policy among many. But the generally used trend of demand and supply i.e. demand – inverse relationship and supply positive relationship do exist. When two countries are not using a single currency (where most of them are), then the price of imports/exports are denominated in either of the two-countries' currency or in a currency accepted by both, in this case most of countries accepts US dollar. Exchange rate will set in and will impact the price, relative to price of the same goods/services from other countries. This means that, if a transaction currency appreciate exports will become expensive to the importers abroad and hence depress aggregate exports level (exports performance). When the country's currency depreciate, domestically produced goods and services will be cheaper to importers abroad, this way exports will be boosted to higher levels (Mtonga, 2006). That is the case of appreciation and depreciation of currency and its proposed impact on exports but what about the question of how such currency's exchange rate impacts exports? Here we referred to the standard exports function as put forward by De Grauwe (1988) and used in many studies since then, but here reduced to only three variables; Exports, Exchange Rate and Foreign Demand of exports.

$$EXP = f(ER, FD) \dots\dots\dots(3.1)$$

Other things constant, the standard exports function above shows that, exports depend on foreign demand (FD) and exchange rate (ER). Foreign demand (FD) refers to the increased purchasing power of buyers of the country's exports. In this case, if income of Tanzania's exports destination countries increases, then more of goods and services will be exported outside Tanzania, other things stable, hence will boost domestic production in Tanzania. Among biggest export destination countries of exports from Tanzania are South Africa, India, Kenya, DR Congo, Germany and Switzerland among others. When income in those countries increase, so will be the exports from Tanzania.

### **3.3 Exchange Rate Level and Exports**

The interplay of exports and exchange rate can well be traced by using the above standard export equation (equation 3.1). Holding the variable; foreign demand (FD) constant, will allow the dependent factor "exports" to react only based on the movement of factor "exchange rate" (ER). And if that is the case, the reaction of dependent factor "exports" can be explained based on which school of thought one belongs. The first, and probably the strong school is the one expecting inverse movement to happen i.e. if the exchange rate become strong (currency appreciation) then exports will go down. In other words, if the country's currency is strong it will suppress the demand of importers abroad to buy from that country and so the exports level of the country in question will drop (Kandil, 2008), this is the view of the pro-managed floating exchange rate regime. But such an explanation is not alone, the other school of thought is of a belief that a stronger currency is not always negative to the economy. This argument raised by Guitian (1976) and Beenstock (1995). The authors argued that, while it negatively affects exports, it positively affects other sectors of the economy. And to make it much clearer, (Ca'Zorzi & Schnatz, 2007) looked at developing countries which are the main importers of oil and argued that; a stronger currency enables poor countries to import oil which is of the main inputs in their production activities at cheaper cost. This will pull down production cost and finally makes the products of those countries more profitable and marketable in the global market. All in all, as Morgenroth (2000) put it, there are many differing views regarding how the exchange rate level does affect exports performance. And

both weak and strong currency movements tend to complement each other and hence offset the harmful effects into the economy. A good example is when a producer sells both in the local market and in the foreign markets which is mostly the case in many economies. When the currency appreciates, and depress exports earning, the revenue from the local market will cover the lost profit abroad due to strong currency move. (Fang & Lai, 2003). But this needs a strong market share/size within the economy, something which in SSA countries, specifically Tanzania, is not the case due to the fact that these countries mainly export goods which are raw materials in nature to be used in high-tech industries abroad. This way, the exchange rate level of Tanzanian shilling to other currencies mostly expected to affect exports negatively.

### **3.4 Exchange Rate Volatility and Exports**

The discussion above shows that exchange rate level is the primary determinant of export prices. But today, the key concern is on how frequent the exchange rate keeps on changing rather than its level. Exchange rate volatility is the time to time change of exchange rates in such a way that it cannot be precisely predicted nor has it a clear pattern or trend in its movement. It can be a change of the exchange rate level from day to day, month to month or from a quarter to another (as for this study) or even a year to the next one. Doğanlar (2002) wrote that, volatility of exchange rates brings uncertainty into the business game. It poses a risk to those conducting cross-border transactions and that way it greatly affects decision making of most of key economic players when the parties involved are risk-averse ones. And the theoretical analysis on what brings about exchange rate volatility, takes two perspectives; Monetarist and Keynesian as explained below.

#### **3.4.1 The Cause of Exchange Rate Volatility**

The monetarist perspective regarding the cause of volatility of exchange rate is based on purchasing power parity (PPP) and this school of thought is of a belief that volatility of exchange rates is the result of the activities of financial industry of a country with open market and free floating exchange rate regime. (Davidson, 2003). With this perspective, for a country

to perform well in exporting abroad, it must keep the inflation as low as possible and exchange rate should be always at equilibrium as it adjusts itself to inflation otherwise there will be a room for arbitrage activities that will eventually push up the exchange rate level. And as per this perspective, not alone that low inflation does influence exports but also interest rates. Elkhafif (2003) writes that when inflation is low, that means it narrows the interest rates differential between a country and her trading partner and this way, carry trade practices will be constrained. But even if it can happen for carry trade activities, the process will be a “back-and-forth” process depending on the expectations of speculators in the market at a time. So, there will be moments speculators moves their investments from countries with low interest rates to those with higher interest rates and while doing so, they will be pushing up the demand of the currency of a country with high interest rates (the now new investment heaven), the currency will then definitely appreciate. And the reverse of this will happen when they expect that interest rate will go down soon in the country they are now rushing to invest due to its current promising interest rate. After the interest rate being affected by inflation, if it is lower, then it has a direct impact on the real side of the economy by making loans cheap to production units and hence boost production level in the country.

On the other hand, as per Keynesian perspective, this school of thought believes that exchange rate volatility comes from the contents of the balance of payment. The view assumes that; short run prices of goods and services are unchanging and when they starting changing is because of change in the economic activities and does so in a slow pace (Ngandu, 2008). Based on this view, there is a continuous mismatch in the world economy and because every economy works harder to improve her exports performance, then it brings volatility of exchange rates of currencies with flexible exchange rate systems. On top of that, (Engel, 2010) wrote that, some countries intentionally devalue their currencies to strengthen their competitive stand. And once currency devalued, exports will climb higher. Ultimately there will be higher real income, higher spending and so increased production through multiplier effect in the economy. But SSA countries especially Tanzania and even emerging countries in the region like South Africa cannot produce enough to cover all her needs, so importation will always be there. Moreover, floating nature of exchange rate regime, currency speculation plus

noise trading and other unpredicted investment decisions in the economy does bring to frequent fluctuation of country's exchange rate.

### **3.4.2 Theories on Exchange Rate-Exports Relationship**

In an environment where cross-border transactions are disposed to random exchange rate variability, exporters and other key players normally does react in accordance with the movements of exchange rate. And their responses depend on their risk behaviour. Of course, among them there will be different direction of reactions but finally, their acts will define the path the aggregate exports of a country should follow, which in turn defines the balance of trade and the overall performance of current account in the economy both in the short run and long run. Theoretically, how such a current account will react is well explained in the below three theories put forward.

#### **3.4.2.1 The Elasticity Approach (Marshall-Lerner Condition)**

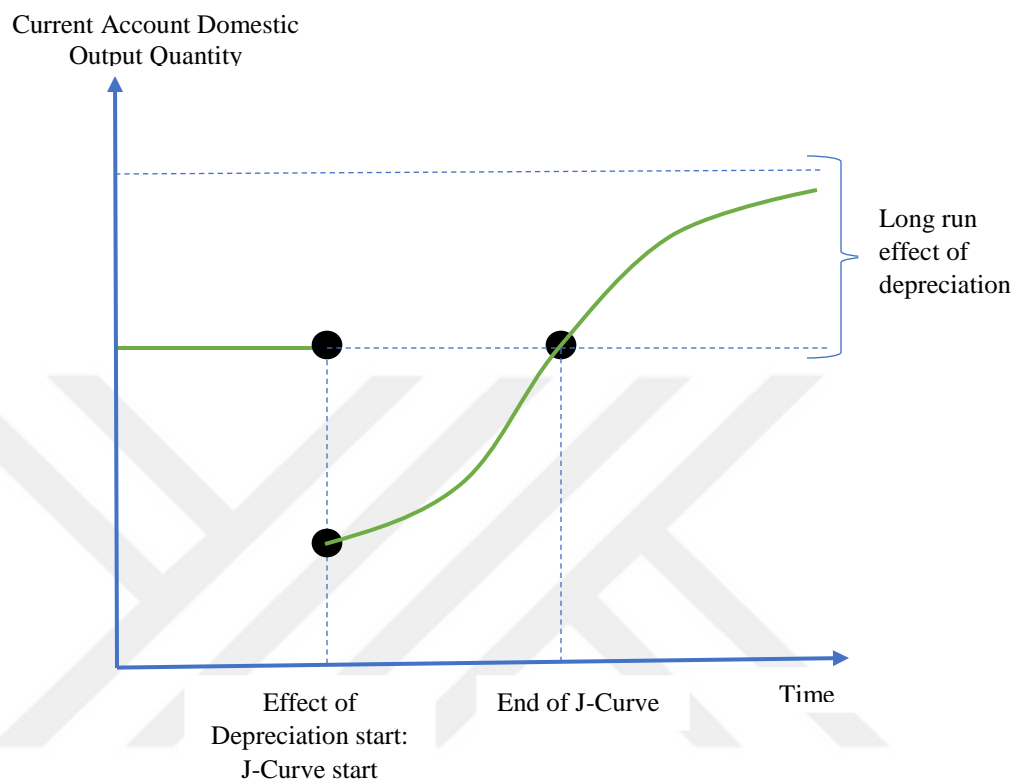
As (Menzies, 2005) put it, the condition tries to explain the puzzle of how devaluation or say depreciation of local currency (here TZS in our case) will boost country's exports and finally improve the balance of trade. The ML condition is named after Alfred Marshall and Abba P. Lerner who extended their theory of demand elasticity on international trade and argued that depreciation or deliberate devaluation of exchange rate in the economy tends to improve the balance of trade through boosted exports and depressed imports i.e. exports becomes cheaper and imports becomes expensive. But per the authors of ML condition, this is only possible when the sum of absolute values of demand elasticities of exports and imports is greater than one (1). Moreover, the authors made it clear that they are aware of the impact to be taking charge in the long run when all factors became no longer fixed. If an exchange rate is just depreciated or say devalued, there will be a time lag for international trade agents to change their decisions. In fact, the net effect of currency depreciation/devaluation to the balance of trade of the economy will depend on how exports and imports responds to price changes (price elasticity of demand of exports and imports). When goods and services exported are elastically

reacts to price changes, then their quantity demanded will increase proportionately more than the decrease in export price, and the total exports revenue will increase (if price dropped by 10% then quantity demanded will increase for more than 10%). And the same when goods and services imported are elastically responding to price change, then total expenditure on imports will go down. And per ML condition, both exports and imports will improve the balance of trade following devaluation/depreciation based on their state of price elasticity. Reinert, Rajan, and Glass (2009) reported that, the ML condition or as sometimes termed “Elasticity Approach” or “imperfect substitutes model” is still commonly applied in analysing balance of trade. Policy makers are said to assume that the ML condition does hold and hence help them in determining the stability of foreign exchange market as well as anticipating the potential impact of changes in the exchange rate. Boyd, Caporale, and Smith (2001) in their recent and notable study, empirically tested the ML condition and found that it does not hold as price elasticities of exports and imports are inelastic in the short run. This brought another theory in the name of J-Curve that explain what happen to the balance of trade in short run after depreciation or devaluation of the currency.

