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THE IMPACT OF EXCHANGE RATE ON CLOTHING EXPORTS IN SOUTH AFRICA, From 1994Q1 to 2014Q1

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FULL DISSERTATION SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE MASTER OF COMMERCE IN ECONOMICS AT THE (MAFIKENG CAMPUS) OF THE NORTH WEST UNIVERSITY

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ABSTRACT

The study empirically examines the impact of exchange rate on clothing exports in South Africa, for the period 1994Q1 to 2014Q1.Secondary data is obtained from Quantec data warehouse and SARB. Econometric techniques are used to test the impact of exchange rate on clothing exports in South Africa, using Johansen co-intergration test. ECM was applied to establish to establish the long-run and short-run relationship. The results verify a long-run positive relationship which exists between the two variables under study, positive relationship between exchange rate and clothing exports. The findings and conclusions are valuable for international organisations and governments. In the area of designing future policies and approaches the government should fix South Africa's exchange rate, so it exports more than it imports having a competitive advantage and more employment

Keywords: Clothing exports, Exchange rates, Clothing imports, Gross Domestic Product, South Africa.

DECLARATION

I, KesaobakaMmelesi declare that the full dissertation for the programme of masters of economics in commerce on the impact on exchange rate on clothing exports in South Africa has not before been submitted for a degree at this, or any other institution of higher learning, that this is my own work and all the sources i have used or quoted have been indicated and acknowledged by complete reference.

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MmelesiKesaobaka

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Date

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Acronyms

1. **AGOA-**African Growth and Opportunity Act
2. **CIRP-**Covered Interest Rate Parity
3. **CMT'S-**Cut, Make and Trim
4. **Clo-Trade-**Clothing Trade
5. **DCCS-**Duty Credit Certificate Scheme
6. **DTI-**Department of Trade and Industry
7. **ESSET-**Ecumenical Service for Socio-Economic Transformation
8. **EU-** European Unions
9. **MFN-**Most Favoured Nation
10. **NEDLAC-**National Development and Labour Council
11. **SA-**South Africa
12. **SACTWU-**Southern African Clothing and Textile Workers Union
13. **SADC-**Southern African Development Community
14. **SAP-**System Application Products
15. **SARB-**South African Reserve Bank
16. **SEED-**Small Enterprise Development
17. **SETA-**Sector Training Authority
18. **UCIRP-**Uncovered Interest Rate Parity
19. **USA-**United State of America
20. **USITC-**United State International Trade Commission
21. **WTO-**World Trade Organisation

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Chapter 1: Orientation of the study

1.1 Introduction of the study

The exchange rate is an important macroeconomic variable used as a parameter for determining international competitiveness. It is regarded as an indicator of competitiveness of any currency of any country and an inverse relationship between this competitiveness exists. To this end, the lower the value of the indicator in any country, the higher the competitiveness of the currency of that country will be. Exchange rate is the price of a nation's currency in terms of another currency. An exchange rate thus has two components, the domestic currency and a foreign currency, and can be quoted either directly or indirectly. In a direct quotation, the price of a unit of foreign currency is expressed in terms of the domestic currency. In an indirect quotation, the price of a unit of domestic currency is expressed in terms of the foreign currency (Arize, Malindretos and Kasibhatla, 2003).

An exchange rate that does not have the domestic currency as one of the two currency components is known as a cross currency, or cross rate. Exchange rate system includes set of rules, and arrangements and institutions under which nations effect payments among themselves. Traditionally, gold exchange standard was used by the Bretton-woods for example the flexible rating system is currently being used in Nigeria. The flexible exchange rates are largely determined by market mechanism uses the forces of demand and supply.

For 25 years after WWII, the international monetary system known as the Bretton Woods system was based on stable and adjustment exchange rates. Exchange rate was not permanently fixed, but occasional devaluations of individual currencies were accepted to correct fundamental disequilibria in the balance of payments (BOP). The ever rising attack on the dollar in the 1960's ended in the collapse of the Bretton Woods system in 1971, and it was unwillingly replaced with a regime of floating exchange rates.

After the collapse of the Bretton Woods system, where countries were indulged to adopt monetary policies that maintained the exchange rates within a fixed value, many countries around the world started to undertake flexible exchange rate

regimes. As this type of exchange rate system increased in popularity, countries liberalised their economies and at the same time the effect of globalisation intensified resulting in economic cooperation and trade between countries. Because transactions between countries are priced in foreign exchange, the level and the speed of variability of the exchange rate became an important tool to determine countries' competitiveness in foreign markets and to estimate how much profit or loss the exporters could make from trading with foreign countries within a given time (Obstfeld and Rogoff, 1995).

The South African textile and clothing industry has a strong vision, aiming to use all the natural, human and technological resources at its disposal to make South Africa the favoured domestic and international supplier South Africa manufactured textiles and clothing. Since 1994, about US$900 million has been spent on updating and upgrading the industry, making it efficient, internationally competitive, and ready to become a major force in the world market. Exports account for R1,4 billion for apparel and R2,5 billion for textiles, mostly to the US and European markets. Exports to the US increased by a dramatic 62% in 2001, driven primarily by the benefits offered under the Africa Growth and Opportunity Act (AGOA) which provides for duty-free imports of apparel produced in South Africa (SA Info, 2014).

The South African textile and clothing industry has a powerful vision. It aims to use all the natural, human and technological resources at its disposal to make South Africa the favoured domestic and international supplier of South African manufactured textiles and clothing. Though the textile and apparel industry is small, it is well placed to make this vision a reality. Due to technological developments, local textile production has evolved into a capital-intensive industry, producing synthetic fibres in ever-increasing proportions. The apparel industry has also significant technological change and has benefited from the country's refined transport and communication infrastructure. The South African market demand rising reflects the sophistication of First World markets and the local clothing and textile industry has developed accordingly to offer the full range of services from natural and artificial clothing production to non-woven, spinning, weaving, tufting, knitting, dyeing and finishing.

South Africa has lost out on $900-million in trade with sub-Saharan Africa because of increased Chinese imports, costing the country more than 77 000 jobs over a decade, a new report by the University of East Anglia (UEA) from the UK has revealed.

Growth by 14% between 2001 and 2010 in South Africa's industrial production could have been about 5% greater if the country had not lost market share to China, though its exports to sub-Saharan Africa are 10% greater. Thus, South African industrial exports to sub-Saharan countries were at risk of being packed by Chinese's exports, grown from $4.1-billion in 2001, to $53.3-billion in 2011. Sub-Saharan Africa accounts for over a fifth of South Africa's total exports, with Zimbabwe, Zambia, Mozambique, the Democratic Republic of Congo, Kenya, Angola, Nigeria, Tanzania, Malawi and Ghana the most important markets. (Esterhuizen, 2012)

Although the value of South African exports to these countries has been rising significantly over the past decade, its share of total exports to the ten countries had declined from about 21% in 1997 to 15% in 2010. China's share of exports into the region increased from 5% in 1997 to 24% in 2010, with a marked increased seen since the Asian nation joined the World Trade Organisation (WTO) in 2001. The most significant trade losses were felt in Angola and Tanzania, while the impact was least severe in neighbouring countries, particularly Zimbabwe and Zambia, as well as Malawi. Though, the loss of market share, putting ahead the economic growth and demand for imports in a number of African countries had escalated in response to the commodity boom, led by the rushing the demand for raw materials in China (Vergil, 2002).

The textiles and clothing industry arose from rapid restructuring in the 1990s to take advantage of new trade agreements and increase exports to Europe and the USA. Textile exports grew at 5.9% a year in real value from 1996 to 2001, standing at R2.3 billion in 2001.

South Africa will find it increasingly difficult to compete with Far Eastern countries in low-cost low-value clothing production; the principal opportunities in textiles and clothing lie in the development of niche markets for products with strong local and international demand and in the move to higher-value production.

South Africa's major concern, which has an official unemployment rate of 25%, had been the effect of Chinese imports on employment. The manufacturing sector alone shed over 350 000 jobs since 1990 and employed less than 1.2-million in 2010. The direct loss of employment attributable to displacement of domestic production by imports from China in the period 1992 to 2001 was 24 117, after China joined the WTO the figure increased by 77 751. Many of the ten industries with the highest level of Chinese import penetration were traditional labour-intensive sectors, including textiles and clothing, footwear, leather products and furniture. The report found that Chinese competition in these industries was likely to have a particularly severe impact on employment, especially of unskilled workers.

Decreasing share of the manufacturing sector in South Africa's Gross Domestic product (GDP) has also been moderate attributed to increasing competition from imports. South Africa has faced raising difficulties in competing China domestically and in international markets, as the Asian giant is the world's second-largest economy in terms of GDP, after the US, and has overtaken Germany as the world's largest exporter.

By 2010, South Africa became the largest source of imports gaining of Germany and the US. Trade between South Africa and China has grown dramatically over the past decade; yet, the levels and structure of trade indicated significant irregularities. The current structure of trade with China is of particular concern to policy makers in South Africa. President Jacob Zuma stated at the Forum on China Africa Cooperation, in Beijing, in July that "the imbalance in trade between China and Africa was unsustainable in the long term, as it comprised mainly African exports of raw materials to China and Chinese exports of manufactured goods to Africa".

Therefore, foreign direct investment will be lower when there is higher exchange rate than when the exchange rate is steady. Decreased foreign investment may results in low aggregate output and reduced export volumes. Thus, reducing their exposure to countries with high exchange rate volatility as this will have a negative effect on their expected profits (Brodsky, 1984).

South African firms share concerns, revealed by the World Bank's (2007) South Africa Investment Climate Assessment, where concern about the exchange rate is

rated the second most serious constraint to the enterprise operations and growth for arepreventative sample of South African firms.

The International Monetary Fund projections over the next five years showed Chinese exports growing at over 10% a year in volume terms. Yet, exports to Africa may well continue to expand even more rapidly, as China needs to find new outlets for exports because of the slowdown in developed country markets. Chinese imports would therefore probably continue to impact on industrial production in South Africa over the next five years with more industries being affected.

The impact on employment in the most labour-intensive industries might be less dramatic in future, as the increases in import penetration could be in more capital-intensive industries. The impact on South African exports is also likely to continue for several years, although eventually South African exporters may move out of those products and markets where they compete with China and once that have occurred then the negative effects reduced(Vergil, 2002).

The experience of quotas on textile and clothing imports in South Africa in 2007 and 2008 suggested that protectionist measures were not an answer to mitigating the impact of Chinese imports. The Department of Trade and Industry is negotiating with China to obtain better access for South African manufactured exports to the Chinese market and this might help reduce the deficit with China in the future.

1.2 Problem statement

When the exchange rate increases, there will be a decrease in clothing exports. If a country's exports exceed imports, the demand for its currency rises and therefore, it has a positive impact on the exchange rate.On the other hand, if imports exceed exports, the desire for foreign currency rises and hence, exchange rate for such country moves up. Undoubtedly, any measure that tends to increase the volume of exports more than the rate of importation will definitely raise the value of the domestic currency. In the case of South Africa the exchange rate is relatively low, however South Africa exports less than it imports. That has become a grave concern.

1.3 Research aim and objective of the study

1.3.1 Aims of the study

- ✓ To determine the impact of exchange rate on clothing exports
- ✓ To determine if there is a relationship between exchange rate and clothing exports
- ✓ **1.3.2 Objectives of the study**
- ✓ To review theoretical literature and existing studies on related topics, as well as researching other related topics such as the types of exchange rate regimes.
- ✓ To use econometric models with recent data in order. To provide empirical evidence regarding the relationship between exchange rate and clothing exports on the countries under investigation.

1.4 Research questions

- ✓ What is the impact of exchange rate on clothing exports?
- ✓ Is there a relationship between exchange rate and clothing exports?
- ✓ What policies, based on the findings can be undertaken to encourage exchange rates and clothing exports in South Africa?

1.5 Hypothesis of the study

H o: Exchange rates have impact on Clothing exports

H1: Exchange rates have no impact on Clothing exports **1.6 Limitation of the study**

The limitations to this study will be from a challenge that in developing countries such as South Africa, there is minimal management and fewer studies have been conducted on clothing exports and exchange rate in South Africa, this makes the accessibility of the data and information associated to it scarce. This challenge may affect the outcomes of the study as it acts as a base for the research being carried out. One other limitation is the variety of the countries, and that factors contributing to growth in various countries might be similar but their outputs may vary due to their differences such as which sector the country is dominant in, what are their macroeconomic objectives and its socio-economic impact on the country at large.

1.7 Importance of the study

High exchange rate could have implications for business and policy decisions and that is the reason why the movements of the exchange rate feature strongly in the debates around trade and trade policies (Mundell, 1961).

This research will thus primarily aim to benefit policy makers of emerging market economies by providing up to date knowledge, new evidence and analysis pertaining the relationship between exchange rate and the performance of clothing exports. By presenting baseline information using the most recent statistics and econometric techniques, the study will also help analysts and academics by contributing to existing knowledge on the topic and to provide a base for future research on related topics.**1.8 Literature review**

1.8.1 Trade theories

1.8.2New Trade Theory

In the 1970s, the difference between the estimate of free trade and real world trade flows was rising continuously. When trade was quickly increasing between industries, nations with comparable economies and endowments of factors of production were anonymous. In many new industries, comparative advantage was not defensible. It appeared that production and trade depended on causal.

1.8.3 The Ricardian Static Comparative Advantage

This study aims to explain the basis for trade in David Ricardo's point of view, how the gains from trade generated and compare and contrast his comparative advantage to Adam Smith's theory of absolute advantage.

1.8.4 Adam Smith's Theory of Absolute Advantage

During the seventeenth and eighteenth centuries the dominant economic philosophy was *mercantilism*, which advocated severe restrictions on import and aggressive efforts to increase export.

1.8.5 Ohlin model the economic field of international trade.

The H-O model is a general equilibrium model that lies in the economic field of international trade. It was conceived by two Swiss economists called Eli Heckscher and Bertil Ohlin. The model is an extension and improvement of the theory of comparative advantage that was developed and put forward by David Ricardo. It tries to predict the patterns of trade based on the factor endowments of trading nations. In brief, the theory asserts that countries will export goods in which they have a cheap and plentiful endowment of the factors of input and import those goods in which they have a scarcity of factor inputs in their production.

1.9 Exchange rate theories

1.9.1 Interest Rate Parity and Interest Rates

The interest rate parity condition was developed by Keynes (1923), as what is called interest rate parity currently, to link the exchange rate, interest rate and inflation. The theory also has two forms: covered interest rate parity (CIRP) and uncovered interest rate parity (UCIRP). CIRP describes the relationship of the spot market and forward market exchange rates with interest rates on bonds in two economies. UCIRP describes the relationship of the spot and expected exchange rate with nominal interest rates on bonds in two economies.

1.9.2 Purchasing Power Parity and Inflation rates(PPP), which is also called the inflation theory of exchange rates. PPP can be traced back to sixteen-century Spain and early seventeen century England, but Swedish economist Cassel (1918) was the first to name the theory PPP. Cassel once argued that without it, there would be no meaningful way to discuss over-or-under valuation of a currency. Absolute PPP theory was first presented to deal with the price relationship of goods with the value of different currencies. The theory requires very strong requirements.

1.9.3 The Balassa-Samuelson Model and External Debt

The standard version of the B-S model is presented using a single-factor aggregate production function in Obstfeld and Rogoff (1996). The Balassa-Samuelson model is one of the cornerstones of the traditional theory of the real equilibrium exchange rate.

1.9.4 The Balance of Payments Theory

The balance of payments theory of exchange rate is also named as "General equilibrium theory of exchange rate". According to this theory, the exchange rate of the currency of a country depends upon the demand for and supply of foreign exchange. If the demand foreign exchange is higher than its supply, the price of foreign currency will increase.

1.10 Empirical studies

Theron (2005) examined the South African clothing industry as comparatively unusual, as it supplies both the domestic and foreign markets. In the wake of South Africa's policy decision to join the global regime on clothing and thereby expose the local market to foreign competition, some manufacturers sought to re-orient themselves to produce for the export market. In the clothing and textile sectors combined, 30 percent were supplying foreign markets in 2005, compared with 10 percent in 1994 (Business Report, 2/2/05). The clothing industry on its own had less exporters by the second half of 2005, at a figure of about 150 out of a total of 2000 clothing manufacturers registered with the Sector Training Authority (SETA). A number of clothing manufacturers had been exporting apparel to the US and EU markets for a substantial period of time. On the back of a weaker rand, some large Kwa-Zulu Natal CMTs (with around 300 workers) exported jeans to the US, ceasing when the rand turned (Govender, 2005).