#### **3.4.2.2 The J-Curve Effect**

The J-curve phenomenon being the development of ML condition such that ML condition holds only in the long-run, it shows what happens to exports and entire performance of balance of trade in the short run where the ML condition empirically seen to be not holding. The idea is that, the ML condition does hold only in the long run such that as soon as the currency depreciate in the short run, the volumes of both exports and imports remains unchanged and the weak currency brings less exports revenue while spending more on importation, something which brings deterioration in the balance of trade. However, with time, export revenues start to improve while spending on imports going down, (see Figure 3.2 below) this will improve exports performance and overall balance of trade.

**Figure 3.2: J-Curve**



**Source:** P. R. Krugman (2008), p.448

The graph above depicts that, in no time after the depreciation of exchange rate of country's currency, the prices of imports went up, but no corresponding immediate decline in the quantities demanded for importation. This is because, the existing importation deals are contracts signed some time ago, and hence no room for abrupt change. And the same happens on exports; domestic exports, right after depreciation or devaluation become more attractive to foreign markets but quantities do not immediately mend quite for the same reason. An increase in value of the imports against a constant or a small change in the value of exports results in a trade deficit in the short run. As time pass-by importers have enough time to adjust their import quantities with respect to the rise in prices while quantity demanded for exports increases and this result in an improvement in the balance of trade. (Kamoto, 2006).

### 3.4.2.3 Exchange Rate Pass-Through

Exchange rate pass-through is the degree to which the prices of imported and exported goods change because of change in exchange rate. It can also be defined as the extent to which changing currency values lead to changes in import and export prices. Campa and Goldberg (2002); (Campa & Goldberg, 2005) while defining the concept of exchange rate pass-through they said; exchange rate pass-through is the percentage change in local currency import prices resulting from a one percentage change in the exchange rate between the exporting and importing countries. In plain terms, when home currency appreciates exports becomes expensive hence exports volumes tend to decline from its previous level. And if the exporter does not respond by bearing a portion of price increase (sharing the burden with their customers abroad) then the whole load will fall on the shoulders of importer i.e. 100% exchange rate pass-through/complete exchange rate pass-through. Understanding of the exchange rate pass-through is a helpful in analysing how exchange rate movements does affect export prices of a country which eventually affects the overall performance of the economy. Han and Suh (1996) highlighted further by strengthening that the degree of pass-through from the nominal exchange rate to export price (from exporter's perspective), which is measured by the foreign currency, can differ based on whether a home currency strengthen or weakens (appreciates or depreciates). The degree of pass-through is influenced by two major factors: the mark-up and the cost part of imported input materials, explained in terms of home currency, in the production of export goods (Hooper & Mann, 1989). On the one hand, the magnitude of pass-through is unitary (one) when the mark-up or the difference between the costs of goods or services and their selling prices is fixed. If the mark-up varies by the same proportion as the exchange rate, then the degree of pass-through will be zero (Han & Suh, 1996). From the empirical studies, (P. R. Krugman, 2008) realize that the degree of pass-through may be far less than one in the short run and the opposite holds in the long run.

And according to previous empirical studies concerning exchange rate pass-through, it shows that; the pass-through coefficients have been quite stable or dramatically shifted over time, differing from industry to another and from country to another.



### **3.5 Empirical Review**

As early as one decade after countries started to apply fluctuating exchange rate regime back in 1973, the subject of how unstable and random exchange rate movement does affect exports gained a momentum. The study by IMF (1984) paved a way for much deep inquiry into the subject and the academia started receiving a huge number of empirical findings of varying coverage and methodologies. And for the purpose of this review, the past empirical findings were grouped into three; based on their concluding remarks. The first group is the group of empirical studies that concluded a negative relationship between the variables exchange rate and exports. The second group are those studies concluded a positive relationship and finally, the third group are those studies found no relationship between the two variables. Below are some of those relevant and prominent studies and their findings for better understanding and for drawing reference.

#### **3.5.1 Exchange Rate-Export Relationship Findings**

A study by Sandu and Ghiba (2011) applying the VAR model to examine the relationship between exchange rates and exports in Romania, applied almost all tests and estimates similar to this study, found that, considering first lag as significant, exchange rates depress export volume and a positive effect in the second lag. Also, the authors found that, a shock in exchange rate has significant effects on exports after two periods (quarters) based on the results of impulse-response function. Results of variance decomposition shows that, exports have weaker influence of less than 10% on exports.

In another study considering economically developing economies by Genc and Artar (2014) such that the key investigation was to see the relationship between real exchange rate and exports, specifically, if there is cointegration or not between variables found that there is cointegration and that means there is long-term relationship between exchange rates and exports. This study is current one, using annual data from 1985 to 2012 and it concluded that the error parameter of export is negative and significant (-0.259).

Ahmad, Draz, and Yang (2016) studied the causal relationship between exchange rates, exports and growth. Applying Granger Causality, the results were such that there is long-run causality running from exchange rate through growth to exports, and a unidirectional causality among variables in the short-run. And the main finding of the study was that; the undervalued exchange rates significantly influence exports (positively related).

### **3.5.2 Exchange Rate Volatility-Export Findings**

The studies explained above were basically examining the existing relationship between exchange rate level and export rather than exchange rate volatility and export. And that is the approach used in this study. But for the purpose of fully understanding the current state of existing literature on the topic, it is worthy reviewing those studies that examines effects of volatility of exchange rates on exports as they constitute the bigger part of past studies. Below is the review of those studies as grouped into three categories based on their findings.

#### **3.5.2.1 The Negative Relationship Findings**

One of notable studies regarding the effects of exchange rate volatility on Turkish exports is a paper by Vergil (2002). The author applied error-correction model to see how volatility of Turkish lira exchange rate in relation to currencies of her three main trading partners in Europe (German, France, Italy) and USA affect the country's exports. The author generally concluded that, the real exchange rate volatility of Turkish lira in relation to counterparts' currencies is negatively and significantly affect the demand of Turkish real exports. The breakdown of the Vergil's findings is such that; in the long-run, real exports to USA, France and Germany are negatively affected with statistical significance. But the author pointed out that in the short-run, Turkish exports to those three countries were not much affected due to fully hedging instruments used by Turkish businesspersons using forward exchange markets. This study covering the period between 1990:1 to 2000:12 joins the group of many past studies that supports the hypothesis that; exchange rate volatility negatively affects exports flow.

Another finding worthy of consideration, again of the impact of Turkish lira real exchange rate fluctuation on the Turkish exports by Özbay (1999) covering the period 1988: II to 1997:II shows that the Turkish exports are negatively affected by the uncertainty but no same statistically significant effect on the country's imports. The author concluded that, as the demand for Turkish exports abroad are significantly affected by real exchange rate uncertainty, the Turkish demand for imports is not much affected by the lira exchange rate volatility.

In another empirical study (Yüksel, Kuzey, & Sevinç, 2012) again on Turkey, covering the period from 2003:2 to 2010:12, the authors tried to establish how Turkish exports are affected by three factors; export prices, exchange rate volatility and weighted GDP of Turkey's major trading partners. The study employing OLS regression model, although not significant at a level of 5% but found a negative relationship between exchange rate volatility of Turkish lira and exports from Turkey. According to the authors, the exchange rate of the Turkish lira and its volatility plays a central role in determining the fate of Turkish exports performance. The finding of this study again is in line with previous studies in Turkey like those of Özbay (1999) and Vergil (2002) discussed above. For that they found impact of volatility of exports was below statistical significance, the authors suggested that other models like VAR, GARCH and MGARCH to be applied in future studies, and for this reason, considering the study by Yüksel et al. (2012) is recent one, in our study the VAR approach was used to capture the interaction between variables.

Now, on literature beyond Turkish boundaries, Dinh and Nguyen (2016) while studying the impact of exchange rate volatility on Vietnam's agricultural exports found that frequent fluctuation of currencies significantly affect the performance of the country's agricultural exports to a point that it makes Vietnam vulnerable of losing her significant market share. The authors in this study provides a very relevant case study for our study to refer because like Vietnam, the agricultural sector is the backbone of the Tanzania's economy, the biggest employing sector and the number one with high volume of exports.

A famous study by Chowdhury (1993) investigated the effect of exchange rate volatility on exports volumes of seven most industrialized countries (G-7) using multi-variate error-

correction model for the sample period of eighteen years (18) from 1973 to 1990. The findings were such that, in those countries, the volumes of goods and services exported beyond their borders are significantly affected by fluctuation of exchange rate in an inverse direction. This found impact, is for each of the seven countries separately and when taken as whole. Moreover, the author argued in this study that, the weak relationship between the two variables as found in a considerable number of studies prior to this one, possibly was a result of insufficient attention to the stochastic properties of the times series data used in the respective studies. Moreover, among all the studies regarding this topic, those concluded a negative relationship makes the biggest number, and among many other the following studies had found the same results; Arize, Malindretos, and Kasibhatla (2003), Kenen and Rodrik (1986), and; Koray and Lastrapes (1989) all these studies among many others indicated that the exchange rate volatility suppressed the volume of international trade in the studied economies and sectors of economies.

### **3.5.2.2 The Positive Relationship Findings**

Nkurunziza (2016) examined the effect of exchange rate volatility and balance of trade sector of the Rwandese economy covering the period from 1996:1 to 2013:12 and the author noted that; developing economies have exacerbated fluctuations in exchange rates. The study found that there is a positive quadratic relationship between exchange rate and balance of trade components. The author concluded that; by polynomial regression model estimation, exports and imports will increase as exchange rate increase, in other words, exchange rate volatility and balance of trade (exports-imports) are positively related. And the author finally recommended that for Rwandese economy to keep the pace, it must keep the scale of exports as higher as possible. Import substitution and export promotion strategies were also recommended in this study in a belief that such strategies will work on favour of the Rwandese economy if supported by strict implementation. Although this study is not all the way same as our study here for that it studied the effects of exchange rate volatility vs overall balance of trade (in our study its exchange rate against exports) but it is of much use and need

consideration because of relevance, proximity to the topic of ours and the fact that Rwanda and Tanzania are sister economies, geographically, strategically and even demographically.

In another newly published study by Yee, Mun, Zhengyi, Ying, and Xin (2016) covering the time period from 1975 to 2013, the authors investigated how exports relate to four determinants; import, inflation, foreign direct investments (FDI) and exchange rate in the Malaysian economy which according to the authors based on their findings, Malaysia is an assembly point exporter. Authors applied OLS model of analysis and the findings were such that; import found to have positive relationship with export and hence implied that the country is an assembly point (and of course Malaysia is famous for exportation of assembled electric and electronic components); foreign exchange rate found to have positive relationship with export, this was in line with the so called Elasticity Approach or Marshall Learner condition as discussed in the theoretical part of this chapter above. FDI found to have an inverted U-curve relationship with export. And that said to be something which gave a new look to the conflicting evidence of liner relationship between FDI and exports. The authors noted that, export promotion facilities in this case can attract more of FDI when such influx of investments are not targeted for producing goods and services to be consumed domestically. And inflation found to be having negative relationship with export.

A game changer paper by McKenzie and Brooks (1997) investigated how Germany's exports to and imports from the US does respond to exchange rate volatility. McKenzie and Brooks applying a GARCH models to measure volatility and then analyse the relationship, found that unlike most of previous studies, the exchange rate volatility had positively and statistically significant affected Germany's exports to US in the period under the study i.e. from 1973:4 to 1992:9. Moreover, this paper has been an eye opening during analysis of our study for Tanzania because the on-going debate on whether to use nominal or real exchange rate for measuring volatility was extensively discussed.

Using quarterly data from 1982 to 2001, Kasman and Kasman (2005) empirically studied the effect of exchange rate volatility on Turkish exports performance. The authors used cointegration and error-correction models in analysing the data. The study focused on a handful of top export destination of Turkish exports and the results were such that; exchange

rate volatility of Turkish lira found to having a statistically significant positive effect on Turkish exports to its major trading partners in the long run. And from early studies that found positive relationship between exchange rate volatility and exports like the one of Brada and Méndez (1988) recently the number is increasing. Some of notable one are; Todani and Munyama (2005), Franke (1991), Grauwe (1992), Doyle (2001), Bredin, Fountas, and Murphy (2003) and a study by Asseery and Peel (1991).

**Table 3.1 Summary of Some Past Empirical Studies and their Findings**

STUDY	DATA	PERIOD	MODEL OF ANALYSIS	RESULTS
Vergil (2002)	Bilateral	90-00 Monthly	Cointegration	Negative
Ozbay (1999)	Aggregate	88-97 Quarterly	Cointegration	Negative
Yüksel, Kuzey, & Sevinç (2012)	Aggregate	03-10 Monthly	OLS	Negative
Koray and Lastrapes (1989)	Bilateral	73-85 Monthly	VAR	Negative
Chowdhury (1993)	Aggregate	73-90 Quarterly	VAR	Negative
Arize et al. (2003)	Aggregate	73-04 Quarterly	Cointegration, ECM	Negative
Kenen and Rodrik (1986)	Aggregate	75-84 Quarterly	OLS	Negative
Nkurunziza (2016)	Aggregate	96-13 Monthly	OLS	Positive
Kasman and Kasman (2005)	Aggregate	82-01 Quarterly	Cointegration	Positive
Yee et al. (2016)	Aggregate	75-13 Annually	OLS	Positive
McKenzie and Brooks (1997)	Bilateral	73-92 Monthly	OLS	Positive
Genc and Artar (2014)	Aggregate	85-12 Annually	Panel Cointegration	Cointegrated
Ahmad, Draz and Yang (2016)	Aggregate	70-09 Annually	VECM	Positive
Asseery and Peel (1991)	Aggregate	72-87 Quarterly	Squared residual from ARIMA process fitted to real exchange rate	Positive
Sandu and Ghiba (2011)	Aggregate	03-11 Quarterly	VAR	Positive
TanreYRO (2007)	Bilateral	70-97 Annually	Panel Pseudo-maximum likelihood Instrumental variable	No effect
Aristotelous (2001)	Bilateral	1889-1999 Annually	Time series Granger method of co-integration	No effect
Lee (1999)	Sectoral	73-92 Quarterly	VAR	No effect

**SOURCE:** Author's own compilation from different sources

### **3.5.2.3 The No-Relationship Findings**

In a bilateral study between the UK and the US, Aristotelous (2001) applying time series Granger method of co-integration examined how exchange rate volatility and change of exchange rate regime for the period of one century from 1889 to 1999 affected the UK's exports to the US. And the findings of the study were such that; exchange rate found to have no impact of the volume of UK's exports to the US and with such findings, it supported the theory that suggests that exchange rate volatility does affect other variables such as prices of FDI but not exports. And another conclusion was that, in the century studied, the change of exchange rate regimes took place had no impact on UK's exports for that no evidence found whatsoever.

In another comprehensive study of 104 countries, covering the period from 1970 to 1997, Tenreyro (2007) applied "Panel Pseudo-maximum likelihood Instrumental Variable" to study how nominal exchange rate volatility affect trade flows of countries under the study. This study is unique because it covered so many countries unlike most of past studies, and more so is the challenge and critique posed by the author. It was argued in this study that, the conventional methods applied before to study the effects of exchange rate volatility on trade flows are full of systematic biases brought into the literature from a variety of sources and hence gave spurious results. The results of analysis in this study was that; exchange rate volatility has no impact on trade flows.

A sectoral study by Lee (1999) found that exchange rate volatility has no effect on durable goods trade. The study applied VAR model of times series analysis and GARCH method of measuring volatility of exchange rate between the US vs G7 countries plus The Netherlands, Belgium, Sweden and Switzerland. The study used quarterly data for the period from 1973 to 1992.

### **3.6 Globalisation and Trade**

The term globalisation stands for a worldwide movement of integrating countries and communities towards having common economic, financial, trade and communications platform. With globalisation, economies become much more interconnected and interdependent with free movement of capital, good and services beyond their traditional borders. IMF (2006) defined globalisation as the process through which an increasingly free flow of ideas, people, goods, services, and capital leads to the integration of economies and societies. Major factors in the spread of globalization have been increased trade liberalization and advances in communication technology. Here comes clear that, this rapid movement of change all over the world is of paramount importance when it comes to policy issues pertaining to exports. At the epicentre of globalisation there is mass but gradual shift of most small economies like Tanzania and SSA countries to industrialisation, meaning that, gradually, these countries are moving from traditional economies based on agriculture to industrialised ones. The move will stimulate business activity, technology improvement, and high labour productivity; and is made possible through high influx of FDI. Trade wise, such a movement came with improved means of transportation for easy movement of goods across countries, also it made labour much more mobile, something quite contrary to the Heckscher-Ohlin theory discussed earlier in the previous chapter (Chapter 2). In another literature, Rajeev (2009) credited globalisation that it created an environment such that multinational companies (MNCs) can locate their production sites into different countries and reap the advantages available, and this will benefit different countries at once and many countries together contributing to technological growth. But Amighini and Rabelotti (2003) on the other hand, they warned that globalisation can harm the traditional trade and production activities in the economy. All in all, globalisation made common currencies possible, and there is empirical evidence that this increased export. A good case is of European Union as reported by European Central Bank that from 1999 to mid-2000s the exports increase from 33% of the GDP to 38% of the GDP. (Bunda, Di Mauro, & Ruffer, 2008).



### **3.7 Regulations and Trade**

With globalisation transforming the world, the vivid thing here is that; for any single country, it trades with several countries simultaneously. The number of goods, services and production inputs that countries are exchanging also are of varying kinds and number. This fact refutes other assumptions of Heckscher-Ohlin theory of two economies producing only two commodities as discussed before. But countries are not of the same level of development and not with the same magnitude of endowment of factors of production, so if globalisation must be left completely to flow, there could be imbalance in a sense that, some countries will always gain out international trade deals while others are always losers. Hence, countries apply protectionism policies to balance the phenomena. Those policy restrictions set are for the purpose of regulating the whole trade game such that local producers are shielded from stiff competition from abroad they cannot stand with. Hall and Lieberman (2006) pointed out the reasons behind regulations and wrote that; countries are having price differentials such that if not regulated, trade can result in more costs than benefits. Therefore, policies are from time to time adjusted to ensure benefit to the economy.

Different policies are normally used. Those includes among many others; quotas, tariff and boycott. Application of restrictions makes imports expensive and exports cheap abroad; at the same time defend the local industries by making locally produced goods price competitive and improving balance of trade after discouraged importation.

## **CHAPTER 4**

### **METHODOLOGY**

#### **4.0 Overview**

In the previous chapter, the results of various relevant empirical studies in the existing literature were carefully scrutinised. And based on such careful examination of past studies, methods of how best to deal with the dataset were derived. Finally, variables were identified and appropriately selected. Also, model for analysis and assumptions thereof were carefully decided. Hence, in this chapter, how and what dataset was collected, time-period covered and all necessary step-wise chronology of analysis of data (model) and concerned tests and estimations are explained. The time series methodology is selected to unveil the relationship between the variables, based on the nature of the data used.

Section 4.1 to Section 4.5 explains research problem, questions and objectives of this study. It also answered questions of why this study is needed (gap), why it is important and what is the contribution of this study. It went on identifying data, their sources and collection methods and of course reasons behind their selection. And the first five parts ends discussing various variables used in this study. Section 4.6 stipulates data analysis techniques used; exploratory data analysis and unit root (stationarity) test are well explained. Finally, Section 4.7 specifies the model used in the analysis and the estimation techniques employed. Cointegration test, Vector Auto-Regressive (VAR) Model and Granger-Causality all are discussed. It is correct to say that; the methodology was both exploratory and descriptive based on the existing literature – a mixed approach. Quantitative - through the econometrics analysis to assess the relationship and Qualitative in a sense that it considers the application of available data to give a descriptive analysis on the trend in exports performance of Tanzania. It also looked at existing literature and harness the results of the econometric work for recommending policy direction.

#### **4.1 Research Problem, Research Questions and Objectives**

The key problem existing is lack of empirically established relationship between the exchange rate of Tanzanian shilling and Tanzania's exports performance, something that brings a sub-problem of lack of clearly studied Granger Causality between the two variables. Hence, this study tried to provide answers to the following research questions:

- i. Is there long-run relationship between exchange rate of Tanzanian shilling and Tanzania's exports?
- ii. Is there short-run relationship between exchange rate of Tanzanian shilling and Tanzania's exports?
- iii. Can exchange rate of Tanzanian shilling Granger Cause on Tanzania's exports?

Considering the significance of the proposed topic from both theoretical and practical view, plus very limited number of studies so far conducted regarding Tanzania, this thesis focused into achieving the following general and specific objectives:

##### ***General Objective***

Generally, the study intends to empirically investigate the possible short and long-run relationship between exchange rate of Tanzanian shilling and Tanzania's exports performance (exchange rate level rather than volatility).