South African studies on employment losses in the clothing industry have shown social dislocation (Van der Westhuizen and Deedat 2003; ESSET 2003; Van der Westhuizen 2005). Prior to employment loss, these workers were low wage earners who increasingly found themselves to be the sole breadwinners as jobs in other sectors were lost, which has meant that after these workers' employment loss such households have been pushed into poverty. Secondly, these workers cannot find alternative employment due to limited economic diversification and the low rate of job creation and, therefore, labour absorption in South Africa. The latter point is strengthened by experiences elsewhere: Between 70 and 80 percent of the workers in the clothing sector are women in most poor countries,

and many perhaps most of them would not have had an income in the formal sector in the absence of the clothing industry. If we assume that these workers have a higher income and higher productivity in the clothing sector than in their bestalternative economic activity, the income gains in poor, clothing exporting countries are higher than [economic model estimates] (Nordas 2004: 30-31).

It is important to maintain a stable and competitive real exchange rate and an active industrial policy to enable manufacturers to upgrade and develop new markets. Problems could arise if commodity prices fell, which would affect the growth of other African economies, so that the relative loss of market share to China in sub-Saharan Africa would turn into an absolute decline in exports and further depress the domestic manufacturing sector.

1.11 Research Methodology

1.11.1Research Data

This study empirically examines the impact of exchange rate on clothing in South Africa from 1992Q1 to 2014Q1.

1.11.2Research design

Quarterly time-series data for clothing exports (CLEXP) and clothing imports (CLIMP) were collected from Quantec data warehouse. Exchange rate (EXR) and Gross Domestic Product (GDP) were collected from South African Reserve Bank (SARB).and the variables to be used in the study. Econometricsoftware (E-views 8) was used for statistical data analysis.

In order to present the results, the study I adopted the ADF (Augmented Dickey Fuller test); to test for stationarity. Augmented Dickey-Fuller (ADF) unit root tests Eligibility conditions for a time series to be stationary are: the average of the time series is constant or, in other words, the observations should fluctuate around the average; the series' variance is constant. In economic terms, a series is stationary if a shock over the series is temporary (is absorbed in time), not permanent. If a series is non stationary, through differentiation it becomes a stationary series. The order of integration of the series is the number of successive differentiations obligatory to

obtain a stationary series. In some cases, most economic and financial time series produce a non-stationarity result in the mean.

1.12 Organisation of the study

This study is structured into five chapters. Chapter one deals with introduction background of the study, problem statement, aims and objectives, hypothesis, importance of the study, limitations and definition of concepts used in the study. Chapter two provides a literature review. Chapter three deals with methodology. Chapter four is the interpretation of the data. Conclusion and recommendations are undertaken in chapter five.

1.13 Definition of concepts

1.13.1 Exports

A function of international trade whereby goods produced in one country is shipped to another country for prospect trade or sale.

1.13.2 Exchange rate

The value of one currency for the purpose of exchange to another currency.

1.13.3 Clothing

Clothes,especially a particular type of clothes, protective clothing.

1.13.4 Textile

Textile or cloth is a stretchy natural fibre consisting of a network often referred to as thread.

1.13.5 Imports

A good or service brought into one country from another.

1.13.6 Gross Domestic Product

Total cost of goods produced and services given in a country during a year.

1.13.7 Foreign Direct Investment

Is a key component in international economic integration, it encourages the transfer of technology between countries, and allows the host economy to endorse its products more broadly in international markets.

Chapter 2: Literature Review

2.1 Introduction

This chapter is aimed at investigating the theoretical determinants of exports and exchange rate theories in South Africa. This chapter have both the theoretical and empirical literature, under the theoretical literature; the study explores trade theory which is classified into two categories namely, traditional theory (which has a classical/neoclassical foundation) and new trade theories. Traditional trade theory incorporates the principles of perfect competition, homogeneous goods and constant returns to scale in production. This would include the trade theories of Ricardo, Heckscher-Ohlin and the modifications or extensions of the Heckscher-Ohlin theory. The new theories of international trade on the other hand, would include theories characterized by product differentials, imperfect competition, increasing returns to scale and technological lags that imply dynamic comparative advantage in trade. This chapter also explains theInterest Rate Parity and Interest Rates,Purchasing Power Parity,TheBalassa-Samuelson Model and External Debt and The Balance of Payments Theory.

The empirical literature provides a summary of existing studies on the subject, on the methods that was employed by others and their results. This study uses two types of empirical studies i.e Cross-sectional studies, and cross-country time series studies, which individually investigate the exchange rates impact on clothing exports prosperity of a single country.

2.2. Theoretical Literature

Theoretical literature investigates how exchange rates impact the clothing exports by exploring the determinates of exports and exchange rate theories

2.2.1 New Trade Theory

In the 1970s, the difference between the estimate of free trade and real world trade flows was rising continuously. When trade was quickly increasing between industrial nations, comparable economies and endowments of factors of production was anonymous. In many new industries, comparative advantage was not defensible. It

appeared that production and trade depended on causal. Conversely, comparative advantage explains that countries trade mainly because of large similarity in factor endowments and technology. Though, the fact was not always true (Smith 1994). According to Ricardo, a country cannot have comparative advantage together with comparative disadvantage for a given good. It is impossible to overlook intra industry trade with any degree of confidence, although one allows for statistical confidence (Smith 1994).

To provide a better understanding about trade using modern literature of international trade, the New Trade Theory has been developed by (Dixit and Norman, 1980), (Lancaster, 1980), (Krugman, 1979,80,81), (Helpman, 1981) and (Eithier, 1982). Normally, these models address the limitations of traditional theory by exploring trade realities. Hence, trade theory can be divided in two groups. First, traditional theory which includes the trade theories of Smith, Ricardo, Heckscher and Ohlin, second is the New Trade Theory.

One major disagreement between traditional trade theory and new trade theory is related to the policy recommendations required for industrial development. Traditional trade theory supports the fact that neutral incentives and Laissez Faire policies always allow industrial development. In addition, new trade theory gives more importance to specialisation because of rising returns. This is done by implementing it in the models of imperfect competition.

2.2.2 The Ricardian Static Comparative Advantage

This study aims to explain the basis for trade in David Ricardo's point of view; how the gains from trade generated, compared and contrasted his comparative advantage to Adam Smith's theory of absolute advantage.

The theory of comparative advantage was expounded by David Ricardo. The theory explains why it can be beneficial for two countries to trade if one country has a lower relative cost of producing some goods. There are various assumptions underlying the Ricardian comparative advantage; he assumed a labour theory of value to be employed in this model. As a result, the relative value of a commodity is based solely on its relative labour satisfied. Production outlook states that no other inputs are used in the production process, or any other inputs are measured in terms of labour

personified in their production, or labour ratio is the same in all industries. Ricardo also states that the economy is characterized by perfect competition. This means that no single consumer or producer is large enough to influence the market, they are all price takers. In addition, all participants have full access to market information. There is free entry to and exit from the industry, and all prices equal the marginal cost of production. Ricardo also assumed that technology is fixed for both countries, so unit costs of production are constant. Hence, the hours of labour per unit of production of goods do not change, despite of the quantity produced. The model also assumes an analysis of a two-country, two commodities world to shorten the presentation. All factors of production are immobile and both countries have the capacity to produce both goods. Any imports are perfectly balanced by an equivalent-valued export flow: thus, neither country incurs a trade deficit, which ought to be financed.

The comparative advantage theory goes further to assert that unrestricted exchange between countries will raise the total amount of world output if each country tends to concentrate in those goods that it can produce at a relatively lower cost compared to potential trading partners. In a Ricardian world, trade is determined by relative efficiency in production. It can be revealed that it will be in the interest of every country to involve in trade because every country will find a product in which it has a comparative advantage. Specialization in production will happen and because trading countries face the same relative prices, specialization will occur in different goods, therefore, facilitating exchange between the two trading countries. It is the difference in labour that determines the goods in which the country has a comparative advantage.

According to an English economist David Ricardo, the basis for trade is to gain more profit as he demonstrate this on his book entitled Principles of Political Economy and Taxation. He promotes free trade or extensions of foreign trade as one of the ways to gain more income while all restrictions to trade will hold back its economic growth like in mercantilist country. Soaring price of tariff taxes imposed to goods and restrictions on policies reduce exporting products to other countries. Those countries which have free trade agreements will benefit from this system as they economically and effectively allocate their capital and labour. By the means of trade between two

countries the amount of labour will be saved. In the globalization period today, influential countries are pressing the developing world to accept liberalization of trade to support the best way to raise global living standards which is to take full advantage of trade.

Ricardo observed that a country characterized by the most substantial advantages either naturally or artificially in exchanging them for the commodities of other country. 'Comparative advantage refers to superior features of a country that provide it with exclusive benefits in global competition typically derived from either natural endowments or deliberate national policies' (Cavusgil et al 2008: 98). In this theory the most significant factor is the comparative efficiency or the ratio between how simply the two countries can manufacture the product. Saudi Arabia is naturally rich in oil as it is known as the world's leading oil producer and exporter to other countries.Its fast-growing export to the United States of America includes crude oil, fuel oil, liquefied petroleum gases, industrial organic chemicals, and precious metals like gold. Petroleum products with oil and gas represent over 98% of Saudi Arabia's exports to the U.S.,while the artificial export products are textile industrial supplies. In return for such commodities the products the United States of America export to Saudi Arabia are water, wheat, barley, oats, sorghum, corn and fish. Saudi's emerging demand for food and clean water depends on a constant supply of oil revenues from its American trading partner. In addition to that are their artificial import from the US which are new and used passengers cars, civilian aircraft, industrial engines, drilling and oilfield equipment, generators, electric apparatus, excavating machinery, measuring, testing and control instruments and many other industrial machines.

The predecessor of Ricardo's theory of Comparative advantage is the theory of Absolute Advantage of Scottish political economist, Adam Smith. Both of them are known in the classical economic theory and Adam Smith has a legendary book which is The Wealth of Nations. Just as Ricardo, he is interested in economic growth through the benefit of trade freely and examined its dependence on international trade. Tariffs and policies are the barriers for trade. They both based their theory on the assumptions that labour is the only one kind of production factor. According to Adam Smith, absolute advantage in the production of particular goods or using fewer

resources is the only basis for trade (Cavusgil, Knight and Riesenberger 2008, p. 97). The central part of his theory is that labour is the source of welfare and the replacement of domestic market with international market will make the partition of labour which will increase productivity through specialisation.

Like in the previous example, consider Saudi Arabia and the United States is trading partner. Saudi Arabia has an absolute advantage in producing petroleum products and the United States has absolute advantage on the production of wheat. Presume labour is the only production used in making both goods. It is clear that Saudi Arabia has abundance of oil to produce petroleum products in which the average worker takes 20 days of labour to produce these products and because of scarcity in water it takes more time to produce which average worker takes 60 days. Compare to its trading partner the US which can produce wheat in 30 days and 100 days to produce petroleum products. Saudi Arabia can import wheat from US in exchange of petroleum products. As a result, both countries receive substantial gains from trade since petroleum products and wheat is essential to the advancement of their national living.

China has an absolute advantage in human capital and gives the most economical price of labour, but it doesn't mean it will not engage in trade. Based on Comparative advantage China can export mobile phone and import car from USA since it can save more labour cost rather than producing both.

Having a comparative advantage is not the same as being the best among the rest of the countries, and having an absolute advantage doesn't automatically have comparative advantage on other country. I consider neither of the two principles is superior to the other. Every country has comparative advantage with different absolute advantages in producing goods or either have an absolute advantage in the production of a good without comprising a comparative advantage. However it doesn't imply that a country with an absolute advantage in the production of such good should always produce this good rather than import it from other country. Comparative advantage determines whether it pays to produce a good or it is better to import it by measuring what you have forgone or your opportunity cost.

Comparative Advantage and Absolute advantage are interconnected with each other as they have common interest which is trade for economic growth. In my analysis to

David Ricardo's discernment, I agree with him to value the significance of opportunity cost rather than cost for the reason that it is more practical in a way it gives more value to efficiency of allocating resources and most important is it does not monopolise trading despite it gives chance to small countries to also benefit from trade. Comparative advantage is proportional to the difference between the relative prices in world markets and other relative price that would be successful in domestic markets without trade. If that difference is large, then a country earns a large advantage otherwise if the difference is small, then there is only a small advantage from trade.

Each nation is mutually interdependent with each other as they need to fill up the surplus of other goods; especially the natural resources as it vary to the geographical location of the country. In addition to this argument, government intervention has a vital role in the balance of trade for the reason that it is characterized by national saving and investment. Smith and Ricardo's principle is basically emphasizing the importance of trade in economy. 'Free Trade could also lead to world peace by substituting commercial relationships among individuals for competitive relationships between countries'.

2.2.3 Adam Smith's Theory of Absolute Advantage

During the seventeenth and eighteenth centuries the dominant economic philosophy was *mercantilism*, which advocated severe restrictions on import and aggressive efforts to increase export. The resulting export surplus was supposed to enrich the nation through the inflow of precious metals. Adam Smith (1776), who is regarded as the father of modern economics, countered mercantilist ideas by developing the concept of *absolute advantage*. He argued that it was impossible for all nations to become rich simultaneously by following mercantilist prescriptions because the export of one nation is another nation's import. However, all nations would gain simultaneously if they practiced free trade and specialized in accordance with their absolute advantage. Table 2.1, illustrating Smith's concept of absolute advantage, shows quantities of wheat and cloth produced by one hour's work in two countries, the United States and the United Kingdom. Division of labour and specialization occupy a central place in Smith's writing. Table 2.1 indicates what the international

division of labour should be, as the United States has an absolute advantage in wheat and the U.K. has an absolute advantage in cloth. Smith's absolute advantage is determined by a simple comparison of labour productivities across countries. Smith's theory of absolute advantage predicts that the United States will produce only wheat (W) and the U.K. will produce only cloth (C). Both nations would gain if they have unrestricted trade in wheat and cloth. If they trade 6W for 6C, then the gain of the United States is 1/2 hour's work, which is required to produce the extra 2C that it is getting through trade with the U.K.

Because the U.K. stops wheat production, the 6W it gets from the United States will save six hours of labour time with which 30C can be produced. After exchanging 6C out of 30C, the U.K. is left with 24C, which is equivalent to almost five hours' labour time. Nations can produce more quantities of goods in which they have absolute advantage with the labour time they save through international trade. Though Smith successfully established the case for free trade, he did not develop the concept of comparative advantage. Because absolute advantage is determined by a simple comparison of labour productivities, it is possible for a nation to have absolute advantage in nothing. In Table 2.1, if the labour productivity in cloth production in the United States happened to be 8 instead of 4, then the United States would have absolute advantage in both goods and the U.K. would have absolute advantage in neither. Adam Smith, however, was much more concerned with the role of foreign trade in economic development and his model was essentially a dynamic one with variable factor supplies, as pointed out by (HlaMyint, 1977).

Table 2.3 Absolute advantage

	U.S	U.K
Wheat(bushel/hour)	6	1
Cloth(yards/hour)	4	5

Source: International Economics by Dominic Salvatore

2.2.4 Ohlin model the economic field of international trade

The paper provides a summary of the model. This is achieved through the giving of the theoretical development of the model. In addition, it outlines and concisely

gives a summary of the assumptions and four theories under which the H-O model is founded upon. In conclusion it gives a passive critic of the model as put forward by other economists and presents other alternatives available in place of the H-O model.

The H-O model is a general equilibrium model that lies in the economic field of international trade. It was conceived by two Swiss economists called Eli Heckscher and Bertil Ohlin. The model is an extension and improvement of the theory of comparative advantage that was developed and put forward by David Ricardo and it tries to predict the patterns of trade based on the factor endowments of trading nations. In brief the theory asserts that countries will export goods in which they have a cheap and abundant endowment of the factors of input and import those goods in which they have a scarcity of factor inputs in their production.

(Eli Heckscher, (1919) and (Bertil Ohlin (1933) laid the foundation for significant developments in the theory of international trade by concentrating on the relations between the compositions of countries factor endowments and goods trade patterns in addition to the end results of free trade for the functional distribution of income within countries. Rudimentary concepts were further developed by and added by Paul Samuelsson and Ronald Jones among others.