##### ***Specific Objectives***

Specifically, the study is meant:

- i. To investigate any relationship between exchange rate of Tanzanian shilling and Tanzania's exports performance; Cointegration, Negative, Positive or No-Relation.
- ii. To examine the Granger Causality of exchange rates of Tanzanian shilling and Tanzania's exports.

## **4.2 The Existing Research Gap**

As introduced in the previous chapter, among the pioneer review of literature on the subject matter was the article of McKenzie (1999) and the study showed no consensus in the conclusions regarding the confirmed relationship between exchange rate volatility and exports performance. After such a review, the academia flooded with empirical studies on the relationship of exchange rate volatility and exports performance. These post-review studies also came with new models and measurements of volatility. Eight years later, Bahmani-Oskooee and Hegerty (2007) continued the work of McKenzie. This second review article by Bahmani-Oskooee and Hegerty incorporated literature up to the year 2005. This time again no consensus regarding the established relationship between the two variables. But above all, going through all those previous empirical works up to this time, one observation is vivid; and that is the fact that almost all of those studies were investigating the effects of exchange rate volatility on exports and concentrated on the developed countries, with few studies on emerging countries. And almost no studies on developing Sub-Saharan Africa, Tanzania especially – and here is where the huge gap exist, possibly the big reason behind less studies in SSA countries could be the lack of data among other reasons but recently there have been much improvement in the collection and dissemination of statistical data. This study investigates the effects of exchange rates on exports performance, but exchange rate level rather than volatility, because exchange rate does affect exports in two ways; level of the current exchange rate and the its frequency of change (volatility). (Beenstock, 1995; Kandil & Nergiz Dincer, 2008; Morgenroth, 2000)

## **4.3 Significance of the Study**

Though, this study was not meant to determining an alternative exchange rate arrangement (regime) for the country, but quantitative determination of the magnitude of the impact of exchange rate on country's exports will assist in focusing domestic policies on how to alleviate the negative impact if any. These would improve the Tanzania's trade balance and promote economic growth in return. Hence, it is expected that, this study is of paramount importance, benefit and use to a number of stakeholders, from policy makers to investors,

from individual participants (importers and exporters) to multinational companies operating in Tanzania or thinking to do so, from academics within Tanzania to academics out of Tanzania, from the author's university (AYBU) to other institutions to mention a few.

- i. The findings of this study help to know at what magnitude the exchange rate and exports in Tanzania are related.
- ii. The findings help to establishing the determinants of Tanzania's exports which is something crucial for a fastest growing economy like the one of Tanzania.
- iii. The study enables the Bank of Tanzania (Central Bank), policy makers as well as regulators to identify the potential factors that are influencing the exports for policy formation.
- iv. The study added to the already existing body of literature and hence serve as a reference for future research.

#### **4.4 Data, Sources and Collection**

The dataset used in the analysis of this study were secondary in nature (time series) and collected from two official sources; International Monetary Fund's International Financial Statistics (IFS) and the central bank of Tanzania known as Bank of Tanzania (BOT) via its regular quarterly economic review reports of the country (Tanzania) freely available online (in the bank's website) for public use. The data, of all variables (three variables) are collected as quarterly averages covering the period from 1st of January 1993 until 31st of December 2016 - a period of 24 years. The focus was on quarterly data rather than semi-annual because it reduces time aggregation bias and capture both short and long-run behaviours if any. All variables during empirical analysis were converted and expressed into logarithm form. The reasons behind this transformation is the exponential patterns with consistent upward fluctuation that can easily be visible in the whole raw data. Such exponential feature is likely to blur crucial connection between variables and hence, should be diminished effectively by treating them in logarithmic form, and converting data into logarithms is useful in turning

substantially skewed data to be fairly symmetrical/normal, and therefore contributes considerably to eliminating heteroscedasticity. In a nutshell, two variables are the main; exchange rate (USD/TZS) and exports. Other variable used is “foreign demand” of Tanzania’s exports proxied by Industrial Production Index (IPI) of six among ten major trade partner countries to Tanzania.

Referring to Akhtar and Hilton (1984), Chowdhury (1993) and Bahmani-Oskooee and Hegerty (2007), using nominal or real figures of exchange rates to analyse the effect has been an on-going debate still. Some of the studies showed that when nominal exchange rates were used it has a significant effect on exports. (Akhtar & Hilton, 1984; Hooper & Kohlhausen, 1978). Others found that when real figures of exchange rate were used, export is significantly affected. (Cushman, 1986; Kenen & Rodrik, 1986). Other studies reported that whether nominal or real data are used results are qualitatively similar. (Koray & Lastrapes, 1989). Hence, with such ambiguous nature regarding acceptable ways of measuring the variables, this study took nominal figures of exchange rates and exports. The quarterly currency rate of Tanzanian shilling was taken as the price of single unit of US dollar (US\$/TZS) - indirect quote, showing number of shillings that buys a single US dollar such that an increase in the exchange rate means depreciation of TZS against the US\$. Such an exchange rate was used since most of trade deals between Tanzania and her trading partners are executed in US\$. And in the country’s domestic trading, the US\$ is the dominant among all foreign currencies locally accepted. Hence, it is expected that given the fluctuation of the US dollar in the international markets, it is indirectly translated or passed to the Tanzanian shilling. Therefore, exploring Tanzania’s exports dynamism using the dollar/shilling exchange rate would give a clear understanding of the country’s export performance.

And about the variable export, this study focused on the country’s aggregate exports (value in local currencies) from Tanzania to the rest of the world. The study takes evidence from Tanzanian shilling’s nominal, aggregate values of exports (as per previous studies), (Bahmani-Oskooee & Hegerty, 2007) to examine the nexus between exchange rate level and exports performance of the country. And like the case for exchange rate above, using nominal or real

figures of exports to analyse the effect has been an on-going debate again. The exports data were defined as the quarterly values of exports as mentioned above.

Based on the export function introduced in the third chapter earlier, export being a dependent variable is a function of exchange rate and foreign demand (FD). The foreign demand variable (FD) was represented by quarterly average of industrial production index of six countries among top ten destinations of Tanzania's exports (See Table 4.1 below).

$$EXP = f(ER, FD) \dots\dots\dots (4.1)$$

The six countries acted as a proxy for the demand of Tanzania's exports abroad i.e. if a partner country's industrial production index goes up, more of imports are needed to feed the now expanded production capacity. This took into account the fact that Tanzania's exports like most of other developing countries, are raw materials to the industries of the destination countries. The countries of which the industrial production index was collected are India, Belgium, Germany, Switzerland, Netherlands and Japan. (NBS, 2016).

**Table 4.1 Tanzania's Top 10 Exports Destinations, 2007 -2013**

<b>RANK</b>	<b>COUNTRY</b>	<b>VALUE (TZS Million)</b>
1	Switzerland	6,554,325
2	South Africa	5,444,597
3	China	4,446,698
4	India	3,138,635
5	Kenya	2,180,217
6	Japan	2,165,946
7	Germany	1,535,269
8	Democratic Republic of Congo	1,390,316
9	Netherlands	1,103,758
10	Belgium	862,564

**Source:** Data from National Bureau of Statistics, Tanzania and author's own calculations

## **4.5 Data Analysis Techniques**

The study used time series data and so the time series methodologies were applied in analysing the dataset. The study was conducted using EViews 9.0 econometric software package, to test the causal relationship of exchange rate volatility and exports. The following tests were employed: Unit root test for stationarity; Augmented Dickey-Fuller Test (ADF). Cointegration test; (Johansen), VECM Granger Causality test, Impulse Response Function and Variance Decomposition. The implementation of these time series variables discussed in this section and all statistical tests was carried out at 5% level of significance.

### **4.5.1 Exploratory Data Analysis**

The techniques used in this section are mostly graphical and descriptive statistics. This procedure enables the researcher to gain an insight into the data set, extract important variables and their distributions. Also, enables detection of other anomalies.

Various empirical studies noticed that it is common to transform times series data into natural logarithms. Benoit (2011) stated that logarithmically transforming variables in a time series model is a very common way to handle situations where a non-linear relationship exists between the independent and dependent variables. Moreover, logarithmic transformations are a convenient means of transforming a highly-skewed variable into one that is more approximately normal. Thus, in this study, variables were transformed into natural logarithms in order to interpret the coefficients of the cointegrating vector as long-term elasticity.

The data distribution was examined using graphs and standard descriptive statistics namely mean, median, standard deviation, skewness and kurtosis. Jarque and Bera (1980) test was conducted to ascertain the normality of the data distribution under the null hypothesis of normal distribution such that if result, J-B value is greater than zero, it is said to have deviated from the normal distribution assumption. Similarly, skewness and kurtosis represent the nature of departure from normality. In a normally distributed series, skewness is 0 and kurtosis is 3. Positive or negative skewness indicate asymmetry in the series and less than or greater than 3 kurtosis coefficients suggest flatness and peaked-ness, respectively.



Also, the assumption that the errors terms are linearly independent of one another (uncorrelated with one another) was tested such that if the errors are correlated with one another, it is stated that they are auto correlated. To test for the existence of autocorrelation or not, the popular Breusch-Godfrey Serial correlation LM test was employed. As noted in (Brooks, 2014) the rejection/non-ejection rule would be given by selecting the appropriate region.

Furthermore, to test for the presence of heteroscedasticity, the popular White test was employed in this study. This test involves testing the null hypothesis that the variance of the errors is constant (homoscedasticity) or no heteroscedasticity.

#### 4.5.2 Test for Stationarity (Unit Root Test)

Most time series data are found to be non-stationary. A stochastic process is said to be stationary if its mean and variance are constant overtime, while the value of the covariance between two periods depend only on the gap between the periods and not the actual time at which this covariance is considered. If one or more of these conditions are not fulfilled then the process is said to be non-stationary (Charemza & Deadman, 1992). The most famous unit root test; Augmented Dickey-Fuller (ADF) test was conducted to investigate the property of time series data as proposed by Dickey and Fuller (1981). In order to check the stationarity of the variables, the following two regression forms were used:

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \sum_{j=1}^p \gamma_j \Delta Y_{t-j} + \varepsilon_t, \quad (\text{With Constant}) \quad (i)$$

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \alpha_2 t + \sum_{j=1}^p \gamma_j \Delta Y_{t-j} + \varepsilon_t, \quad (\text{With Constant and trend}) \quad (ii)$$

For all  $t = 1, 2, \dots, 120$  and  $\varepsilon_t$  is a white Noise.

Where  $\Delta$  is the first lag operator,  $\alpha$  the constant and  $\beta$  the coefficient of time trend and  $p$  is the lag order. The null hypothesis is  $\rho = 0$  against the alternative  $\rho < 0$ . If the calculated ADF statistic is greater than 1 fail to reject the null hypothesis of presence of unit root. The additional lagged terms were included to ensure that the errors are uncorrelated.

#### **4.6 Empirical Design (Model Specification and Estimation)**

If there is cointegration among the variables, Vector Error Correction model (VECM) based on causality test are normally employed while Vector Auto-Regression model (VAR) is used in case of no-cointegration among variables. Since the purpose is to check the nexus of exchange rate and exports, and no cointegration is found among variables, then the VAR model was picked and hence defined below:

##### **4.6.1 Cointegration Test**

Firstly, after stationarity was tested to prove that all variables are integrated at the same order  $I(1)$ , the second stage in methodological process was to run a cointegration test. To perform this, Johansen cointegration test was used. This was proposed by Johansen and Juselius (1990), and Johansen (1991); (Johansen, 1995). The test used both the Trace statistics and the maximum Eigenvalue tests. The optimal lag length in this test was based on using the Akaike Information Criterion (AIC). Johansen's methodology takes its starting point in the vector auto regression (VAR) of order  $p$ . When the variables are found to be cointegrated, the relationship may be interpreted as a long run relationship. Since the study investigates the relationship between exchange rate and exports, then the hypothesis for the cointegration vectors was clearly defined. In order to test the hypothesis, the order of the cointegration vector needs to be determined first. The order (rank) of cointegration  $r$  was determined by constructing the trace statistics  $\lambda_{trace}$  and the estimated values of the characteristic roots or Eigenvalues  $\lambda_{max}$ .

#### 4.6.2 Vector Autoregressive Model and Granger Causality Test

It is admitted that error correction model can do a good job of pinpointing a short and long run effect, however it is usually not stable and thus not very useful in prediction, hence, the Vector Autoregressive (VAR) model is estimated in first-difference in case of absence of cointegrating relation among the variables by excluding the error correction term,  $\lambda\varepsilon_{t-1}$  for Granger causality with a short-term interactive feedback relationship following Granger (1988). This suggested empirical model has already been used in the context of exchange rate volatility and exports by a considerable number of studies. A VAR model of order  $p$ , where the order  $p$  represents the number of lags, that includes  $k$  variables. For each currency  $i$  estimate the following:

$$\Delta \ln EXP_t = \alpha + \sum_{t=1}^p u_i \Delta \ln EXP_{t-1} + \sum_{t=1}^p v_i \Delta \ln ExRate_{t-1} + \sum_{t=1}^p w_i \Delta \ln IPI_{t-1} + \varepsilon_t \dots (iii)$$

$$\Delta \ln ExRate_t = \alpha + \sum_{t=1}^p v_i \Delta \ln ExRate_{t-1} + \sum_{t=1}^p u_i \Delta \ln EXP_{t-1} + \sum_{t=1}^p w_i \Delta \ln IPI_{t-1} + \varepsilon_t \dots (iv)$$

$$\Delta \ln IPI_t = \alpha + \sum_{t=1}^p w_i \Delta \ln IPI_{t-1} + \sum_{t=1}^p u_i \Delta \ln EXP_{t-1} + \sum_{t=1}^p v_i \Delta \ln ExRate_{t-1} + \varepsilon_t \dots (v)$$

Where,  $\ln EXP$  = natural log of Export,  $\ln ExRate$  = natural log of exchange rate and  $\ln IPI$  = natural log of industrial production index. In Equations (iii to v),  $\alpha$  is a vector of constants,  $\varepsilon$  denotes the white noise error terms and  $t$  stands for the time lags. The optimum lag length,  $p$ , is determined using the Schwartz Information Criterion (SIC). A bivariate VAR is estimated and diagnostic tests are run to check for serial correlation, heteroscedasticity, parameter instability, and structural breaks, and all tests must satisfy a particular lag number under Akaike Information Criterion (SIC).

### 4.6.3 Impulse Response Function

The Impulse Response Function (IRF) analyses the time profile of the effects of current shocks in one variable – say independent variable - on the current and future behaviour of other variable(s) – independent variable(s), and in this study, it is about tracing the effect of a one standard deviation shock to one of the innovations (shock, impulse, residuals and error terms) on current and future values of indigenous variables (dependent variables). Simply put, Impulse response functions represent the mechanisms through which shock spread over time. Consider the Wold representation of a covariance stationary VAR(p),

$$\begin{aligned} Y_t &= C(L)\varepsilon_t \\ &= \sum_{i=0}^{\infty} C_i \varepsilon_{t-i} \end{aligned} \quad (vi)$$

The matrix  $C_j$  has the interpretation:

$$\frac{\partial Y_t}{\partial \varepsilon'_{t-j}} = C_j \quad (vii)$$

OR

$$\frac{\partial Y_{t+j}}{\partial \varepsilon'_t} = C_j \quad (viii)$$

That is, the row  $i$ , column  $k$  element of  $C_j$  identifies the consequences of a unit increase in the  $k^{th}$  variable's innovation at date  $t$  for the value of the  $i^{th}$  variable at time  $t + j$  holding all other innovation at all dates constant. (Gambetti, 2017; Hamilton, 1994; Lu & Xin, 2010; Sandu & Ghiba, 2011).

#### 4.6.4 Variance Decomposition

In the VAR model of analysis, three tests are normally carried out to explore the existing relationship among variables being studied; Granger Causality, Impulse Response Function and Variance Decomposition. The idea of variance decomposition is to decompose the total variance of a time series into percentages attributable to each structural shock. The analysis of variance decomposition is important because it address questions such as “What are the sources of the business cycle?” and “Is the shock important for economic fluctuation?” and the like. (Gambetti, 2017; Hamilton, 1994; Sandu & Ghiba, 2011).

Consider the following identified VAR:

$$Y_t = F(L)w_t \quad (ix)$$

$$var(Y_{it}) = \sum_{k=1}^n \sum_{j=0}^{\infty} F_{ik}^{j2} var(w_{kt}) \quad (ix)$$

$$= \sum_{k=1}^n \sum_{j=0}^{\infty} F_{ik}^{j2} \quad (x)$$

Where  $\sum_{j=0}^{\infty} F_{ik}^{j2}$  is the variance of  $Y_{it}$  generated by the  $k$ th shock. This implies that:

$$\frac{\sum_{j=0}^{\infty} F_{ik}^{j2}}{\sum_{k=1}^n \sum_{j=0}^{\infty} F_{ik}^{j2}}$$

is the percentage of variance of  $Y_{it}$  explained by the  $k$ th shock.

## CHAPTER 5

### DATA ANALYSIS & INTERPRETATION

#### 5.0 Overview

This chapter discusses step-wise analysis regarding the effect of exchange rates on export performance with evidence from Tanzania's macroeconomic data. And not only analysis, but also the empirical interpretation following such an investigation. The chapter is divided into seven (7) sections, starting with general descriptive statistics of the dataset used, results of unit root tests conducted to check for stationarity, diagnostic test, cointegration test and running of the model to determine the relationship existing between the variables i.e. test for granger causality, impulse response function and variance decomposition respectively.

#### 5.1 Descriptive Statistics

Summary statistics for the return series are presented in Table 5.1. All the variables have positive mean such that export (LOGEXP\_SA) has the highest and industrial production index (proxy of foreign demand) has the lowest mean. Regarding the standard deviation, seasonally adjusted export (LOGEXP\_SA) is more volatile than Tanzanian Shilling (LOGEXRATE) and foreign demand (LOGIPI\_SA) as it has higher standard deviation. In addition, the Jarque-Bera statistics for two variables; exports (LOGEXP\_SA) and industrial production index (LOGIPI\_SA) reject the null hypothesis that the series are normally distributed for all indices since the probability of JB test is equal to zero. And for variable exchange rate (LOGEXRATE), the JB test accepts the null hypothesis as the probability of the test is not equal to zero. All the signs of the skewness are negative for all three variables. Moreover, looking at the coefficients for kurtosis as a measure of peaked-ness or flatness of the distribution of the series, all return series are platykurtic (kurtosis value less than 3), this indicates that they are flat relative to normal. (Balanda & MacGillivray, 1988; Westfall, 2014).

**Table 5.1: Descriptive Statistics**

	LOGEXP01_SA	LOGEXRATE	LOGIPI_SA
Mean	12.90371	6.931176	4.463574
Median	12.94468	7.009685	4.461471
Maximum	14.99550	7.687951	4.657993
Minimum	10.49397	5.846116	4.189107
Std. Dev.	1.326649	0.449297	0.152571
Skewness	-0.033537	-0.322452	-0.190164
Kurtosis	1.672810	2.245243	1.630660
Jarque-Bera Probability	7.063728 0.029250	3.942233 0.139301	8.078963 0.017607
Sum	1238.756	665.3929	428.5031
Sum Sq. Dev.	167.1998	19.17745	2.211388
Observations	96	96	96

**SOURCE:** Eviews analysis

## 5.2 Results of Unit Root Tests

As mentioned in the previous chapter i.e. methodology part, an alternative of unit root test: Augmented Dickey-Fuller test - ADF (Dickey & Fuller, 1981) was used to test for stationarity. The choice of the lag length required for the test is based on Akaike Information Criterion (AIC) such that, when the max lag length is 10, the optimal lag order was determined by AIC as 5. The null hypothesis of ADF test is that; a series has a unit root (non-stationary process) against the alternative hypothesis of stationary. The results derived from ADF unit root tests are presented in the Table 5.2 below. Based on the test, in terms of ADF test including constant and constant and trend terms, at a level for all log return series, the null hypothesis of a unit root process could not be rejected, except for exchange rate when tested including “constant and trend”. However, for all differentiated variables series under ADF test including

constant and constant and trend term, the null hypothesis of existence of a unit root could strongly be rejected at 1% level of significance. Therefore, our tests results suggest that at level, almost all variables series have a unit root (except exports). But at first difference, all variables appear to be integrated at the same order one,  $I(1)$ .