The Heckscher-Ohlin model, with two countries, two goods and two factors or otherwise referred to as the two-by-two-by-two model with this formulation is often called the Heckscher-Ohlin-Samuelson model (H-0)model based on the work of Paul Samuelson, who developed a mathematical model from the original insights of Eli Heckscher and Ohlin. The objective of the H-O model was to envisage the relationship of trade in products between the two nations, based on their differences in factor endowments. It goes ahead to add that, international trade compensates for the uneven geographical distribution of productive resources, the root insight of the H-O model was based on the assumption that traded goods are in actual fact bundles of factor (land, labour, capital). Therefore the exchange of commodities between countries is an indirect factor arbitrage, transferring the services of immobile factors of production from regions where these factors are abundant to areas where they are in scarcity. This therefore at times can completely remove the factor-price difference. The important and greatest proposition of the H-O model is

that the preference to trade factors externally changes a local market for factor services into an international market, thus as a consequences, the derived demand for factor inputs turns out to be much more elastic, and also much more similar across countries.

In this model, each individual nation will export the product that utilizes its abundant factor intensively. Therefore under our assumption the home country will export good1 and the foreign country will export good 2. To prove this, let's take a particular case of the factor endowment differences L/K>L*/K* and assume that the labour endowments are identical in the two countries (L*=L) while the foreign capital endowment exceeds that at home, K*>K. In order to derive the trade pattern of dealings between the two countries, we advance by initially establishing what the relative goods price is in individual countries without any trade or in autarky.

The model states that only the factors of production of production that is land labour and capital are the three factors that determine a nation's comparative advantage. The model adds on and states that nations have a comparative advantage in those products in which the required factors of production, the country has been endowed with locally relative to other factors of production.

The model was expounded based on the assumptions that Ohlin made. That is, the two countries have the same level of production; this assumption meant that in the production of the same level of output of a good, both countries would use the same level of labour as well as the same level of capital. In a practical sense this implied that the per-capita productivity of two countries is the same when using the same level of technology and equal amounts of capital. This assumption has attracted critic as it assumed the aspect of each individual country having a unique natural advantage in the production of different goods, but Ohlin countered this by saying the O-H model is a long run model and in the long run conditions of industrial production are the same.

The other assumption is that the production function and process exhibits and must reflect constant returns to scale. That is, both nations involved in the H-O model produce both goods and both their production process have constant returns to scale, that is they are homogenous of degree one. This implies that if there is a

balanced upsurge in all factor inputs, the output will increase by the same percentage. This can be represented by, If y=F (L, K), then y'=(2L,2K)=2y.

Factors of production are flexible and can move freely within the boundaries of a country and immobile across national boundaries. The H-O model draws a distinction between domestic and external factor mobility. Factors of production movements are allowed between firms within a particular nation, but capital and labour cannot cross boundaries. Domestic factor mobility insures that the workforce can relocate from a region of low wages to a region of higher wages, and capital is mobile and moves from a low interest region to a higher interest region. This ensures that factors of production prices are uniform within the boundaries of a country. That is, this model further assumed that capital can shift effortlessly into either technology such that the industry mix can change without adjustments of costs between the two factors of production. Moreover labour mobility within countries can be reinvested and re-employed to between different industries and produce different products costless, that is labour can be move from one industry to another with no costs involved.

Perfect internal competition, that is to say that neither capital nor labour, has the influence and strength to affect prices or factor rates by restraining supply and Constant prices of goods. There are no barriers to trade, that is any trade impediments or restrictions such as tariffs export restraints, and exchange control as well as quotas are non-existent world trade is assumed to be free. In reality this is not practical, as most countries want to protect some of their home industries and very limited countries practice free trade.

Transport costs are assumed to be zero; it is a good assumption as transportation costs inhibit and reduce trade volume. Critic of this is that the costs incurred in the trade particularly in transportation of factors of production form a major portion of the market costs attached to goods.

Perfect competition and full employment, prevail in goods as well as factor markets, this supposition excludes monopolistic and oligopolistic market structures. It as well rules out price and wage rigidities. In a perfect market all consumers and producers are price takers that is each one is too insignificant to wield any market strength and,

or influence the prevailing prices in the market. All factors are completely and fully employed.

In identical technology two trading nations, that is where the production functions are similar in both the two nations there will be enough employment in the long run. The H-O model is a long run model. Bertil asserted that the physical circumstances of productions are the same everywhere the only difference comes from the rate at which countries adopt new technology but in the long run the technology is at the same level everywhere there is no factor intensity reversal, and no specialization by any country in one good.

Homogenous capital, the H-O model assumes capital as a homogenous and transferable, this assumption is wrong as capital has a measure and its assumption of homogeneity is untenable. In exclusion of the influence of unemployment, the assumption of the absence of firm since states that the production function is the same in all nations, this suggests that all firms are the same in every aspect. It also failed to take into consideration that politics plays especially in the field of immigration between countries. Several alternatives such as the New Trade Theory, Gravity model of trade, Ricardo-Sraffa trade theory have been forwarded to act as alternatives for the H-O model. But none has served to be as practical and economically real as the H-O model

In conclusion, the Heckscher and Ohlin model continues to provide astounding insights, not merely as a theory as it accurately and correctly explains many prominent and dominant features of the patterns that international trade exhibits, in addition it is indeed a very important component in any field on the influence of globalization in the international trade.

2.2.5 Interest Rate Parity and Interest Rates

The interest rate parity condition was developed by Keynes (1923), as what is called interest rate parity nowadays, to link the exchange rate, interest rate and inflation. The theory also has two forms: covered interest rate parity (CIRP) and uncovered interest rate parity (UCIRP). CIRP describes the relationship of the spot market and forward market exchange rates with interest rates on bonds in two economies.

UCIRP describes the relationship of the spot and expected exchange rate with nominal interest rates on bonds in two economies.

This is the normal form of the covered interest rate parity, which states that the domestic interest rate must be higher than the foreign interest rate by an amount equal to the forward premium (discount) on domestic currency. According to CIRP, if the exchange rate of, say, the shilling against the USD is fixed, the interests of the two countries should be equal. Thus, a small country with a pegged exchange rate regime cannot carry out monetary policy independently.

The forward exchange rate may be strongly influenced by the market expectations about the future exchange rate if new information is taken into consideration. In an uncertain environment, an un-hedged interest rate parity condition may hold. Very few empirical studies support UCIRP. For example, using a K-step-ahead forecasting equation and overlapping techniques on weekly data of seven major currencies, Hansen and Hodrick (1980) reject the market efficiency hypothesis for exchange.

2.2.6 Purchasing Power Parity and Inflation rates

(PPP), which is also called the inflation theory of exchange rates, can be traced back to sixteen-century Spain and early seventeen century England, but Swedish economist Cassel (1918) was the first to name the theory PPP. Cassel once argued that without it, there would be no meaningful way to discuss over-or-under valuation of a currency. Absolute PPP theory was first presented to deal with the price relationship of goods with the value of different currencies. The theory requires very strong preconditions. Generally, absolute PPP holds in an integrated, competitive product market which can be traded freely without transportation costs, tariffs, export quotas, and so on. However, it is unrealistic in a real society to assume that no costs are needed to transport goods from one place to another. In the real world, each economy produces and consumes tens of commodities and services, many of which have different prices from country to country because of transport costs, tariffs, and other trade barriers (Kanamori& Zhao, 2006).

Absolute PPP is generally viewed as a condition of goods market equilibrium. Under absolute PPP, both the home and foreign market are integrated into a single market. Since it does not deal with money markets and the balance of international payments, we consider it to be only a partial equilibrium theory, not the general one. Perhaps because absolute PPP requires many strong impractical preconditions, it fails in explaining practical phenomenon, and signs of large persistent deviations from Absolute PPP have been documented (Kanamori& Zhao, 2006).

2.2.7 The Balassa-Samuelson Model and External Debt

The standard version of the B-S model is presented using a single-factor aggregate production function in Obstfeld and Rogoff (1996). The Balassa-Samuelson model is one of the cornerstones of the traditional theory of the real equilibrium exchange rate. The key empirical observation underlying the model is that countries with higher productivity in tradable compared with non-tradable tend to have high price levels. The B-S model hypothesis states that productivity gains in the tradable sector allow real wages to increase commensurately and, since wages are assumed to link the tradable to the non-tradable sector, wages and prices also increase in the non-tradable sector. This leads to an increase in the overall price level in the economy, which in turn results in an appreciation of the real exchange rate.

However, the shortcomings of this model are clear. First, it assumes that the tradable price at home is the same as that abroad. This is clearly an unrealistic special form of PPP, but for tradable goods only. Under this setting, how the prices of tradable are determined remains unknown. Second, since it says nothing about the demand side, it is criticized by the Keynesian school, which regards price to be rigid or sticky. Third, without considering the behaviour of consumers, or the demand side, it is difficult to interpret how market prices are formed. Last and most importantly, this model does not deal with the role of money; it can at best explain partly how the real exchange rate is determined (Holub&Cihak, 2003; Kanamori& Zhao, 2006).

Integrating the model with a model of accumulation of capital and with the demand side of the economy,Holub and Cihak (2003) claimed that that the predictions of their model were generally consistent with empirical findings for Central and Eastern European countries. But the extended model still does not have room for money and the nominal exchange rate. This implies that money is assumed out of this kind of model and that prices are assumed to be flexible enough to adjust to supply and demand.

2.2.8 The Balance of Payments Theory

The balance of payments theory of exchange rate is also named as "General equilibrium theory of exchange rate. According to this theory, the exchange rate of the currency of a country depends upon the demand for and supply of foreign exchange. If the demand of foreign exchange is higher than its supply, the price of foreign currency will go up. In case, the demand of foreign exchange is lesser than its supply, the price of foreign exchange will decline (Kanamori and Zhao, 2006). The demand for foreign exchange and supply of foreign exchange arises from the debit and credit items respectively in the balance of payments. The demand for foreign exchange comes from the debit side of balance of payments. The debit items in. The balance of payments are (1) import of goods and services (2) Loans and investments made abroad (Kanamori& Zhao, 2006).

The supply of foreign exchange arises from the credit side of the balance of payments. It is made up of the exports of goods and services and capital receipts. If the balance of payments of a country is unfavourable, the rate of foreign exchange declines. On the other hand, if the balance of payments s favourable, the rate of exchange will go up. The domestic currency can purchase more amounts of foreign currencies (Kanamori& Zhao, 2006).When the exchange rate of a country falls below the equilibrium exchange rate, it is a case of adverse balance of payments. The exports increase and eventually the adverse balance of payment is eliminated. The equilibrium rate is restored. When the balance of payments of a country is favourable, the exchange rate rises above the equilibrium exchange rate resulting in the decline of exports (Kanamori& Zhao, 2006).

2.3 Empirical Literature

Exchange rate on clothing exports hypothesis is empirically investigated for determination of impact of exports on exchange rate. This study uses two types of empirical studies which are cross-sectional studies, which determine export impact on group on countries, and cross-country time series studies, which individually investigate the exchange rates impact on clothing exports wealth of single country.

2.3.1. Cross-Sectional Studies

Nordas (2003: 30-31) investigated that many clothing workers in developing countries would not have an income in the formal sector were it not for the clothing industry. Some trade theorists suggest that workers retrenched from uncompetitive industries will experience a short period of frictional unemployment before undergoing training and accessing new employment opportunities. However, developing countries frequently suffer low investment levels which result in sub-optimal job creation, as has been seen in South Africa with its capital formation level of only 16 percent of GDP.

Hence, restructuring has been associated with growing unemployment, and re-employment levels in the clothing industry have been low, as can be seen in the table below (ESSET 2003: 10).

Table 2.4 Re-employment rates for workers retrenched between Sept 1997 and Sept 2000

	No of workers	Percent re-employed
Re-employed	13 163	30,9%
Not re-employed	29 383	69,1%
Total	42 546	100%

Source: ESSET 2003: 28

Manne, Kipling and Robson (2005) emphasised that labour intensive nature of the clothing industry and its social function in absorbing relatively low skilled labour which is otherwise currently not being absorbed in the South African economy.The negative consequences of trade policy through social policy and administrative targeting is complex, which accords more importance to the analysis of first round effects of changes in the trade regime. Whether such considerations have played a role in the policy decision to liberalise clothing trade is vague.

2.3.2. Country Specific Studies

Altman (1993), ESSET (2003) and USITC (2004) examined that the clothing sector's decline (negatively) has been associated with import penetration due to the liberalisation of trade in South Africa, which commenced under the National Party in the 1980s and increased in pace during the 1990s. Historical factors influencing its decline were because the industry's insulation due to apartheid sanctions and protective tariffs; comparatively concentrated production and ownership structures, causing inefficiencies because of high overheads; the predominance of family-run businesses which are operated conservatively, do not seek to maximise growth, and are not pursuing novel production and management methods. Related hereto are the low levels of capital investment; the lack of pursuance of strategies apart from labour cost flexibility, such as marketing, operational change, and skills development.
The industry continued its decline throughout the 1990s and the first half decade of the 2000s, as evidenced by the following statistics:

Table 2.3: Average percentage change in selected indicators for the clothing industry between two periods: 1994-1998 and 1994-2003

Real value added at basic prices	-10,4%
Real exports	-4,4%
Real output per employee	-11,9%
Real remuneration per employee	6,8%
Real value of sales (1998-2003)	-12%

Source: Barnes 2005: 3

The table below shows how the clothing industry's percentage of Gross Domestic Product has weakened since 2000, along with the related textiles and leather industries.

Table 2.4: Clothing, textiles and leather as percentage of South African gross domestic product (2000-June 2005)

2000	2001	2002	2003	2004	2005
3.72%	3.49%	3.55%	3.23%	3.04%	2.83%

Source: Reserve Bank Quarterly Bulletin2, constant 2000 prices, seasonally adjusted

The increase in production in 2002 is also reflected in the next table that show an increase for clothing exports under AGOA. This surge in clothing exports can be explained as being due to the boost of a weaker rand and the benefits of the government's Duty Credit Certificate Scheme (DCCS).

Table 2.5: Total South African apparel exports to the US market under AGOA

2001	2002	2003	2004	7/2004 Year-to date	7/2005 Year-to date
$194.887m	$200.019m	$232.318m	$141.466m	$80.714m	$44.370m

Source: US Department of Commerce, www.agoa.info

Barnes (2005) found that employment levels in the industry have fluctuated in the past 16 years since liberalisation started Table 2.5 below shows the drop in employment in the wake of the National Party's liberalisation policy of 1989, the Structural Adjustment Programme. Table 6 shows employment at a higher level in 1997 than in 1992, and then a trend of steady decline from 1997 onwards. However, this data is generated by Statistics SA, and does not reflect the reported number of jobs lost.

These figures also differ from those emerging from firms registered with the education and training authority of the sector, which is a total of 124 037 in 2005. This number represents employees working for organised employers, which did not include informal employers at the time of the formation of the SETA at the end of 2004. Barnes (2005:4) calculated total employment in the clothing sector as 158 879 by using the formal vs. informal clothing sector employment figures in the September 2003 Labour Force Survey and the formal employment figures of Statistics SA.

Although fluctuations in employment, under-registration of workers, and increasing in formalisation explain why figures still seem too high, these problems may only be resolved by more accurate data collection.

Table 2 6: Employment in the clothing industry 1987 – 1992

1987	1988	1989	1990	1991	1992
131326	134163	127750	120524	114300	107028

Source: South African Standardised Industry Database, Quantech(2004)

Table 2 7: Employment in the clothing industry 1997 – 2004

1997	1998	1999	2000	2001	2002	2003	2004
126901	116740	123902	121615	117281	117417	114932	113922

Source: South African Standardised Industry Database, Quantech (2004)

Kipling, Baard and Jan Henk Boer (2005) found that the clothing imports into the South African market increased rapidly. China being the most competitive exporter of clothing in the world market, the vast bulk of clothing imports came from the Asian giant, with the value of clothing imports surpassing that of exports for the first time in 1998. In the wake of a significantly stronger South African currency, import growth showed the most dramatic increase between 2002 and 2005. Units from China jumped from 85 million in 2001 to 123 million in 2002 (45 percent); to 215 million in 2003 (75 percent); to 335 million in 2004 (56 percent) (SARS Customs figures quoted in Clothing Trade Council of South Africa 2005). Manufacturers contend that China's success in the South African clothing market can at least partially be ascribed to an 'unequal [international] playing field'.

CloTrade(2005: 3) andLande (2005) explored the benefits that accrue to Chinese producers are a fixed exchange rate undervaluing the Chinese currency by up to 40 percent (only changed in the second half of 2005); lower labour costs in the absence of a human rights regime; non-performing loans at a 1,5 percent interest rate; export incentives; state-subsidised infrastructure; production by state-owned enterprises which sometimes run at a loss; and possible input subsidisation in the Chinese textile industry. Chinese officials have, however denied these claims and insist that China's competitiveness is the result of its 'market economy' policies (Sunday Times, 9/10/2005).

Bennett (2003) found that apart from multilateral agreements, South Africa has also renegotiated bilateral agreements with Southern African states such as Malawi, Zimbabwe and Mozambique, allowing the importation of clothing at below Most Favoured Nation (MFN) duty rates The SADC Trade Protocol and bilateral agreements create the opportunity for the importation of apparel into the South African market at lower rates than the WTO rates.

Difficulties have been encountered in rooting out the problem due to corruption and a lack of capacity and resources in the customs administration (Bennett 2003: 9).China's average declared unit price and average declared weight at customs is respectively about half of other countries' values, causing price suppression in the apparel market (CloTrade 2005).

China also exports overruns and products to South Africa for which orders were cancelled, a practice which is difficult to prove because of complex anti-dumping procedures, according to CloTrade (2005: 16).

Robson (2005) examined that cheap imports caused a price deflation within the industry, a phenomenon witnessed across the world in the apparel market as garment prices have declined by 15% over the past five years. As elsewhere, it forced adjustments in the South African industry, especially by manufacturers, as buyers now had the choice of imported goods at lower prices, and manufacturers were therefore competing with such goods, as well as goods from the rural areas and from CMTs. Before 1994, manufacturers' primary strategy to deal with market pressures was to decentralise plants in a hierarchy by region and by race.

Galati (2000) explores the Rand as one of the most actively traded emerging market currencies. Its daily global turnover volume in 1999 was about 9.5 billion dollars, only below the Brazilian Real (10.8 billion dollars) among emerging market currencies. In April 2005 the South African Rand accounted for 0.4 percent of global foreign exchange transactions (with an average daily turnover of 10 bn dollars) and was at the same level than other larger emerging markets such as Mexico, according to the Central Bank Survey of the Bank for International Settlements (2005).

Some manufacturers, such as Seardel and House of Monatic, continue to manufacture apparel but augment their production with imports from Asia. Seardel stated in its 2004 interim report that it sources overseas clothing product 'innovatively' as one strategy to counter the influence of the imports influx on their market (www.seardel.co.za). House of Monatic imports the goods that it cannot manufacture (Buckingham, 2005).

Between 10 and 25 percent of the Cape Clothing Association's members, ranging from small to large manufacturers, also import (Van Zyl,2005). Asian manufacturers in South Africa have followed the same route, as a site visit to Newcastle showed: several previous clothing factories had been recreated into 'factory shops' where imported apparel is sold.

Theron (2005) examined the South African clothing industry as comparatively unusual, as it supplies both the domestic and foreign markets. In the wake of South Africa's policy decision to join the global regime on clothing and thereby exposing the local market to foreign competition, some manufacturers sought to reorient themselves to produce for the export market. In the clothing and textile sectors combined, 30 percent were supplying foreign markets in 2005, compared with 10 percent in 1994 (Business Report, 2/2/05). The clothing industry on its own had less exporters by the second half of 2005, at a figure of about 150 out of a total of 2000 clothing manufacturers registered with the Sector Training Authority (SETA) A number of clothing manufacturers had been exporting apparel to the US and EU markets for a substantial period of time. On the back of a weaker rand, some large KwaZulu Natal CMTs (with around 300 workers) exported jeans to the US, ceasing when the rand turned (Govender, 2005).

Theron and Govender (2005) experienced new clothing exporters found a strong rand militating against their international ambitions from 2003 onwards, while the influx of cheap imports rendered production for the domestic market unsustainable. In 1999 clothing exports surged with 38 percent; only to fall by a similar percentage since mid-2003. Kipling(2005). The largest clothing manufacturer in Southern Africa,

Seardel, announced in August 2005 that its headline earnings per share would decrease by 30percent from the previous year (Business Report, 23/8/2005). Its clothing exports dropped by 53,5 percent from 2003 to 2004 as a result of the stronger rand, accounting for 9,2 percent of total revenue in 2004 as opposed to 19,9 percent in 2003 (Seardel Interim Report 2004). Only a 'small percentage' remains of those who in 2001-2003 had been exporting on the back of a weaker rand Van Zyl (2005).

Table 2 8: March-Quarter 2005 Export-Import performance for clothing, textiles and leather

	Exports	**imports**
Growth: over March-Quarter 2004	**-28.54**	**2.13**
Growth: over March-Quarter 1999	**-5.27**	**13.76**
Share in manufacturing in March-Quarter 2005	**2.13**	**5.34**
Share in manufacturing in March-Quarter 1999	**3.94**	**3.85**

Source: SA Manufacturing Review. DTI, 2005

Overall export performance has been below expectation (Kaplan 2003: 25), especially when South Africa is compared with other AGOA participants. As can be seen below, South African exports have fallen substantially since 2003, while exports from other AGOA signatories have continuously been rising. While the year to date figures for 2004 and 2005 are lower for AGOA, exports overall possibly reflecting the end of the Multi-Fibre Arrangement South Africa's figure for 2005 are almost 50 percent less than that for 2004.

Kaplan (2003) examines the statistical evidence that shows, first, the impact of the weaker rand in boosting exports, and then the impact of the stronger rand in reducing exports. Manufacturers are adamant that competing in the international market is impossible without a weaker currency and government support. Those

manufacturers that managed to retain their export market in the face of a strong currency were able to because of one of three factors: long-standing relationships forged over several years (House of Monatic;Seardel; Allwear; Tern Sportswear); or a strongly interconnected relationship with an overseas customer where fabric supply to the manufacturer is part of the deal (Lolita Clothing); or being vertically integrated with a textile manufacturer (Standard Textile Company and Tern Sportswear). These raise two issues: the weakening effect of government indecision on business planning, and the demand for a ready and reliable supply of textiles.

Manne, Kipling and Robson (2005) examined that access to textiles is a highly limiting factor. Competitiveness in the world market demands ready access to a reliable supply of a variety of quality textiles.

Buckingham and Robson (2005) explores the reasons for the disappointing export performance that brings one to the first broad observation that differences between the economic environments in South Africa and its trading partners influence exporters more than producers for the domestic market. These differentials include lower inflation and lower overhead costs such as electricity, transport in trading partners, while municipal rates in South Africa have been increasing.

Manne, Kipling and Robson (2005) explore access to textiles is a highly limiting factor cited by a number of respondents. Competitiveness in the world market demands ready access to a reliable supply of a variety of quality textiles. The unpredictability of consumer demand, driven as it is by marketing, makes this even more important. However, textile supply in Sub-Saharan Africa is known as sub-quality, unreliable and suffering from insufficient volumes, long time lags and limited variety. In South Africa, the chronic underinvestment in the textile industry has led to a 1998 estimation that R3 billion to R10 billion over 5-10 years may be necessary to modernise and add capacity in spinning, weaving, finishing, dyeing and printing (USITC 2005: K-42). The reality of poor textile supply also explains South Africa's disappointing uptake of AGOA preferences.

Manufacturers reportedly 'sold' their certificates to retailers who then used the certificates to import apparel (Business Report, 2/2/2005), which is clearly counterproductive. Similar practices occurred under the SAP, also leading to imports being boosted (Altman 1993: vi-vii). The DTI also found that companies able to compete as exporters were 'up to speed' with training and measures to improve productivity (Theron, 2005).

Theron (2005) explores other government initiatives that include the competitiveness Fund, which was hampered by late implementation; and low interest loans for capital upgrade, which was primarily aimed at the textile sector. Some investigations were also launched at provincial level to produce solutions for the troubles besetting the industry. Government, the industry and SACTWU also agreed on country of origin labelling, which became law in 2005. Though, respondents from the industry again criticised the DTI for taking too long to agree to this step.

Van der Westhuizen (2005) investigated that in South Africa; clothing workers are geographically and racially differentiated, with black women predominating in the industry in the rural areas of Kwa-Zulu Natal and coloured women predominating in the industry in the urban areas of the Western Cape. Thus, poor women of colour absorb the social costs of liberalisation, as shown in the case of the clothing industry in South Africa over the past 15 years.

Additional option is regional integration. No country in the Southern African Development Community is competitive at every production stage of the textile and clothing supply chain. The production and value-adding steps in this supply chain require 'different resource investments in capital, skills and capacity building and different markets have different competitive requirements for price, response time, product quality, the variety of products, and order delivery size' (ChemonicsInternational 2004: 3).

SADC is a net exporter of cotton of about 145 000 tons per annum which, if utilised in the sub-region, would go a long way in supplying fabric for AGOA exports (Chemonics International 2004: 6). Zambia, as a cotton producer with good spinning capacity and the potential for growth provided the necessary investments are made

(Mtonga and Chikoti 2002: 3), has argued strongly for vertical integration on a regional scale. However, that would require massively upgradedtextile mills.

Taking regional integration to another level, some industry players in South Africabelieve that Africa could in the medium term become the next low-cost worldproducer of clothing, as Asian countries diversify away from the industry. In Japan,Taiwan, Korea, Hong Kong, and Singapore clothing manufacturing served as a stepping stone industry toward export-oriented economic development. Sub-SaharanAfrica could accept that it cannot presently compete with China when it comes to theproduction of textiles. Instead, through adopting a regional approach, Sub-SaharanAfrica could be next large producer of apparel for the global market. Textiles could besourced from China to overcome the obstacle of textile shortage, while investmentsshould be poured into developing a regional textile production capacity. This is, though, a medium to long-term vision, and as such requires concerted regionalindustrial policy.

2.4 Summary

As is evident from the above discussion, Ricardo's law is superior from Smith's theory because it justifies that trade is still possible between two countries even if a country does don't have absolute advantage in anything. The above arguments also prove that comparative advantage is advantageous to both the trading nations as a result of utilizing relative advantage in import and export. Besides Ricardo's law of comparative advantage, competitive advantage supported by Michael Porter's Diamond Model can help a less efficient nation develop industrial clusters so as to be able to export to a more efficient nation.

The most notable theories that explain forces behind international trade include Ricardo's and the H-O theory which are based on the static comparative advantage assumptions. The traditional trade models fail to explain the existence of trade in similar products which accounts for the dominant share of total world trade particularly between developed countries. Another problem with these models is that they fail to explain dynamic comparative advantage, which is the changing comparative advantage of countries over time. Ricardo's theory is not a close approximation to reality because he assumed labour as the only factor of production

and that technology is exogenous. Due to the limitations of the Ricardian comparative advantage, the H-O theory is regarded as the more sophisticated because it considered capital as a factor of production. However, the H-O theory has its own short comings in the sense that it assumed that production is characterized by constant returns to scale and that perfect competition exists in both countries. In reality, markets are imperfect and industries assume increasing returns to scale. According to (Wood and Mayer,1998), the HeckscherOhlin theory cannot provide a complete explanation of trade patterns because it neglects to consider economies of scale, sectorial differences in efficiency, imperfect competition, government policies and transport costs.

In response to the short comings of the H-O theory, trade can also be explained through the theories such as increasing returns to scale, dynamic comparative advantage and technological competition. In addition, many economists consider R&D and natural resources among the possible determinants of the resources of trade. We can say that results of research on the determinants and exchange rate of clothing exports vary depending on the models used data and countries. Empirical literature does not provide a theoretical framework to pursue. Very few studies have analysed the determinants and exchange rates of clothing exports in South Africa. Therefore, the debate on the impact of exchange rate on clothing exports is still inconclusive. Hence, the research in this area is warranted.

Chapter 3: Research Methodology

3.1 Introduction

This chapter discusses the research methodology used in this study in full aspect. The chapter is divided into three sections. The first section outlines the chapter. The second section, data description, explains all areas concerning the formulation and use of data in the overall study, including the sources of data and information. The third section gives a description of the model used in the study in full detail, and explains the models, techniques, and methods used to undertake the study.

3.2 Data description

The study employed the quarterly time series from the years 1992Q1 to 2014Q1.The period gives a clear trend of what happened after the apartheid era and after apartheid when trade reforms such as trade reforms such as trade liberalization were implemented. In addition, 1992 Q1 to 2014 Q1 produce enough observations to run a regression model, the study uses quarterly data because my variables are measured quarterly.

Table 3.1 Variable names, description and measure.

Variable	Description	Measure
CLEXP	Clothing Exports	Manufacturing - Clothing: Percentage gross rating present level of output below capacity (Percentage)
EXR	Exchange rate	Real effective exchange rate of the rand: Average for the period - 20 trading partners – Trade in manufactured goods
CLIMP	Clothing imports	Manufacturing - Clothing: Expected volume of goods

		imported in 12 months' time (Net balance)
GDP	Gross Domestic Product	Gross domestic product at market prices (GDP)

Source: own compilation

The study estimates the impact of exchange rate on clothing exports in South Africa using the following equation:

$CLEXP_t = f(EXR_t, CLIMP_t, GDP_t, \varepsilon_t)$ 3.1

Where:

CLEXP = Clothing Exports

EXR=Exchange Rate

CLIMP= Clothing imports

GDP = Gross Domestic Product

ε_t = Error term

Clothing exports is a dependent variable. EXR, CLIMP and GDP are independent variables. These variables may have a positive or negative impact depending on their results on the clothing exports. The model is specified as follows in the linear regression:

$CLEXPt = \beta 0 + \beta 1EXRt + \beta 2CLIMPt + \beta 2GDPt + \varepsilon t$ 3.2

Where:

$\beta_0$is a constant

$\beta_1$is a coefficient that is, 1,2,3....n

3.4 Estimation methods

The study uses estimation method of three steps tests which isAugmented Dickey-Fuller unit root test (ADF) unit root test, Johansen Co-integration test and Error Correction Model (ECM) to determine the long-run relationship on clothing exports, exchange rate, clothing imports and gross domestic product.The data employed in this study was collected in the following pattern; Quarterly time-series data for clothing exports (CLEXP) and clothing imports (CLIMP) were collected from Quantec data warehouse. Exchange rate (EXR) and Gross Domestic Product (GDP) were collected from South African Reserve Bank (SARB).The software that was used for the analysis of data was E-views8. Furthermore, the study adopted the Durbin Watson autocorrelation test which is a test that the residuals that form a linear regression or multiple regressions are independent.

Therefore, the paper adopts the following model:

$$Y = f(x1, x2, x3) \quad \ldots\ldots (1)$$

Where Y is theclothing export = dependent variable
Where variables X1, X2 and X3 are independent variables that affect exchange rate
F represents the functional notation or functional form.

Given the standard equation, it can be expressed as:

$$CLEXP = f(EXR, CIMP, GDP) \quad \ldots\ldots (2)$$

Where; CLEXP = Clothing export (EXR= Exchange rate, CLIMP=Clothing import and GDP = Gross Domestic Product).

A detailed form of equation (1) will be as follows:

$$CLIMP = \beta_0 + \beta_1 EXR + \beta_2 CIMP + \beta_2 GDP + \mu \quad \ldots\ldots (3)$$

Where: Bo = intercept of relationship in the model / constant, B1, B2 and B3 = Coefficients of each of the independent variables and μ = stochastic/ Error terms.

Linear representation of the equation will be in this manner:

$$Log(CLEXP) = \beta_{0+}\beta_1 Log(EXR)_+ \ \beta_2 Log(CIMP)\ _+\beta_3 Log(GDP)\ _+\mu \ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

Where; Log = Natural log

From equation (4) a model can further be derived in a form of a time series as;

$$Log(CLEXP) = \beta_{0+}\beta_1 Log(EXR)_+ \ \beta_2 Log(ICMP)\ _+\beta_3 Log(GDP)\ _+\mu \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

$$\Delta Log(CLEXP) = \beta_0 + \sum\beta_1 Log(EXR)_{t-1} + \sum\beta_2 Log(CIMP)_{t-1} + \sum\beta_2 Log(GDP)_{t-1} + \beta_0 + \sum(ECM)_{t-1} + \beta_0 + \sum_t \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

In equation (5), the Error Correction Model appears. Since it appears, its model then is as follows:

Where; $\sum_{i=0}^{n}(ECM)_{t-1}$

Error Correction term t-1 meaning the variables were lagged by one period ∑t White Noise Residual.

The study used the following methods for stationarity (Augmented Dickey Fuller) unit-root tests, and for cointegration the study uses Johansen cointegration tests and diagnostic and stability tests.

3.4.1 Unit root test

The unit root test is significant because it allows examining whether a time series is stationary or not. Knowing the existence of a time series' stationarity is essential for three main reasons. First, a fundamental question in the ARIMA modelling of a single time series is the number of times the series needs to be for the first differenced before fitting the ARIMA model because each unit root requires a differencing

operation. Second, stationarity in regression model is assumed in the derivation of standard inference procedure. Non-stationary of regression model invalidates the standard results. Third, one of the most important questions in cointegration is whether the disturbance term of the cointegration vector has a unit root.