**Table 5.2: Unit Root Test**

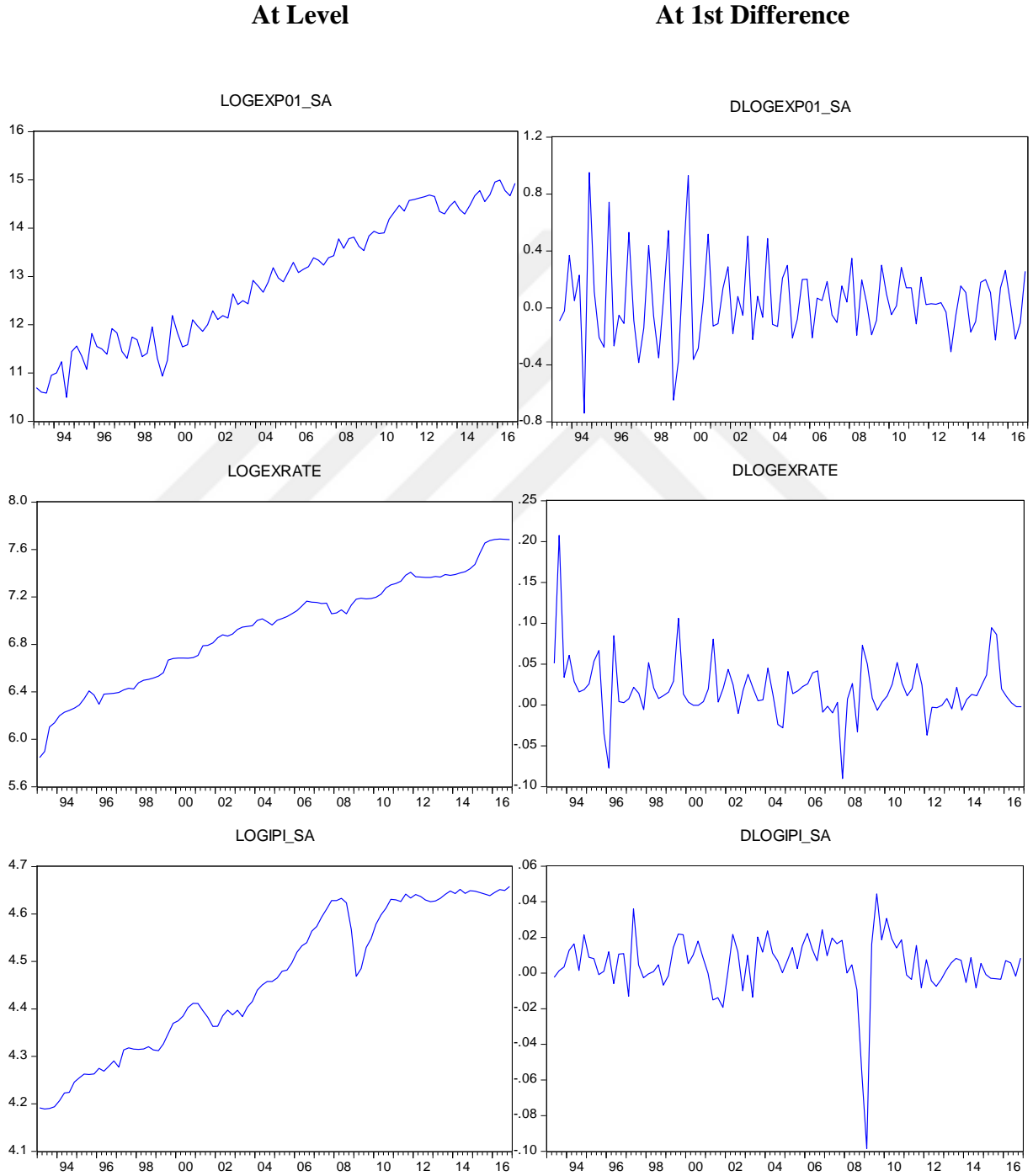
<b>VARIABLE</b>	<b>ADF</b>	
	<b>Constant</b>	<b>Constant and Trend</b>
<b><u>AT LEVEL</u></b>		
LogEXP_SA	-0.769055	-2.132707
LogExRate	-2.421591	-4.457484***
LogIPI_SA	-1.380577	-3.353496
<b><u>1<sup>st</sup>DIFFERENCE</u></b>		
LogEXP_SA	-5.204608***	-5.198691***
LogExRate	-8.018438***	-8.142299***
LogIPI_SA	-6.615565***	-6.625333***

**Note:** \*, \*\* and \*\*\* indicate significance level at 10%, 5% and 1%, respectively

**Source:** EViews Analysis of Data



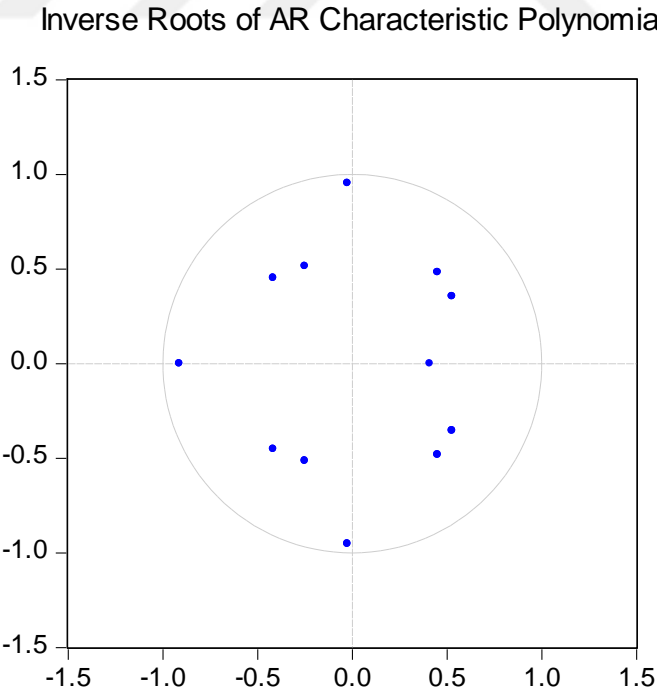
**Figure 5.1: Unit Root Test Results, Graphical Illustration**



### 5.3 Diagnostic Tests Results

For the purpose of avoiding spurious results; all assumptions of error term and residual diagnostic were tested. Also, the stability of VAR model was checked (See AR Roots Graph below in Figure 5.2). The figure shows that the VAR satisfy stability condition as there is no root laying outside the unit circle. To test for the existence of autocorrelation or not, the popular Breusch-Godfrey Serial Correlation LM test was employed. The result noted that the null hypothesis can be rejected as error terms are linearly independent of one another. Furthermore, the result indicates that the null hypothesis; the variance of the errors is constant or no heteroscedasticity, cannot be rejected. In addition, the Jarque-Bera statistics reject the null hypothesis that the series are normally distributed for all indices since the probability of J-B test is equal to zero. Under the null hypothesis of normal distribution, Jarque-Bera (J-B) is 0.

**Figure 5.2:** AR Roots Graph



#### **5.4 Cointegration Test**

All variables were dully tested and proved that they are integrated at the same order  $I(1)$ . Thus, it gave justification to carry out cointegration test to find, if whether exchange rates of Tanzanian shilling and the country's exports have long run relationship or otherwise. And in so doing, the Johansen cointegration test was used, as proposed by Johansen and Juselius (1990), Johansen (1991) and Johansen (1995). When max lag length is 10, the lag order was determined by Akaike Information Criterion (AIC) as 5. Table 5.3 below reports the results of the test, and shows that the results of cointegration from two tests of Trace Statistics and Max-Eigen Statistics do match. While the trace statistics shows that there are no cointegrating equations, so is the Max-Eigen statistics gives the same results. That is, based on the results of trace statistics and Max-Eigen statistics, the null hypothesis could not be rejected at 5% significance level. This way of testing for cointegration were used in several studies such as those of Vergil (2002), Özbay (1999), Arize et al. (2003) etc. among many others. The study by Kasman and Kasman (2005) found almost similar Johansen cointegration tests results such that out of four variables tested, three found to have not been cointegrated. Thus, there is no long run association among variables and based on these cointegration results, then VAR Granger Causality test was carried out to find direction of causality if any. Moreover, for that purpose of testing causality and the rest of VAR dynamic behaviour tests such as Impulse Response Function (IRF), variables were run at first difference. (Lütkepohl & Reimers, 1992; Sims, Stock, & Watson, 1990). Hence, all the test below, followed this approach as seen in the results presented.

**Table 5.3: The Johansen Cointegration Test Results**

Date: 07/09/17 Time: 22:06  
Sample (adjusted): 1994Q3 2016Q4  
Included observations: 90 after adjustments  
Trend assumption: Linear deterministic trend  
Series: LOGEXP01\_SA LOGEXRATE LOGIPI\_SA  
Lags interval (in first differences): 1 to 5

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.106641	15.65747	29.79707	0.7361
At most 1	0.052258	5.508413	15.49471	0.7527
At most 2	0.007503	0.677844	3.841466	0.4103

Trace test indicates no cointegration at the 0.05 level  
\* denotes rejection of the hypothesis at the 0.05 level  
\*\*MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.106641	10.14906	21.13162	0.7305
At most 1	0.052258	4.830569	14.26460	0.7631
At most 2	0.007503	0.677844	3.841466	0.4103

Max-eigenvalue test indicates no cointegration at the 0.05 level  
\* denotes rejection of the hypothesis at the 0.05 level  
\*\*MacKinnon-Haug-Michelis (1999) p-values

**5.5 The VAR Granger Causality**

This section tests the existing causality between variables which are; seasonally adjusted exports (LOGEXP\_SA), exchange rate of Tanzanian shilling (LOGEXRATE) and seasonally adjusted industrial production index (LOGIPI\_SA) of six major trading partners to Tanzania using VAR Granger Causality method. The **Table 5.4** shows the results of VAR Granger

Causality/Block Exogeneity Wald Tests. In the case of exchange rates and foreign demand to fluctuations in exports, the null hypothesis could be rejected i.e. exchange rate and foreign demand does granger cause the exports as probability values are significant at 5% level. Regarding exports and foreign demand to fluctuation of exchange rate, neither does granger cause exchange rate i.e. here the null hypothesis could not be rejected as probability value is not significant at any level of significance as seen in the table below. Finally, in the bottom part of the table, regarding fluctuation in foreign demand, neither export nor exchange rate granger causes foreign demand. Such results are in line with the study conducted by Alam (2010) among others. In a nutshell, these results imply that when exchange rate and foreign demand moves, so does the exports volume of the country.