Prior to estimation of any time series model, the first step is to check the stationarity of variables to be used as regressors in the model. The aim is to verify whether the series had a stationary trend, and, if non-stationary, to establish orders of integration. To test the level of integration of the variables that will be employed in the model, the study will also use the well-known Dickey-Fuller ADF test.

3.4.2 Augmented Dickey-fuller ADF test

The aim of is to determine whether the variables follow a non-stationary trend and are in fact of the order of 1, denoted as I(1) or whether the series are stationary, i.e. of the order of 0 denoted as I(0). The Augmented Dickey-Fuller (ADF) tests are based on the estimation of the following regression.

$$\Delta Xt = \alpha o + \alpha 1 + \alpha 2Xt - 1 + \sum \Delta Xt - 1 + \Phi t \qquad (2)$$

Where Δ is the first difference operator, t is a linear time series trend and Φt is a normally distributed error term. In (3), the null hypothesis that H0: a2 = 0 against the alternative hypothesis H1: a2 ≠ 0 is tested by comparing the calculated t-ratio of ã2 with Mackinnon critical values, which are essentially adjusted t values. If the absolute value of the calculated t-ratio is greater than the critical value, then the null hypothesis of a unit root (non-stationarity) is rejected, and the time series Xt can be characterised as integrated of order zero, i.e. I(0), in levels.

3.4.3Cointegration

After establishing that variables are stationary, it is necessary to determine whether or not there is any long-term relationship between them, this means testing the co-integration. Thus, two time-series integrated in the order d are said to be co-integrated if one unique linear combination of these series exists which is integrated in an order inferior to (d-b) with b ≥1. Thus, in order to test the co-integration between variables, two approaches can be used: the Engler-Granger two-step approach or the Johansen procedure.

3.4.3.1 Johansen Approach to co-integration

This is based on a VAR approach to co-integration. All the variables are assumed to be endogenous (although it is possible to include exogenous variables). The test relies on the relationship between the rank of a matrix and its eigenvalues or characteristic roots. The approach to testing for co-integration in a multivariate system is similar to the ADF test, but requires the use of a VAR approach:

$x_t = A_1 x_{t-1} + u_t$

$\Delta x_t = (A_1 - I) x_{t-1} + u_t$

$\Delta x_t = \pi x_{t-1} + u_t$

Where: $\pi = (A1 - I)$

Where in a system of g variables:

X_t and U_t are g x 1 vectors.

A_1 is an g x g matrix of parameters

I is an g x g identity matrix

The rank of π equals the number of co-integrating vectors if π consists of all zeros, as with the ADF test, the rank of the matrix equals zero, all of the xs are unit root processes, implying the variables are not co-integrated. As with the ADF test, the equation can also include lagged dependent variables, although the number of lags included is important and can affect the result. This requires the use of the Akaike or Schwarz-Bayesian criteria to ensure an optimal lag length.

3.4.4 Error Correction Models

Error Correction Models (ECMs) are a category of multiple time series models that directly estimate the speed at which a dependent variable (Y) returns to equilibrium after a change in an independent variable (X). ECMs are useful for estimating both short term and long term effects of one time series on another. Thus, ECM often meshes well with theories of political and social processes. Theoretically-driven

approach of estimating time series models. ECMsare useful models when dealing with integrated data, but can also be used with stationary data.

An error correction model includes only I(0) variables. This requires all non-stationary variables to be first-differenced, to produce stationary variables. The error correction term is the residual from the co-integrating relationship, lagged one time period, this too will be I(0) if the variables are co-integrated. The error correction model can include a number of lags on both variables. The ECM models the short-run dynamics of the model. As with short-run models including lags, it can be used for forecasting. The coefficient on the error correction term can be used as an extra

3.3.6 Diagnostic and Stability Test

After a test of the ECM was made, the study employed an ADF test to check for stationarity. This will either accept or reject the existence of co-integration built on the characteristics of the regressors in the model. The test also assists to justify the results grouped based on its significance statistically in the stated model or equation. In order estimate or gather these results, this study employs only three, which are; the histogram and normality test, the Serial Correlation test and lastly the Ramsey Reset and Cusum test Engle and Granger (1978).

3.3.7 Histogram and Normality Test

Engle and Granger (1978) show thata properly structured model is determined by using normality test. The test also shows how a random variable can be normally distributed given the underlying data set. In simple terms, the test is a way of choosing a model and can be measured in various ways. In descriptive statistics for example, the test can be employed in order to see the level or percentage of goodness of fit of a normal model to the data (Engle& Granger, (1978). When using the test and the goodness of fit is poor, that is anything below 50%, and then the data is not well modelled. The normality test generates a histogram of the residuals, and the Jarque-Bera-statisticfor testing their normality. In order to get the skewness and kurtosis, and how they differ with the normal distribution, the Jarque-Bera statistic is employed.

3.3.8 Serial correlation tests

When error terms from different (usually adjacent) time periods (or cross-section observations) are correlated, saying that the error term is serially correlated. Serial correlation occurs in time-series studies when the errors associated with a given time period carry over into upcoming or future time periods. To check for serial correlation or autocorrelation, there are numerous ways to go about it. This study yet, uses the Breusch-Godfrey LM test. The LM test can be used because it is large.

3.3.9 Ramsey Reset and CUSUM test

The Ramsey Regression Equation Specification Error Test (RESET) test (Ramsey, 1969) is an overall description examination for the linear regression model. It assiststo identify if the non-linear blends of the independent variablesthat can explain or not be able to explain the dependent variable. While, the Chow test is mostly used to determine if ever the explanatory variables have different effects on different subgroups of the population

3.5 Summary

This chapter considered theeconomic model and the hypotheses tested in the study. The econometric models, as well the methodologies that are followed, are outlined in this chapter. Precisely, the steps in estimating the parametric and semi parametric models are pointed in this chapter. This chapter considered the data issues and the methodological aspect to carry out an analysis of the impact of clothing exports on exchange rate. Approaches discussed are the stationary OLS and the techniques of Johansen co-integrationand error correction modelling (ECM) co-integration outlines the tools to quantify both the long-run relationship and the short-run deviations from equilibrium.

Chapter 4: Data analysis and interpretation

4.1Introduction

The results presented in this chapter provide answers to the questions and aims which were stated in chapter one of this study. What is the impact of clothing exports on exchange rate? Is there a relationship between clothing exports and exchange rate? What policies, based on the findings can be undertaken to encourage exchange rates and exports in South Africa? This chapter presents results of the unit root tests and the graphical analysis for the variables in the model. Cointegration test between the variables will be done with a view to establish the long run relationship. The error correction model is thereafter estimated.

This chapter is divided into four sub-sections. The first presents the results of stationarity/ unit root tests, the second presents and discusses the Johansen cointegtation test results; the third section discusses the long run relationship (ECM). The next section presents the diagnostic tests and stability tests while the last section concludes this chapter.

4.2 Unit root test results

The unit root test is important because it allows examining whether a time series is stationary or not. Knowing the existence of a time series' stationarity is essential. For this purpose, all the variables are examined over graphical review of their time series strategies. Augmented Dickey-Fuller (ADF) tests (Dickey and Fuller 1981) are employed to identify the order of integration (that is the number of times a variable needs to be differenced to make it stationary). The graphical examination of the series is very important before any form of analysis. This graphical examination allows for detection of any data capturing errors, and checking of structural breaks or drifts that may bias the unit root tests. It allows us to have an idea of the stationarity of the data.The variables are clothing exports (CLEXP), exchange rate (EXR), clothing imports (CLIMP) and gross domestic product (GDP) *(See graphs below)*.

Figure 4.2.1 Graphical presentation of clothing exports at levels

Levels

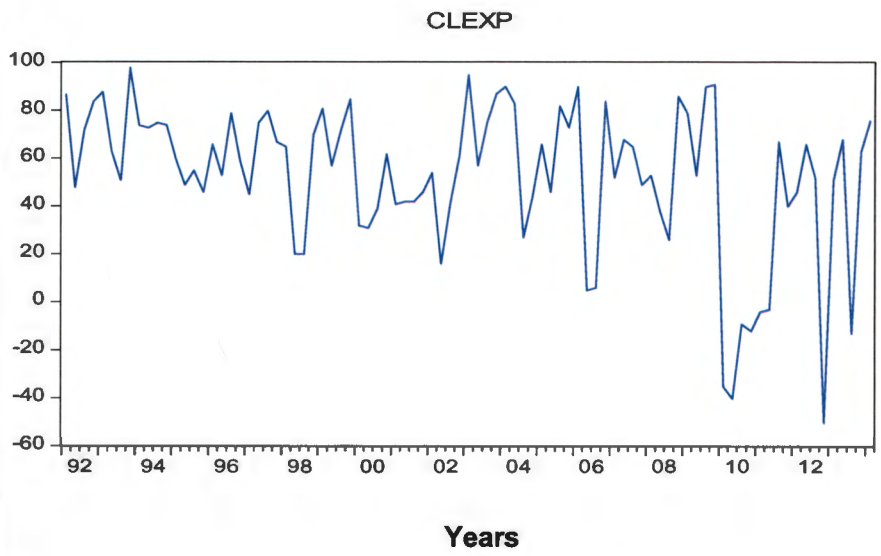
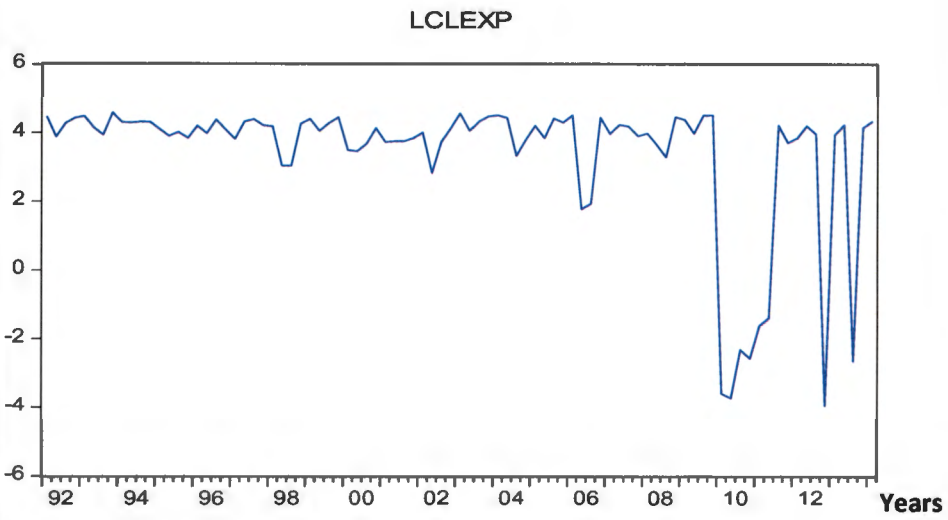


Figure 4.2.2 Graphical presentation of clothing exports at first difference

Levels



The figure above figure 4.2.1 shows the graph that representsclothing exports in levels and suggests that the variable is stationary. The second figure 4.2.4 for first difference shows a more stationary shape, it indicates that the data in this form might be stationary.

The below figure 4.2.3 presenting exchange rate in levels suggests that the variable is stationary, as it can be seen in the graph shows significant time dependence. Hence, the plot of the same variable in figure 4.2.4 for first difference shows a more stationary shape, it indicates that the data in this form might be stationary.

Figure 4.2.3 Graphical presentation of exchange rate at levels

Levels

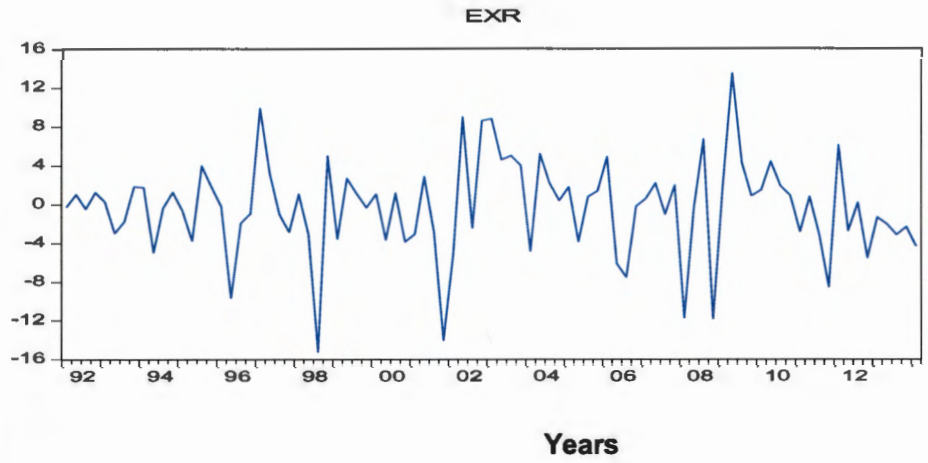


Figure 4.2.4 Graphical presentation of exchange rate at first difference

Levels

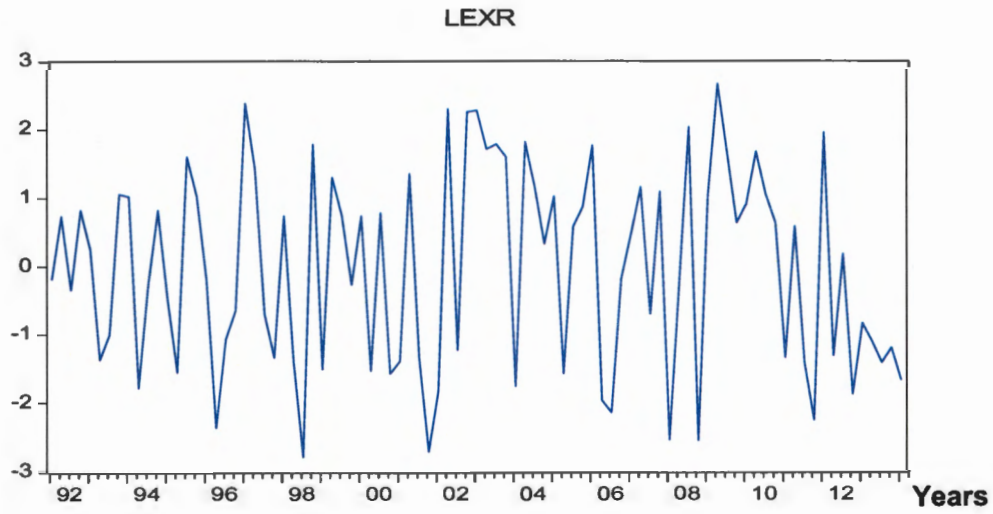


Figure 4.2.5 Graphical presentation of clothing imports at levels

Levels

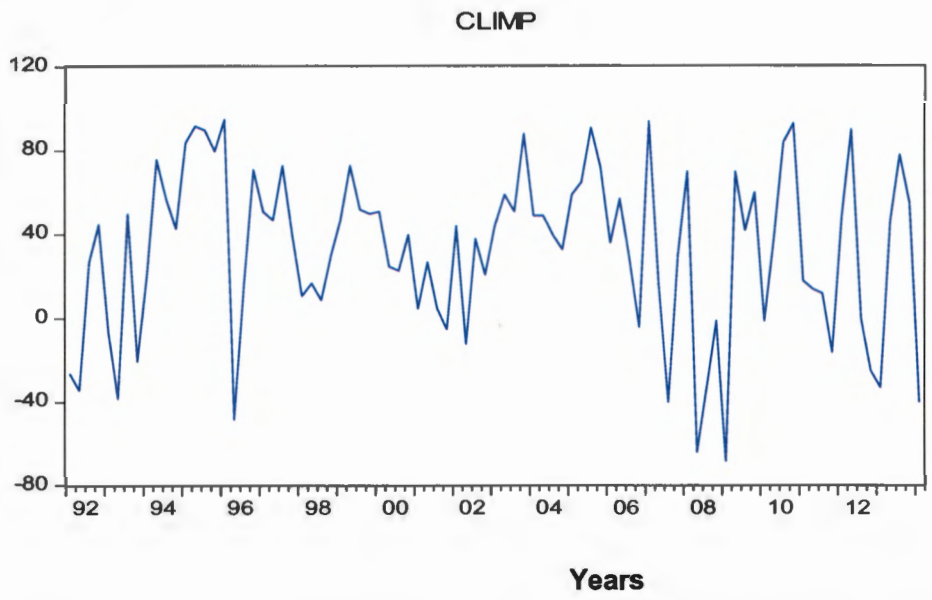
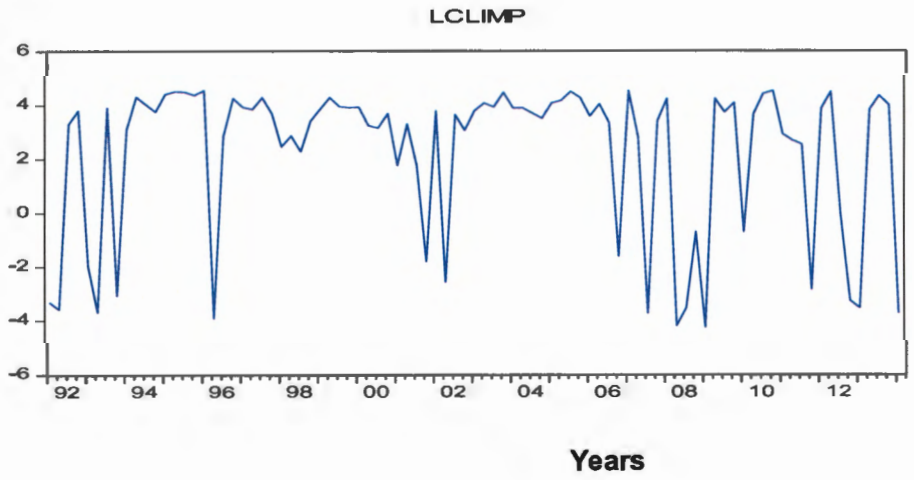


Figure 4.2.6 Graphical presentation of clothing imports at first difference

Levels



The figure above figure 4.2.5 shows the graph that represents clothing imports in levels and suggests that the variable is stationary. The second figure 4.2.4 for first difference shows a more stationary shape.