**Table 5.4: VAR Granger Causality/Block Exogeneity Wald Tests**

VAR Granger Causality/Block Exogeneity Wald Tests

Date: 07/09/17 Time: 22:18

Sample: 1993Q1 2016Q4

Included observations: 91

Dependent variable: DLOGEXP01\_SA

Excluded	Chi-sq	df	Prob.
DLOGEXRATE	17.26162	4	0.0017
DLOGIPI_SA	12.05557	4	0.0169
All	25.93126	8	0.0011

Dependent variable: DLOGEXRATE

Excluded	Chi-sq	df	Prob.
DLOGEXP01_SA	5.183196	4	0.2690
DLOGIPI_SA	0.182373	4	0.9961
All	5.869143	8	0.6619

Dependent variable: DLOGIPI\_SA

Excluded	Chi-sq	df	Prob.
DLOGEXP01_SA	4.858376	4	0.3021
DLOGEXRATE	7.909114	4	0.0950
All	10.19977	8	0.2513

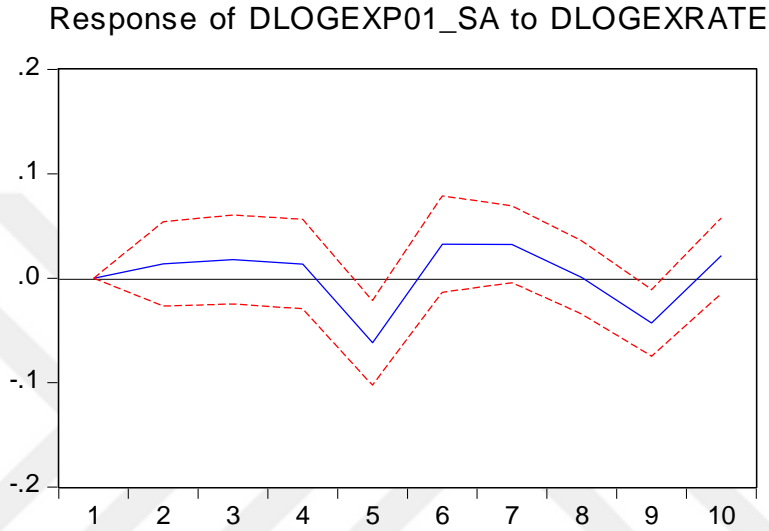
**NOTE:** Null hypothesis: “Does not Granger Cause” Hence, do not reject null hypothesis if Prob. Value is greater than 5%. That means, in this case, both exchange rate and foreign demand (LOGIPI\_SA) granger cause exports (each with unidirectional causality).

### 5.6 Impulse Response Function

As introduced before, the impulse response function analyses the time profile of the effects of current shocks on the future behaviour of variables i.e. exports, exchange rates and industrial production index in this study. Figure 5.3 shows that based on IRF, a one-standard deviation positive shock to exchange rate (depreciation of local currency) increases the country’s exports in nominal terms. And although the effect of shock is contemporaneous but it is not statistically significant at the 5% in the first four periods. Moreover, such effect of shocks is not permanent as it does not increase exports for all 10 periods.

**Figure 5.3: Response to Cholesky One S.D. Innovations  $\pm 2$  S.E.**

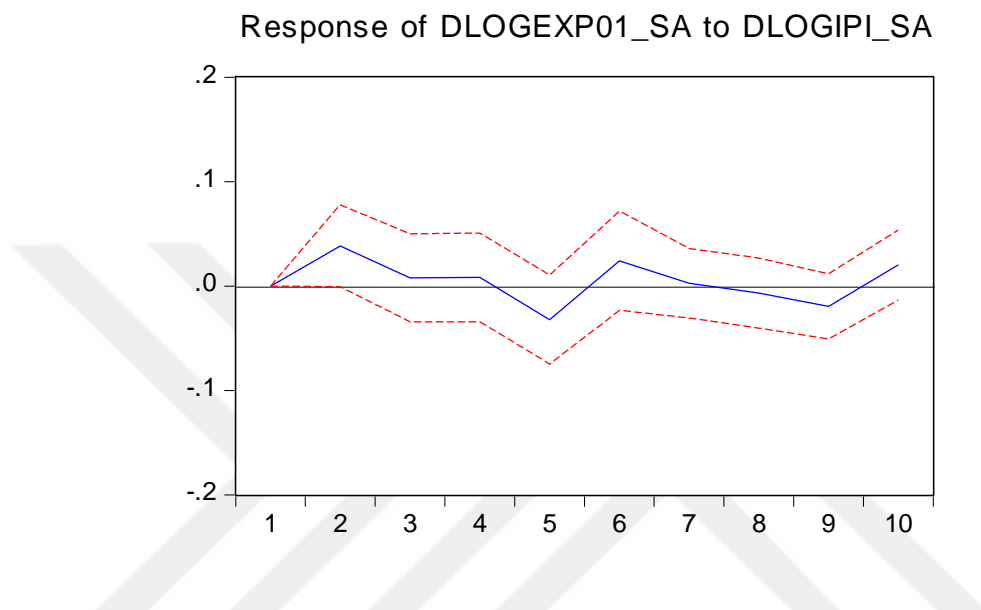
Response to Cholesky One S.D. Innovations  $\pm 2$  S.E.



The Figure 5.4 below, on the other hand, is about how export responds to shocks in foreign demand of Tanzania's exports (Industrial Production Index). The graph shows that; a one-standard deviation positive shock to foreign demand (DLOGIPI\_SA) increases the country's exports. And as was the case above, although the effect of shock is contemporaneous but it is not statistically significant at the 5% in the first four periods. Moreover, such effect of shocks is not permanent as it does not increase exports for all 10 periods.

**Figure 5.4: Response to Cholesky One S.D. Innovations  $\pm 2$  S.E.**

Response to Cholesky One S.D. Innovations  $\pm 2$  S.E.



### 5.7 Variance Decomposition

As said earlier, the idea behind variance decomposition is to decompose the total variance of a time series into percentages attributable to each structural shock applicable to VAR model (Gambetti, 2017; Hamilton, 1994). The tables below decompose the variances of our three variables (nominal figures, remember) into quarters attributable to shocks (impulses or innovations). This gives a clear sense of the effects of shocks into the variables overtime. As seen starting with Table 5.5, in the short time, as soon as after one quarter i.e. in the 2<sup>nd</sup> quarter, a shock in the exchange rate accounts for 1.34 percent in the fluctuation of exports. And the variance went on increasing after the second quarter onwards reaching 12.59 percent in the 9<sup>th</sup> quarter period.

Observing again, the same Table 5.5, there is a quick variance (as soon as after one quarter-period) in exports following a shock in foreign demand (IPI\_SA), a variance accounted to 4.496 percent just in the second period. And variance on periods following that remained



relatively stable such that in the 10<sup>th</sup> period, the variance is 4.7 percent. These results tell us that, the effects of shocks in independent variables exchange rate and foreign demand to the exports volume are weak (less than 5% in the short run - as there is no long run association among variables).

**Table 5.5: Variance Decomposition Results**

Variance Decomposition of DLOGEXP01_SA:			
Period	S.E.	DLOGEXRATE	DLOGIPI_SA
1	0.168104	0.000000	0.000000
2	0.188974	0.490975	4.496833
3	0.194551	1.343258	4.435939
4	0.195972	2.480984	4.637706
5	0.225559	9.513667	5.033102
6	0.234865	9.390862	4.853374
7	0.238551	10.68771	4.710630
8	0.238855	10.76960	4.701077
9	0.253934	12.59322	4.600469
10	0.259705	12.30375	4.698266

Variance Decomposition of DLOGEXRATE:			
Period	S.E.	DLOGEXP01_SA	DLOGIPI_SA
1	0.030967	0.397900	0.000000
2	0.031526	0.496104	0.095364
3	0.031757	0.673569	0.244217
4	0.031781	0.717602	0.304978
5	0.032122	2.660981	0.298848
6	0.032144	2.672171	0.364183
7	0.032276	3.373560	0.375170
8	0.032284	3.373500	0.377809
9	0.032420	3.883830	0.412293
10	0.032431	3.936052	0.412143

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Variance Decomposition of DLOGIPI\_SA:

Period	S.E.	DLOGEXP01_SA	DLOGEXRATE
1	0.015922	1.241335	5.580110
2	0.017195	3.338413	5.065313
3	0.017497	5.659344	5.874518
4	0.017585	6.328342	5.835702
5	0.017957	6.416627	8.186538
6	0.018158	6.275651	9.510411
7	0.018174	6.313335	9.498356
8	0.018186	6.413672	9.505533
9	0.018195	6.439830	9.522824
10	0.018202	6.439401	9.572159

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Cholesky Ordering: DLOGEXP01\_SA DLOGEXRATE DLOGIPI\_SA

## CHAPTER 6

### CONCLUSION AND RECOMMENDATIONS

#### 6.0 Overview

This study was mainly about analysing macroeconomic data to investigate the existing relationship (if any) between exchange rates of Tanzanian shilling and the country's export performance. Hence, this being the final part of the report, it presents summary, conclusion and recommendations for future trade policies and for further studies on the subject matter.

#### 6.1 Summary

Using quarterly time series data for the period from 1993Q1 to 2016Q4, Vector Autoregressive (VAR) model was employed to test the relationship of Tanzanian shilling's exchange rates and exports. Due to absence of cointegrating vector equations, VAR Granger Causality was tested to check the causality between three variables involved in this study; exchange rate, export and foreign demand (proxied by industrial production index of Tanzania's major trading partners). The VAR model has proven to be quite useful for describing the dynamic behaviour of economic and financial time series and for forecasting because it is flexible and it capture the linear interdependencies among multiple time series.

Since classical linear regression models assume that series under inspection are stationary; then in this study, as an initial step, unit root tests to check for stationary nature of variables under consideration were carried out. ADF unit root test revealed that all the three variables; exports, exchange rates and industrial production index are stationary at first difference; therefore, they are said to be integrated at order one,  $I(1)$ . Following the results of unit root rests that provided evidence that the three variables under investigation are at the same order (I), then cointegrating vector test was employed to check if the variables have long-run association

or

not.

To test for cointegration, the Johansen-Juselius method was used as the most widely used following approaches proposed in the past studies; (Engle & Granger, 1987; Granger, 1988; Johansen, 1991; Johansen & Juselius, 1990). The result of cointegration shows that there is no evidence of cointegration using both Trace statistics and Max Eigen test statistics. Both tests applied 5% significance level. Generally, these results indicate that, there is no long-run association between exchange rates, exports and industrial production index.

Results of VAR Granger Causality tests for exchange rates, exports and foreign demand (IPI) reveal that in case of exchange rate and foreign demand to export fluctuation, the null hypothesis could be rejected, that means both exchange rate and foreign demand granger cause the country's exports as probability values are significant at 5% level. Moreover, on top of these two unidirectional causalities, all other directions found to have no causality.

On impulse response function, the results reveal that; shocks in exchange rates have an immediate weak positive effect on exports; as soon as just after one period (quarter in this case), but, such effect on exports volume is not statistical significant and consistent only to the fifth quarter where a significant negative response is seen. On the other hand, effect of foreign demand's shock on exports volume, the result indicates that there is, immediate weak positive effect, starting from as soon as in the second quarter and sustained only to the fifth quarter where again, significant drop is seen.

Finally, the variance decomposition was applied to breakdown the variances over time. And the results showed that in nominal terms, exchange rates and foreign demand have positive influence on fluctuation of exports; shock in exchange rates can cause 1.3 % in the fluctuation of exports in the third period and it reach 12.3% in the tenth period. Foreign demand on the other hand, can cause about 4.49% fluctuation in exports just after one period and remained almost the same until the tenth period. All these, generally shows that, exchange rate and foreign demand have statistically significant effects on exports volume.