Figure 4.2.7 below is the visual inspection of the data on gross domestic product at levels. The variable in levels has an upward trend and the series is non-stationary. The plot of the same variable on figure 4.2.8 in first difference of the series shows non-stationary shape.

Figure 4.2.7 Graphical presentation of gross domestic product at levels

Levels

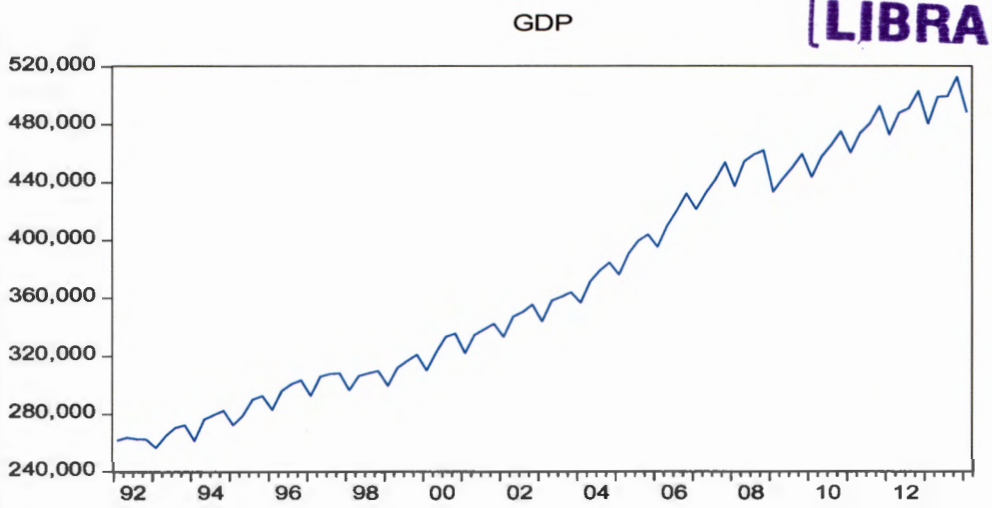
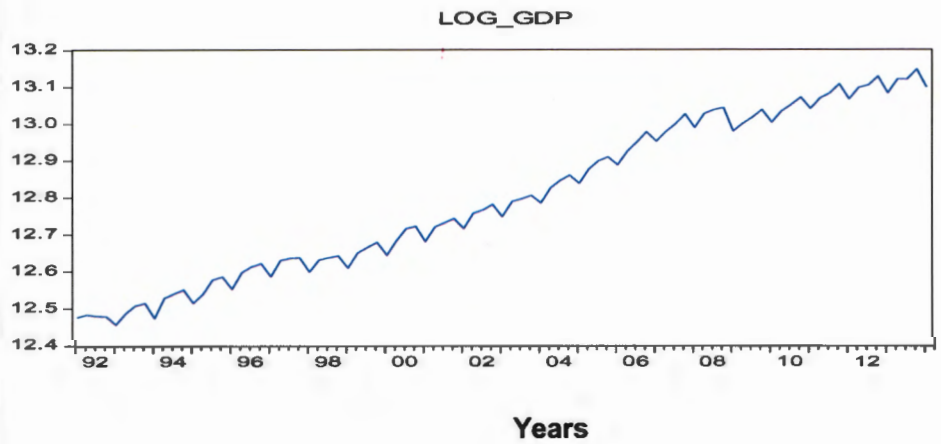


Figure 4.2.8 Graphical presentation of gross domestic product at first difference

Levels



4.3 Formal unit root testing ADF test

At this stage the formal testing procedures currently available are used to examine each of the variables. To determine the integrating order of time series variables, the Augmented Dickey Fuller (1981) is used to test each variable for unit root in levels, and then in the first difference form. These tests are based on the following assumptions:

H_o: unit root exist

H1: unit root does not exist

Interpretation of unit root results is based on comparing their t-statistics with their critical values:

If t*>ADF critical values: accept the null hypothesis (there is unit root)

If t*>ADF critical values: reject the null hypothesis (no unit root)

Table 4.2unit root test at levels

Variables	Model	ADF Lags	ADF (t-Statistics) $\tau_\tau\tau_\mu\tau$	Critical value at 5%	Conclusion
Log(CLEXP)	Trend and intercept	3	-6.880239	-3.461686	No unit root
	Intercept	3	-6.347577	-2.894716	No unit root
	None	3	-1.424630	-1.944619	Unit root
Log(EXR)	Trend and intercept	3	-8.858729	-3.461686	No unit root
	Intercept	3	-8.909299	-2.894716	No unit root
	None	3	-8.933555	-1.944530	Unit root
Log(CLIMP)	Trend and intercept	3	-7.008365	-3.461686	No unit root
	Intercept	3	-6.984808	-2.894716	No unit root
	None	3	-2.450934	-1.944619	No unit root
Log(GDP)	Trend and intercept	3	-4.221246	-3.461686	No unit root
	Intercept	3	-0.467173	-2.894716	Unit root
	None	3	2.133065	-1.944530	No unit root

* Statistically significant at 10% level

** Statistically significant at 5% level

*** Statistically significant at 1% level

The table 4.1 above presents the results of running ADF test on all variables at levels in logarithm form with trend and intercept, intercept, and none. The result from above shows that log of clothing exports and exchange rate show the existence of unit root which is non-stationary in levels where there is only in none and unit root exist in gross domestic product in interceptwhich is also non-stationary. While all variables are stationary (no unit root), thus the results from the above table 4.3.1 indicate that the null hypothesis of non-stationarity is rejected (unit root does not exist).

Table 4.2unit root test at first difference

Variables	Model	ADF Lags	ADF (t-Statistics) $\tau_\tau\tau_\mu\tau$	Critical value at 5%	Conclusion
dLog(CLEXP)	Trend and intercept	3	-11.72419	-3.462912	No unit root
	Intercept	3	-11.79629	-2.895512	No unit root
	None	3	-11.86622	-1.944619	No unit root
dLog(EXR)	Trend and intercept	3	-12.31805	-3.462912	No unit root
	Intercept	3	-12.38874	-2.895512	No unit root
	None	3	-12.46092	-1.944619	No unit root
dLog(CLIMP)	Trend and intercept	3	-11.05520	-3.462912	No unit root
	Intercept	3	-11.09824	-2.895512	No unit root
	None	3	-11.17276	-1.944619	No unit root
dLog(GDP)	Trend and intercept	3	-13.88205	-3.462292	No unit root
	Intercept	3	-13.94302	-2.895109	No unit root
	None	3	-12.67227	-1.944574	No unit root

* Statistically significant at 10% level

** Statistically significant at 5% level

*** Statistically significant at 1% level

The results from table 4.2 show that when the ADF test is applied to variables in first differences with the trend and intercept, intercept and none, all of the variables are

stationary in first difference. Thus the null hypothesis of non stationarity is rejected (no unit root) and the variables are intergrated of order one I(1).

4.4 Cointegration analysis

Once it has been established that the variables are integrated of the same order, the next step is to determine whether there exists a long-run equilibrium relationship amongst them. Cointegration describes the existence of an equilibrium or stationarity relationship among two or more times series each of which is individually non stationary. The advantage of the cointegration approach is that it allows one to integrate the long-run and short-run relationship between variables within a combined framework. Two conditions must be met for two or more variables to be cointegrated.

Firstly, they must be integrated of the same order. Secondly, linear combinations of the variables from the regression of the non-stationary variables (in levels form) must be stationary. In this study, the Johansen's (Johansen 1988; Johansen andJuselius 1990) maximum likelihood approach is used to test for cointegration. This approach has been shown to be superior to Engle and Granger's (1987) residual-based approach. Among other things, the Johansen approach is capable of detecting multiple co-integrating relationships.These tests are based on the following assumptions:

H_o: there is no coitegration

H1: there is cointegration

Table 4.3 Johansen Co-integration test (Trace and Max-Eigenstatistic)

Hypothesized No.of CE(s)	Eingenvalue	Trace Statistic	0.05 Critical value	Max-Eigen Statistic	0.05 Critical value
None	0.289787	67.46378*	47.85613	29.42843*	27.58434
At most 1	0.269566	38.03535*	29.79707	27.01399*	21.13162
At most 2	0.116432	11.02136	15.49471	10.64564	14.26460
At most 3	0.004359	0.375720	3.841466	0.375720	3.841466

Trace test indicates 1 cointegrating equation(s) at the 0.05 level

Max-eigenvalue test indicates 2 cointegratingeqn(s) at the 0.05 level

*denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis(1999) p-values

Table 4.3 above gives the results from johansencointegration test. The first column of the table gives tests for hypothesized no.ofcoitegrated equation where the null hypothesis, pr, ranging from no of cointegration relationship(r = p) up to most two cointegration vectors. The second column gives the eingenvalues in descending order, while the third and fifth column reports the corresponding trace statistics and max-eigen statistics generated. The fourth and sixth column reports the critical values at the five per cent levels.

The results ofthe trace test statistic shows two cointegrating equations at 5% level, having the rejection of the null hypothesis of no cointegration of the series. On the other hand, the maximum eigenvalue statistic indicates the presence of two cointegrating equations at 5% level.The trace test shows that there is 5 per cent significance co-integration equation. This is shown by comparing the trace statistics as it shows that 67.46378 is greater than critical value 47.85613 and 38.03535 is also greater than the critical value 29.79707.The max-eigen statistic that indicates that there is 5 percent significance cointegration. This is realised by comparing the max-eigen statistics as it shows that 29.42843 is greater than the critical value 27.58434 and 27.01399 is also greater than the critical value 21.13162.

The results show that both the Trace and Maximum Eigen value test are significant at 5 percent level. These results prove that the variables are tied together in a single way in the long run; there is no unique long run equilibrium relationship. Thus there is one cointegration relationship in the trace static model and two cointegrationrelationships in the maximum Eigen model. Therefore, the existence of a long run relationship of the model can be seen within an Error Correction Model (ECM).

4.5 Estimation of Error Correction Model (ECM)

The ECM techniques allow the long run and short run dynamics to be estimated in single step. The constant term of the single error correction framework is a combination of the short run and long run constant. This technique has an advantage as it isolates the speed of adjustment parameter which shows how quickly the system returns to equilibrium after a random shock.

Table 4.4 Results of ECM

Variable	Coefficient	Standard Error	t-Statistic
Dlog(EXR)	0.059038	0.090378	0.653238**
Dlog(CLIMP)	0.026256	0.052506	0.499982**
Dlog(GDP)	-3.986775	6.732946	-0.592129*
ECM(-1)	-0.577600	0.100887	-5.725221**
C	0.014470	0.189222	0.076470

t-ratio of estimates,* and ** denote a t-ratio significant at the 1% and 5% respectively.

R^2 =0.292289

Adjusted R-squared = 0.2581838

The R squared of 0.292289 indicates that the model explains 29% of the clothing export variation meaning that there are other significant variables that explains changes in clothing export. All variables are statistically significant at 5% level in elaborating clothing export.

A 1% increase in exchange rate will lead to a 0.059% positive change in clothing export. Although theory stipulates that a higher exchange rate will lead to a rise in imports and decline exports, which means depreciating of trade balance, because customers will find it cheaper to buy imported goods and there will be a tendency to source intermediate goods from other countries. Similarly, devaluation of currency will lead to souring of exports. Leads to an appreciation of general trade balance as imports get expensive while exports get more competitive.

Thus, the results are different from the theory, finding that an increase in exchange rate, that is, the price of buying foreign currency in terms of domestic currency

increases, causing an arise in net exports and an arise in aggregate demand, customers will find is expensive to buy clothing exports due to high exchange rate.

A 1% rise in clothing import will lead to a 0.026% positive change in clothing export. Theory states that it is not possible for all nations to have positive net exports because one or more must import more than they export if the others export more than they import, whilst the findings of this study are different, meaning clothing exports and imports increasing there

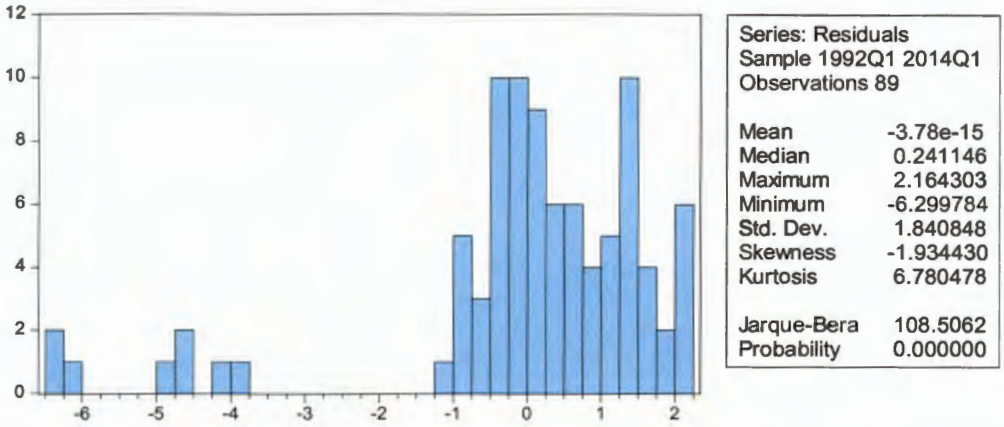
A healthy economy is one where both exports and imports are growing since this typically indicates economic strength and strength and a sustainable trade surplus or deficit. Therefore, if exports are growing well but imports are not (decreased) significantly, it may show that the rest of the world is in a better shape than the domestic economy. Conversely, if exports decline sharply but imports surge, this might show that the domestic economy is doing better than overseas markets. The United State trade deficit, for example, tends to worsen when the economy is growing strongly. The country's chronic trade deficit has not declined it from continuing to be one of the most productive nations in the world.

A 1% change in Gross Domestic Product will lead to a -3.986% negative change in clothing export Although the theory say arise in the gross domestic product can trigger greater productivity and better the economy, thus creating more clothing exports in an upward spiral cycle. The above results show a negative relationship.

The ECM (-1) is negative and significant. This term detect the long run relationship. It reflects attempts to correct deviation from the long-run equilibrium path. Its coefficient is interpreted as the speed of adjustment or the amount of disequilibrium transmitted each period to economic growth. Its magnitude is-0.577600 implying that about 58% of disequilibrium is corrected in subsequent period.

4.6 Diagnostic testing

Figure 4.6.1 Normality test on the residuals



The *Jarque-Bera* test statistics tests whether the residuals are normally distributed. The null hypothesis for the above figure 4.6.1 is that the residual are not normally distributed. The decision rule for the rest is that if P< 0.05 level of significance then the null hypothesis should be rejected. The result for the probability is 0.000 which is less than the 0.05 level of signification, therefore the study accept the null hypothesis. This means that the residuals are not normally distributed for the current study.

Table 4.6.1 Serial correlation test on the residuals

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	8.170766	Prob.F(3.82)	0.0001
Obs*R-squared	20.48209	Prob. Chi-Square(3)	0.0001

The table 4.6.1 above gives the results for the serial correlation on the residuals, from the output of *Breusch-Godfrey*. The null hypothesis of the study is that there is no serial correlation in the residuals. The probability value from the result is 0.0001; in the case the null hypothesis is rejected. This means that there is serial correlation in the residuals.

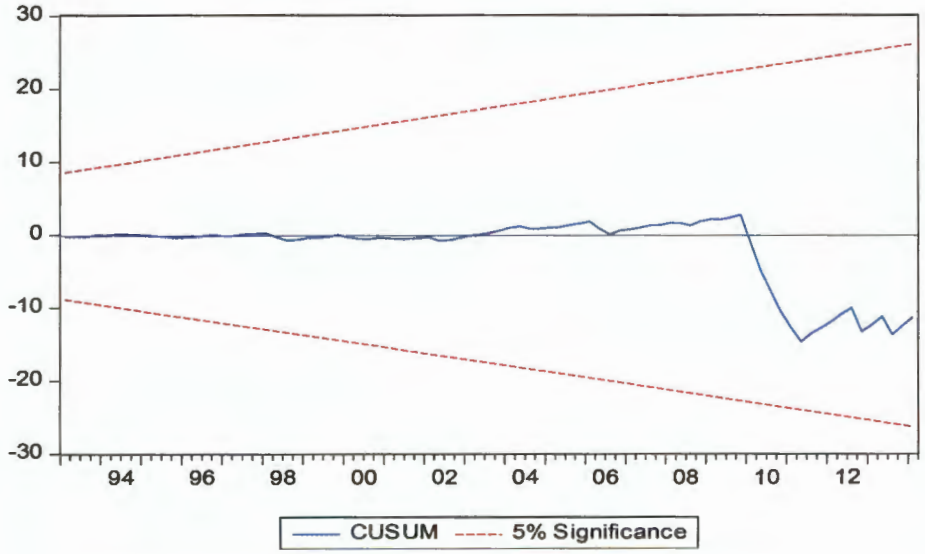
Table 4.6.2 Heteroscedasticitytest:ARCH

HeteroscedasticityTest:ARCH			
F-statistic	44.24917	Prob.F(1.86)	0.0000
Obs*R-squared	29.89598	Prob. Chi-Square(1)	0.0000

Table 4.6.2 gives the result of heteroscedasticity on the residuals, from the output of heteroscedasticity test: ARCH the study test the null hypothesis that there is no heteroscedasticity up to order q in the residual. The probability value from the result is 0.0000; the study rejects the null hypothesis. This means that for the current study there is heteroscedasticity up to order q in the residual

4.7 Stability test

Figure 4.7.1 Cusum test



The stability cusum test is applied to evaluate the stability of the long run coefficient together with the short run dynamics. The cusum test points that the null hypothesis

(i.e that the regression equation is correctly stated) cannot be rejected if the plot of these statistics remains within the critical bound of the 5 percent significant level.

The figure 4.7.1 shows cusum test from 1992Q1 to 2014Q1 the stability of the parameters remain within the critical bounds of parameter stability.

Table 4.7.1 Ramsey reset test on residuals

	Value	Df	Probability
F-Statistic	1.510062	(3.82)	0.2181
Likelihood ratio	4.785892	3	0.1882

The Ramsey reset test, also known as the regression specification error test is applied. The p-value from the results is 0.2181 and 0.1882 which are more than the critical p-value=0,05, therefore, the null hypothesis of the mis-specification in the model is accepted. This means that the model is statistically well specified and that the residual is normally distributed.

4.8 Summary

Chapter 4 outlined the results of the econometric analysis. Prior to the estimation the study used ADF unit root test to test the stationarity of the data. The empirical result from ADF model in level identified that all the variables are stationary (the null hypothesis is rejected). The Johansen cointergration test showed evidence that there is no-cointegration between the clothing exports, exchange rate, clothing imports and gross domestic product. ECM was applied to determine the short-run effects of exchange rate, clothing imports and gross domestic product in clothing exports.

Chapter 5: Summary and Conclusions

5.1 Introduction

This chapter present the summary and conclusion of the findings of the study. Section 5.2 provides the summary of this chapter. The final s4ection gives the conclusion of the study.

5.2 Summary

The main objective of this study was to investigate the impact of exchange rate on clothing exports in South Africa. Chapter one(1) of this study introduced the following research questions: (1)What is the impact of exchange rate on clothing exports?(2)Is there a relationship between exchange rate and clothing exports?(3)What policies, based on the findings can be undertaken to encourage exchange rates and clothing exports in South Africa?

Chapter two (2) gave a strong review of the theoretical exports and theories of exchange rate in South Africa. The empirical literature provides the summary of existing studies on the exchange rate and clothing exports, on the methods that was implored by others and their results. The study divided literature into two types of empirical studies i.e Cross-sectional studies, which determine exchange rate and clothing exports impact on group of countries, and cross-country time series studies, which singly investigate exchange rate and clothing exports impact economic prosperity of a single country.

Chapter three (3) presented the research methodology. This chapter considered data issue and the methodology aspects to carry out the investigation the impact of exchange rate on clothing exports. The chapter also introduced the economic model. The econometric models, as well the methodologies that are followed, were shown in this chapter. The approaches discussed are the unit root test, the techniques of co-integration, error correction modelling and diagnostic test. This study combined

these approaches. Error correction model and co-integration provides the tools to quantify both the long-run relationship and the short-run deviations from equilibrium.

Lastly, chapter four(4) presented the data used to investigate the impact exchange rate on clothing exports in South Africa. Results, analysis and interpretations of the data were also presented in this chapter.

5.3 Conclusion

Co- integration test determines that there is a long-run relationship between changes in exchange rate and clothing exports. The result suggests that the variable under consideration are co-integrated and hence, share a common linear common trend, that is, they move together in the long-run.

The error correction model was applied to establish the short-run. The result from this study revealed that clothing exports hasa significant and positive relationship with exchange rate in the short-run. Clothing imports were included in the model and it also showed a significant and positive relationship with clothing exports in the short-run. GDP showed an insignificant and negative relationship with clothing exports. Lastly, the results of the diagnostic test and stability test employed in the study presented heteroskedastity and a problem of serial correlation is found in the residuals and the residuals are normally distributed.

5.4 Limitations of the study and areas for further study

This study used only four variables which are clothing exports, exchange rate, clothing imports and GDP. Looking how the study gives positive and negative results. Addition of other variables in coming studies might improve the outcome of the results.

5.5 Recommendations

The study investigated the impact of exchange rate on clothing exports in South Africa. The results from this study showed that exchange rate has a positive change in clothing exports. China has fixed exchange rates that the government sets and maintains as the official exchange rate, where imports and exports are having a negative relationship. A higher exchange rate will lead to an increase in imports and a decrease in exports, meaning that trade balance depreciates. Thus, customers will

find it cheaper to purchase imported goods and there will be a tendency to source intermediate goods from other countries. Similarly, depreciation of the currency will lead to higher exports, leading to appreciation of general trade balance as imports get more expensive while exports get more competitive. The competitive advantage of fixed exchange rate is that policy makers cannot revalue to sustain a currency artificially high to decline imported cost-push inflation.

On the other hand, South Africa has floating exchange rates where it is determined by the private market through demand and supply. If the demand for a currency is low, its value will decline, therefore making imported goods more expensive and increasing the demand for local goods and services. Thus, generate more jobs, causing an auto-correction in the market; floating exchange rate is constantly fluctuating, where imports and exports can have a positive relationship. Where individuals will have more money to spend which will benefit the population. Competitive advantage of floating exchange rate is that policy makers are free to diminish to achieve certain objectives, such as job creation, economic growth and decreasing inflationary pressure.

The government should make South Africa's exchange rate to be a fixed exchange rate, so that South Africa exports more than it imports having a competitive advantage and more employment.

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Appendix 1.1 Data (1994Q1-2014Q1)

YEARS	CLEXP	EXR	CLIMP	GDP
1992/03/31	87	-0.4	-26	263278
1992/06/30	48	1.3	-34	263007
1992/09/30	72	0.3	27	257157
1992/12/31	84	-2.9	45	265177
1993/03/31	88	-1.7	-6	270820
1993/06/30	63	1.9	-38	272676
1993/09/30	51	1.8	50	261765
1993/12/31	98	-4.9	-20	276421
1994/03/31	74	-0.3	22	279549
1994/06/30	73	1.3	76	282565
1994/09/30	75	-0.6	57	272575
1994/12/31	74	-3.7	43	279230
1995/03/31	60	4	84	290145
1995/06/30	49	1.8	92	292631
1995/09/30	55	-0.2	90	283053
1995/12/31	46	-9.6	80	296237
1996/03/31	66	-1.9	95	300760
1996/06/30	53	-0.9	-48	303393
1996/09/30	79	9.9	17	292826
1996/12/31	59	3.2	71	305964
1997/03/31	45	-1	51	307807
1997/06/30	75	-2.8	47	308171
1997/09/30	80	1.1	73	296580
1997/12/31	67	-3	40	306386
1998/03/31	65	-15.2	11	308270
1998/06/30	20	5	17	309817

1998/09/30	20	-3.5	9	299684
1998/12/31	70	2.7	30	312120
1999/03/31	81	1.1	47	316838
1999/06/30	57	-0.3	73	321205
1999/09/30	72	1.1	52	310326
1999/12/31	85	-3.6	50	322664
2000/03/31	32	1.2	51	333322
2000/06/30	31	-3.8	25	335462
2000/09/30	39	-3	23	322026
2000/12/31	62	2.9	40	334676
2001/03/31	41	-2.8	5	338469
2001/06/30	42	-14	27	342212
2001/09/30	42	-5.2	5	333306
2001/12/31	46	9	-5	347204
2002/03/31	54	-2.4	44	350396
2002/06/30	16	8.6	-12	355529
2002/09/30	41	8.8	38	343995
2002/12/31	61	4.6	21	358345
2003/03/31	95	5	44	360923
2003/06/30	57	4	59	364059
2003/09/30	75	-4.8	51	356887
2003/12/31	87	5.2	88	371714
2004/03/31	90	2.2	49	379044
2004/06/30	83	0.4	49	384685
2004/09/30	27	1.7	40	376327
2004/12/31	44	-3.8	33	391002
2005/03/31	66	0.8	59	399722
2005/06/30	46	1.4	65	404031
2005/09/30	82	4.9	91	395449
2005/12/31	73	-6.1	72	410298
2006/03/31	90	-7.5	36	420695
2006/06/30	5	-0.2	57	432679
2006/09/30	6	0.6	28	421784
2006/12/31	84	2.2	-4	433014
2007/03/31	52	-1	94	442196
2007/06/30	68	2	16	454171
2007/09/30	65	-11.7	-40	437678
2007/12/31	49	-0.3	30	454887
2008/03/31	53	6.7	70	459649
2008/06/30	38	-11.8	-64	462380
2008/09/30	26	1.8	-33	433797
2008/12/31	86	13.5	-1	442772
2009/03/31	79	4.3	-68	450509
2009/06/30	53	0.9	70	459822

2009/09/30	90	1.9	42	443936
2009/12/31	91	3.4	60	457731
2010/03/31	-35	2.2	-1	465818
2010/06/30	-40	1.1	39	475523
2010/09/30	-9	-3.1	84	460863
2010/12/31	-12	1	93	474374
2011/03/31	-4	-3.3	18	481032
2011/06/30	-3	-8.3	14	493074
2011/09/30	67	5.5	12	473284
2011/12/31	40	-2.7	-16	488293
2012/03/31	46	0.2	48	491516
2012/06/30	66	-5.3	90	503351
2012/09/30	52	-2.2	0	480895
2012/12/31	-50	-2.5	-25	499485
2013/03/31	51	-2.8	-33	499776
2013/06/30	68	-1.8	46	513277
2013/09/30	-13	-4.4	78	488812
2013/12/31	63	5.5	55	504465
2014/03/31	76		-40	488812

Appendix 1. 2 Unit root at levels

Null Hypothesis: CLEXP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.880239	0.0000
Test critical values:	1% level	-4.065702	
	5% level	-3.461686	
	10% level	-3.157121	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CLEXP)
Method: Least Squares
Date: 11/09/14 Time: 19:14
Sample (adjusted): 1992Q2 2014Q1
Included observations: 88 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CLEXP(-1)	-0.726379	0.105575	-6.880239	0.0000
C	51.37651	9.903021	5.187963	0.0000
@TREND("1992Q1")	-0.295736	0.129545	-2.282885	0.0249

R-squared	0.358377	Mean dependent var	-0.125000
Adjusted R-squared	0.343280	S.D. dependent var	35.20574
S.E. of regression	28.53013	Akaike info criterion	9.573295

Sum squared resid	69187.30	Schwarz criterion	9.657749
Log likelihood	-418.2250	Hannan-Quinn criter.	9.607319
F-statistic	23.73823	Durbin-Watson stat	1.887655
Prob(F-statistic)	0.000000		

Null Hypothesis: CLEXP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.347577	0.0000
Test critical values:	1% level	-3.506484	
	5% level	-2.894716	
	10% level	-2.584529	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CLEXP)
Method: Least Squares
Date: 11/09/14 Time: 19:16
Sample (adjusted): 1992Q2 2014Q1
Included observations: 88 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CLEXP(-1)	-0.634349	0.099936	-6.347577	0.0000
C	33.35856	6.126041	5.445370	0.0000

R-squared	0.319037	Mean dependent var	-0.125000
Adjusted R-squared	0.311119	S.D. dependent var	35.20574
S.E. of regression	29.22036	Akaike info criterion	9.610074
Sum squared resid	73429.35	Schwarz criterion	9.666377
Log likelihood	-420.8432	Hannan-Quinn criter.	9.632757
F-statistic	40.29174	Durbin-Watson stat	1.938692
Prob(F-statistic)	0.000000		

Null Hypothesis: CLEXP has a unit root
Exogenous: None
Lag Length: 2 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.424630	0.1428
Test critical values:	1% level	-2.592129	
	5% level	-1.944619	
	10% level	-1.614288	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CLEXP)
Method: Least Squares
Date: 11/09/14 Time: 19:16
Sample (adjusted): 1992Q4 2014Q1
Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CLEXP(-1)	-0.080813	0.056726	-1.424630	0.1580
D(CLEXP(-1))	-0.357105	0.102745	-3.475647	0.0008
D(CLEXP(-2))	-0.444265	0.100722	-4.410786	0.0000

R-squared	0.286944	Mean dependent var	0.046512
Adjusted R-squared	0.269762	S.D. dependent var	35.26969
S.E. of regression	30.13935	Akaike info criterion	9.683801
Sum squared resid	75395.57	Schwarz criterion	9.769418
Log likelihood	-413.4034	Hannan-Quinn criter.	9.718258
Durbin-Watson stat	1.981449		

Null Hypothesis: EXR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.858729	0.0000
Test critical values:	1% level	-4.065702	
	5% level	-3.461686	
	10% level	-3.157121	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR)
Method: Least Squares
Date: 11/09/14 Time: 19:18
Sample (adjusted): 1992Q2 2014Q1
Included observations: 88 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR(-1)	-0.963848	0.108802	-8.858729	0.0000
C	-0.123380	1.071372	-0.115161	0.9086
@TREND("1992Q1")	-0.003246	0.020904	-0.155295	0.8770

R-squared	0.480119	Mean dependent var	-0.046591
Adjusted R-squared	0.467887	S.D. dependent var	6.828523
S.E. of regression	4.981141	Akaike info criterion	6.082691
Sum squared resid	2109.000	Schwarz criterion	6.167146
Log likelihood	-264.6384	Hannan-Quinn criter.	6.116716
F-statistic	39.24950	Durbin-Watson stat	1.985150
Prob(F-statistic)	0.000000		

Null Hypothesis: EXR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.909299	0.0000
Test critical values:	1% level	-3.506484	
	5% level	-2.894716	
	10% level	-2.584529	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR)
Method: Least Squares
Date: 11/09/14 Time: 19:19
Sample (adjusted): 1992Q2 2014Q1
Included observations: 88 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR(-1)	-0.963834	0.108183	-8.909299	0.0000
C	-0.267835	0.528554	-0.506731	0.6136

R-squared	0.479972	Mean dependent var	-0.046591
Adjusted R-squared	0.473925	S.D. dependent var	6.828523
S.E. of regression	4.952799	Akaike info criterion	6.060248
Sum squared resid	2109.598	Schwarz criterion	6.116551
Log likelihood	-264.6509	Hannan-Quinn criter.	6.082931
F-statistic	79.37560	Durbin-Watson stat	1.984628
Prob(F-statistic)	0.000000		

Null Hypothesis: EXR has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.933555	0.0000
Test critical values:	1% level	-2.591505	
	5% level	-1.944530	
	10% level	-1.614341	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR)
Method: Least Squares
Date: 11/09/14 Time: 19:19
Sample (adjusted): 1992Q2 2014Q1
Included observations: 88 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