## **6.2 General Conclusion**

The key finding of this study, therefore, is that; there is no cointegration between exchange rates of Tanzanian shilling and exports. And, the findings obtained through VAR Granger Causality test shows that exchange rates of Tanzanian shilling and foreign demand granger cause the country's exports volume i.e. any change in exchange rate movements or foreign demand will bring significant change to Tanzania's exports. The Impulse Response Function (IRF) shows that; a one-standard deviation positive shock to exchange rate (depreciation of local currency) increases the country's exports in nominal terms. And although the effect of shock is contemporaneous but it is not statistically significant at the 5% in the first four periods. Moreover, such effect of shocks is not permanent as it does not increase exports for all 10 periods. The same were observed when a one-standard deviation positive shock to the foreign demand was applied.. The Variance Decomposition shows that, the effect of exchange rates on exports is weak in the earlier periods (less than 5 percent) but becomes strong in the future. The results similar to these were also reached by Sandu and Ghiba (2011) in a study which is methodologically closer to this one regarding Romanian economy. Also by Oluyemi and Isaac (2017) in a recent study on Nigerian economy among studies applied VAR model of time series analysis.

## **6.3 Policy Recommendation**

As the findings suggest, exchange rate level of Tanzanian shilling (in nominal terms) do affect the country's exports performance. In other words, it shows that depreciation or deliberate devaluation of Tanzanian Shilling does contribute to boosting of country's exports volume (in line with the Marshall-Lerner Condition). Hence, the monetary policies of the country can continue devaluation strategies to boost export. This way, will improve balance of payment and overall performance of the economy.

## **6.4 Future Studies**

As results of this study reveal that nominal exchange rates and foreign demand plays a role to shift the aggregate exports volume in Tanzania, then it will give a much closer insight into the

subject matter if the future studies retake the topic in a way that the variables will be tested as real variables (after being deflated) so that the effect of inflation, if any, could be examined. Moreover, as this study used aggregate data, so sector wise studies should be taken in the future as Tanzania embarks on industrialisation and green revolution. This will give a comprehensive picture of the dynamism.



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## APPENDICES:

### **A: Individual Series Unit Root Test Results**

Null Hypothesis: LOGEXPORT\_SA has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=11)

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	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.009156	0.7475
Test critical values: 1% level	-3.500669	
5% level	-2.892200	
10% level	-2.583192	

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\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LOGEXPORT\_SA has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=11)

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	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.704049	0.2375
Test critical values: 1% level	-4.057528	
5% level	-3.457808	
10% level	-3.154859	

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\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LOGIPI\_SA has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=11)

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	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.380577	0.5887
Test critical values: 1% level	-3.501445	
5% level	-2.892536	
10% level	-2.583371	

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\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LOGIPI\_SA has a unit root  
 Exogenous: Constant, Linear Trend  
 Lag Length: 1 (Automatic - based on SIC, maxlag=11)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.353496	0.0642
Test critical values: 1% level	-4.058619	
5% level	-3.458326	
10% level	-3.155161	

\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LOGEXRATE has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=11)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.421591	0.1386
Test critical values: 1% level	-3.500669	
5% level	-2.892200	
10% level	-2.583192	

\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LOGEXRATE has a unit root  
 Exogenous: Constant, Linear Trend  
 Lag Length: 0 (Automatic - based on SIC, maxlag=11)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.457484	0.0029
Test critical values: 1% level	-4.057528	
5% level	-3.457808	
10% level	-3.154859	

\*MacKinnon (1996) one-sided p-values.



Null Hypothesis: D(LOGEXPORT\_SA) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=11)

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	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-11.38665	0.0001
Test critical values:		
1% level	-3.501445	
5% level	-2.892536	
10% level	-2.583371	

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\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LOGEXPORT\_SA) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=11)

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	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-11.36953	0.0000
Test critical values:		
1% level	-4.058619	
5% level	-3.458326	
10% level	-3.155161	

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\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LOGIPI\_SA) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=11)

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	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.615565	0.0000
Test critical values:		
1% level	-3.501445	
5% level	-2.892536	
10% level	-2.583371	

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\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LOGIPI\_SA) has a unit root  
 Exogenous: Constant, Linear Trend  
 Lag Length: 0 (Automatic - based on SIC, maxlag=11)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.625333	0.0000
Test critical values:		
1% level	-4.058619	
5% level	-3.458326	
10% level	-3.155161	

\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LOGEXRATE) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=11)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-8.018438	0.0000
Test critical values:		
1% level	-3.501445	
5% level	-2.892536	
10% level	-2.583371	

\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LOGEXRATE) has a unit root  
 Exogenous: Constant, Linear Trend  
 Lag Length: 0 (Automatic - based on SIC, maxlag=11)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-8.142299	0.0000
Test critical values:		
1% level	-4.058619	
5% level	-3.458326	
10% level	-3.155161	

\*MacKinnon (1996) one-sided p-values.

## B: Data Used for Analysis

### DATA USED FOR ANALYSIS:

Exports (EXP), Exchange Rate (ExRate) & Industrial Production Index (IPI) - A proxy of foreign demand of Tanzania's exports

SOURCES: IMF's IFS (ExRate & IPI), BANK OF TANZANIA - BOT (EXP)

	Millions of Tanzanian Shillings	Tanzanian Shillings that Bought a Dollar	Indicator of Production Level in 6 Major Trading Partners to Tanzania
DATE	EXP	ExRate	IPI
1993Q1	44,215.50	345.89	67.02
1993Q2	40,350.50	363.95	65.56
1993Q3	39,484.30	447.89	63.08
1993Q4	57,097.10	463.37	68.76
1994Q1	60,070.30	492.38	68.02
1994Q2	75,578.40	506.69	67.82
1994Q3	36,097.10	514.86	65.38
1994Q4	93,431.00	524.59	72.30
1995Q1	104,849.00	538.30	71.31
1995Q2	85,158.00	567.87	70.58
1995Q3	64,606.00	607.03	68.03
1995Q4	135,765.00	585.85	73.52
1996Q1	103,925.00	542.35	72.71
1996Q2	98,704.00	590.36	71.00
1996Q3	88,429.00	592.76	69.35
1996Q4	150,286.00	594.44	75.51
1997Q1	137,590.00	598.88	72.87
1997Q2	93,690.00	611.93	74.22
1997Q3	81,338.00	620.65	72.22
1997Q4	126,180.00	617.03	77.35
1998Q1	119,366.00	649.89	75.63
1998Q2	84,038.00	663.54	74.33
1998Q3	90,350.00	668.78	72.41
1998Q4	155,547.00	676.47	77.22
1999Q1	81,357.00	687.23	75.48
1999Q2	56,067.00	707.62	75.07
1999Q3	77,784.00	786.80	74.52
1999Q4	196,990.00	797.39	81.53
2000Q1	137,061.80	800.03	80.41
2000Q2	103,019.80	799.64	79.61

2000Q3	107,429.10	799.36	78.84
2000Q4	180,262.90	802.61	84.87
2001Q1	158,638.00	818.66	83.46
2001Q2	141,961.20	887.39	80.51
2001Q3	162,924.00	890.49	77.14
2001Q4	217,633.20	909.10	80.94
2002Q1	181,581.30	949.63	79.69
2002Q2	196,789.00	973.09	79.61
2002Q3	186,658.90	962.96	78.29
2002Q4	309,040.50	980.65	82.85
2003Q1	247,289.60	1,018.09	82.49
2003Q2	268,302.70	1,039.48	79.46
2003Q3	250,986.70	1,044.78	78.74
2003Q4	408,418.10	1,051.33	85.18
2004Q1	363,777.40	1,099.84	86.08
2004Q2	319,399.30	1,113.41	85.00
2004Q3	393,270.30	1,087.09	83.14
2004Q4	530,183.30	1,056.99	88.76
2005Q1	429,045.40	1,101.23	88.34
2005Q2	396,237.10	1,116.64	87.50
2005Q3	483,637.30	1,135.98	85.14
2005Q4	591,683.30	1,161.88	92.26
2006Q1	479,606.10	1,192.44	93.26
2006Q2	513,724.70	1,240.22	92.31
2006Q3	541,226.70	1,293.19	90.32
2006Q4	651,460.00	1,281.74	98.54
2007Q1	619,547.40	1,279.65	98.45
2007Q2	559,066.90	1,267.26	98.08
2007Q3	652,215.10	1,271.36	97.07
2007Q4	679,737.80	1,161.87	104.95
2008Q1	962,956.90	1,170.29	103.94
2008Q2	794,049.60	1,201.50	102.02
2008Q3	966,569.30	1,162.71	98.41
2008Q4	998,568.50	1,250.74	98.89
2009Q1	826,435.70	1,315.01	88.90
2009Q2	757,488.00	1,326.11	87.84
2009Q3	1,022,617.30	1,317.60	89.22
2009Q4	1,127,932.00	1,322.53	97.07
2010Q1	1,074,930.70	1,337.17	99.08
2010Q2	1,090,082.80	1,371.70	98.47
2010Q3	1,448,967.20	1,444.92	97.22

<b>2010Q4</b>	1,669,416.80	1,483.29	105.23
<b>2011Q1</b>	1,922,305.70	1,500.03	104.20
<b>2011Q2</b>	1,716,614.80	1,530.11	101.33
<b>2011Q3</b>	2,131,668.10	1,609.34	100.21
<b>2011Q4</b>	2,181,897.20	1,648.98	105.50
<b>2012Q1</b>	2,246,244.60	1,589.06	105.36
<b>2012Q2</b>	2,302,627.60	1,584.68	102.47
<b>2012Q3</b>	2,388,916.20	1,579.43	98.88
<b>2012Q4</b>	2,318,576.70	1,578.85	104.70
<b>2013Q1</b>	1,702,432.20	1,591.34	103.94
<b>2013Q2</b>	1,617,547.60	1,583.87	102.14
<b>2013Q3</b>	1,886,395.40	1,618.45	100.06
<b>2013Q4</b>	2,100,805.10	1,608.12	107.05
<b>2014Q1</b>	1,772,662.50	1,618.79	105.56
<b>2014Q2</b>	1,610,963.10	1,639.80	104.14
<b>2014Q3</b>	1,927,637.00	1,658.37	100.23
<b>2014Q4</b>	2,351,735.80	1,699.05	107.09
<b>2015Q1</b>	2,616,834.50	1,762.58	106.09
<b>2015Q2</b>	2,087,217.10	1,937.43	103.48
<b>2015Q3</b>	2,402,568.80	2,111.79	100.04
<b>2015Q4</b>	3,126,507.20	2,153.76	105.99
<b>2016Q1</b>	3,254,347.90	2,176.50	105.84
<b>2016Q2</b>	2,614,628.20	2,181.90	104.14
<b>2016Q3</b>	2,351,560.70	2,177.30	100.80
<b>2016Q4</b>	3,040,935.50	2,172.67	108.02