EXR(-1)	-0.961259	0.107601	-8.933555	0.0000

R-squared	0.478419	Mean dependent var	-0.046591
Adjusted R-squared	0.478419	S.D. dependent var	6.828523
S.E. of regression	4.931598	Akaike info criterion	6.040502
Sum squared resid	2115.897	Schwarz criterion	6.068653
Log likelihood	-264.7821	Hannan-Quinn criter.	6.051843
Durbin-Watson stat	1.983339		

Null Hypothesis: CLIMP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.008365	0.0000
Test critical values:	1% level	-4.065702	
	5% level	-3.461686	
	10% level	-3.157121	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CLIMP)
Method: Least Squares
Date: 11/09/14 Time: 19:21
Sample (adjusted): 1992Q2 2014Q1
Included observations: 88 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CLIMP(-1)	-0.734557	0.104812	-7.008365	0.0000
C	30.85127	9.038188	3.413436	0.0010
@TREND("1992Q1")	-0.146507	0.160410	-0.913325	0.3637

R-squared	0.368160	Mean dependent var	-0.159091
Adjusted R-squared	0.353293	S.D. dependent var	47.49565
S.E. of regression	38.19510	Akaike info criterion	10.15679
Sum squared resid	124003.6	Schwarz criterion	10.24124
Log likelihood	-443.8987	Hannan-Quinn criter.	10.19081
F-statistic	24.76381	Durbin-Watson stat	1.943391
Prob(F-statistic)	0.000000		

Null Hypothesis: CLIMP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.984808	0.0000
Test critical values:	1% level	-3.506484	
	5% level	-2.894716	
	10% level	-2.584529	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CLIMP)
Method: Least Squares
Date: 11/09/14 Time: 19:21
Sample (adjusted): 1992Q2 2014Q1
Included observations: 88 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CLIMP(-1)	-0.730827	0.104631	-6.984808	0.0000
C	24.20733	5.358694	4.517394	0.0000

R-squared	0.361959	Mean dependent var	-0.159091
Adjusted R-squared	0.354540	S.D. dependent var	47.49565
S.E. of regression	38.15826	Akaike info criterion	10.14383
Sum squared resid	125220.5	Schwarz criterion	10.20013
Log likelihood	-444.3284	Hannan-Quinn criter.	10.16651
F-statistic	48.78754	Durbin-Watson stat	1.931084
Prob(F-statistic)	0.000000		

Null Hypothesis: CLIMP has a unit root
Exogenous: None
Lag Length: 2 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.450934	0.0146
Test critical values:	1% level	-2.592129	
	5% level	-1.944619	
	10% level	-1.614288	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CLIMP)
Method: Least Squares
Date: 11/09/14 Time: 19:22
Sample (adjusted): 1992Q4 2014Q1
Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CLIMP(-1)	-0.251647	0.102674	-2.450934	0.0163
D(CLIMP(-1))	-0.290923	0.118642	-2.452105	0.0163
D(CLIMP(-2))	-0.310980	0.107175	-2.901612	0.0048

R-squared	0.293070	Mean dependent var	-0.779070
Adjusted R-squared	0.276035	S.D. dependent var	47.57938
S.E. of regression	40.48344	Akaike info criterion	10.27392
Sum squared resid	136029.5	Schwarz criterion	10.35954
Log likelihood	-438.7787	Hannan-Quinn criter.	10.30838
Durbin-Watson stat	2.025382		

Null Hypothesis: GDP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.036213	0.5731
Test critical values:	1% level	-4.069631	
	5% level	-3.463547	
	10% level	-3.158207	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP)
Method: Least Squares
Date: 11/09/14 Time: 19:23
Sample (adjusted): 1993Q1 2014Q1
Included observations: 85 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-0.126794	0.062270	-2.036213	0.0451
D(GDP(-1))	-0.663401	0.086947	-7.629991	0.0000
D(GDP(-2))	-0.610611	0.087946	-6.943034	0.0000
D(GDP(-3))	-0.746362	0.078071	-9.560067	0.0000
C	35170.91	14360.54	2.449135	0.0165
@TREND("1992Q1")	444.4146	190.9444	2.327456	0.0225

R-squared	0.669220	Mean dependent var	2656.529
Adjusted R-squared	0.648284	S.D. dependent var	10734.21
S.E. of regression	6365.987	Akaike info criterion	20.42330
Sum squared resid	3.20E+09	Schwarz criterion	20.59572
Log likelihood	-861.9902	Hannan-Quinn criter.	20.49265
F-statistic	31.96588	Durbin-Watson stat	0.790223
Prob(F-statistic)	0.000000		

Null Hypothesis: GDP has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.726846	0.9996
Test critical values:	1% level	-3.509281	
	5% level	-2.895924	
	10% level	-2.585172	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP)
Method: Least Squares
Date: 11/09/14 Time: 19:23
Sample (adjusted): 1993Q1 2014Q1
Included observations: 85 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.016508	0.009560	1.726846	0.0881

D(GDP(-1))	-0.754704	0.079707	-9.468434	0.0000
D(GDP(-2))	-0.665780	0.086998	-7.652834	0.0000
D(GDP(-3))	-0.773386	0.079305	-9.752010	0.0000
C	2729.702	3550.098	0.768909	0.4442

R-squared	0.646538	Mean dependent var	2656.529
Adjusted R-squared	0.628865	S.D. dependent var	10734.21
S.E. of regression	6539.369	Akaike info criterion	20.46609
Sum squared resid	3.42E+09	Schwarz criterion	20.60978
Log likelihood	-864.8089	Hannan-Quinn criter.	20.52389
F-statistic	36.58321	Durbin-Watson stat	0.798134
Prob(F-statistic)	0.000000		

Null Hypothesis: GDP has a unit root
Exogenous: None
Lag Length: 3 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		9.938184	1.0000
Test critical values:	1% level	-2.592452	
	5% level	-1.944666	
	10% level	-1.614261	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP)
Method: Least Squares
Date: 11/09/14 Time: 19:24
Sample (adjusted): 1993Q1 2014Q1
Included observations: 85 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.023626	0.002377	9.938184	0.0000
D(GDP(-1))	-0.760103	0.079197	-9.597648	0.0000
D(GDP(-2))	-0.669170	0.086667	-7.721202	0.0000
D(GDP(-3))	-0.775401	0.079062	-9.807533	0.0000

R-squared	0.643926	Mean dependent var	2656.529
Adjusted R-squared	0.630738	S.D. dependent var	10734.21
S.E. of regression	6522.847	Akaike info criterion	20.44993
Sum squared resid	3.45E+09	Schwarz criterion	20.56487
Log likelihood	-865.1218	Hannan-Quinn criter.	20.49616
Durbin-Watson stat	0.792820		

Appendix 1. 3 Unit root at first difference

Null Hypothesis: D(CLEXP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.72419	0.0000
Test critical values:	1% level	-4.068290	
	5% level	-3.462912	
	10% level	-3.157836	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CLEXP,2)
Method: Least Squares
Date: 11/09/14 Time: 19:17
Sample (adjusted): 1992Q4 2014Q1
Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CLEXP(-1))	-1.878547	0.160228	-11.72419	0.0000
D(CLEXP(-1),2)	0.472314	0.100645	4.692895	0.0000
C	-1.563485	6.907812	-0.226336	0.8215
@TREND("1992Q1")	0.024871	0.133298	0.186585	0.8524

R-squared	0.713277	Mean dependent var	-0.127907
Adjusted R-squared	0.702787	S.D. dependent var	56.27826
S.E. of regression	30.68136	Akaike info criterion	9.730583
Sum squared resid	77190.37	Schwarz criterion	9.844739
Log likelihood	-414.4151	Hannan-Quinn criter.	9.776525
F-statistic	67.99669	Durbin-Watson stat	1.997346
Prob(F-statistic)	0.000000		

Null Hypothesis: D(CLEXP) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.79629	0.0001
Test critical values:	1% level	-3.508326	
	5% level	-2.895512	
	10% level	-2.584952	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CLEXP,2)
Method: Least Squares
Date: 11/09/14 Time: 19:17
Sample (adjusted): 1992Q4 2014Q1
Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CLEXP(-1))	-1.878927	0.159281	-11.79629	0.0000

D(CLEXP(-1),2)	0.472658	0.100041	4.724650	0.0000
C	-0.432230	3.291087	-0.131334	0.8958

R-squared	0.713155	Mean dependent var	-0.127907
Adjusted R-squared	0.706243	S.D. dependent var	56.27826
S.E. of regression	30.50245	Akaike info criterion	9.707752
Sum squared resid	77223.14	Schwarz criterion	9.793368
Log likelihood	-414.4333	Hannan-Quinn criter.	9.742208
F-statistic	103.1774	Durbin-Watson stat	1.996434
Prob(F-statistic)	0.000000		

Null Hypothesis: D(CLEXP) has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.86622	0.0000
Test critical values:	1% level	-2.592129	
	5% level	-1.944619	
	10% level	-1.614288	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CLEXP,2)
Method: Least Squares
Date: 11/09/14 Time: 19:18
Sample (adjusted): 1992Q4 2014Q1
Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CLEXP(-1))	-1.878415	0.158299	-11.86622	0.0000
D(CLEXP(-1),2)	0.472214	0.099397	4.750782	0.0000

R-squared	0.713095	Mean dependent var	-0.127907
Adjusted R-squared	0.709680	S.D. dependent var	56.27826
S.E. of regression	30.32349	Akaike info criterion	9.684704
Sum squared resid	77239.19	Schwarz criterion	9.741781
Log likelihood	-414.4423	Hannan-Quinn criter.	9.707675
Durbin-Watson stat	1.996146		

Null Hypothesis: D(EXR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-12.31805	0.0000
Test critical values:	1% level	-4.068290	
	5% level	-3.462912	
	10% level	-3.157836	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR,2)
Method: Least Squares
Date: 11/09/14 Time: 19:19
Sample (adjusted): 1992Q4 2014Q1
Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR(-1))	-2.063619	0.167528	-12.31805	0.0000
D(EXR(-1),2)	0.442565	0.099038	4.468628	0.0000
C	0.133804	1.281112	0.104444	0.9171
@TREND("1992Q1")	-0.004805	0.024718	-0.194396	0.8463

R-squared	0.770965	Mean dependent var	-0.005814
Adjusted R-squared	0.762586	S.D. dependent var	11.67782
S.E. of regression	5.690036	Akaike info criterion	6.360706
Sum squared resid	2654.874	Schwarz criterion	6.474861
Log likelihood	-269.5103	Hannan-Quinn criter.	6.406648
F-statistic	92.00798	Durbin-Watson stat	2.193494
Prob(F-statistic)	0.000000		

Null Hypothesis: D(EXR) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-12.38874	0.0001
Test critical values:	1% level	-3.508326	
	5% level	-2.895512	
	10% level	-2.584952	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR,2)
Method: Least Squares
Date: 11/09/14 Time: 19:20
Sample (adjusted): 1992Q4 2014Q1
Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR(-1))	-2.063290	0.166546	-12.38874	0.0000
D(EXR(-1),2)	0.442362	0.098457	4.492945	0.0000
C	-0.084814	0.610036	-0.139031	0.8898

R-squared	0.770859	Mean dependent var	-0.005814
Adjusted R-squared	0.765338	S.D. dependent var	11.67782
S.E. of regression	5.656958	Akaike info criterion	6.337910
Sum squared resid	2656.098	Schwarz criterion	6.423527
Log likelihood	-269.5301	Hannan-Quinn criter.	6.372367
F-statistic	139.6116	Durbin-Watson stat	2.192656
Prob(F-statistic)	0.000000		

Null Hypothesis: D(EXR) has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-12.46092	0.0000
Test critical values:	1% level	-2.592129	
	5% level	-1.944619	
	10% level	-1.614288	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR,2)
Method: Least Squares
Date: 11/09/14 Time: 19:21
Sample (adjusted): 1992Q4 2014Q1
Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR(-1))	-2.063059	0.165562	-12.46092	0.0000
D(EXR(-1),2)	0.442250	0.097877	4.518410	0.0000

R-squared	0.770806	Mean dependent var	-0.005814
Adjusted R-squared	0.768078	S.D. dependent var	11.67782
S.E. of regression	5.623840	Akaike info criterion	6.314887
Sum squared resid	2656.716	Schwarz criterion	6.371965
Log likelihood	-269.5402	Hannan-Quinn criter.	6.337859
Durbin-Watson stat	2.192335		

Null Hypothesis: D(CLIMP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.05520	0.0000
Test critical values:	1% level	-4.068290	
	5% level	-3.462912	
	10% level	-3.157836	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CLIMP,2)
Method: Least Squares
Date: 11/09/14 Time: 19:22
Sample (adjusted): 1992Q4 2014Q1
Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(CLIMP(-1))	-1.862921	0.168511	-11.05520	0.0000
D(CLIMP(-1),2)	0.410909	0.103336	3.976441	0.0001
C	4.219064	9.490406	0.444561	0.6578
@TREND("1992Q1")	-0.088647	0.183005	-0.484396	0.6294

R-squared	0.707600	Mean dependent var	-1.813953
Adjusted R-squared	0.696902	S.D. dependent var	76.50091
S.E. of regression	42.11706	Akaike info criterion	10.36418
Sum squared resid	145455.4	Schwarz criterion	10.47833
Log likelihood	-441.6597	Hannan-Quinn criter.	10.41012
F-statistic	66.14582	Durbin-Watson stat	2.086953
Prob(F-statistic)	0.000000		

Null Hypothesis: D(CLIMP) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.09824	0.0001
Test critical values:	1% level	-3.508326	
	5% level	-2.895512	
	10% level	-2.584952	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CLIMP,2)
Method: Least Squares
Date: 11/09/14 Time: 19:22
Sample (adjusted): 1992Q4 2014Q1
Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CLIMP(-1))	-1.861033	0.167687	-11.09824	0.0000
D(CLIMP(-1),2)	0.410219	0.102849	3.988573	0.0001
C	0.183549	4.524538	0.040567	0.9677

R-squared	0.706763	Mean dependent var	-1.813953
Adjusted R-squared	0.699697	S.D. dependent var	76.50091
S.E. of regression	41.92242	Akaike info criterion	10.34378
Sum squared resid	145871.6	Schwarz criterion	10.42940
Log likelihood	-441.7825	Hannan-Quinn criter.	10.37824
F-statistic	100.0238	Durbin-Watson stat	2.083233
Prob(F-statistic)	0.000000		

Null Hypothesis: D(CLIMP) has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.17276	0.0000
Test critical values:	1% level	-2.592129	
	5% level	-1.944619	

	10% level	-1.614288

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CLIMP,2)
Method: Least Squares
Date: 11/09/14 Time: 19:23
Sample (adjusted): 1992Q4 2014Q1
Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CLIMP(-1))	-1.860750	0.166544	-11.17276	0.0000
D(CLIMP(-1),2)	0.410072	0.102172	4.013546	0.0001

R-squared	0.706757	Mean dependent var	-1.813953
Adjusted R-squared	0.703266	S.D. dependent var	76.50091
S.E. of regression	41.67255	Akaike info criterion	10.32054
Sum squared resid	145874.5	Schwarz criterion	10.37762
Log likelihood	-441.7834	Hannan-Quinn criter.	10.34351
Durbin-Watson stat	2.083402		

Null Hypothesis: D(GDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.958789	0.1501
Test critical values:	1% level	-4.071006	
	5% level	-3.464198	
	10% level	-3.158586	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP,2)
Method: Least Squares
Date: 11/09/14 Time: 19:24
Sample (adjusted): 1993Q2 2014Q1
Included observations: 84 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.729785	0.246650	-2.958789	0.0041
D(GDP(-1),2)	-0.448920	0.188236	-2.384882	0.0195
D(GDP(-2),2)	-0.596346	0.130364	-4.574464	0.0000
D(GDP(-3),2)	-0.806024	0.071207	-11.31943	0.0000
C	2243.141	1033.779	2.169845	0.0331
@TREND("1992Q1")	-1.028238	18.59186	-0.055306	0.9560

R-squared	0.953643	Mean dependent var	-221.6071
Adjusted R-squared	0.950671	S.D. dependent var	17821.30
S.E. of regression	3958.138	Akaike info criterion	19.47368
Sum squared resid	1.22E+09	Schwarz criterion	19.64731
Log likelihood	-811.8947	Hannan-Quinn criter.	19.54348

F-statistic	320.9156	Durbin-Watson stat	1.594237
Prob(F-statistic)	0.000000		

Null Hypothesis: D(GDP) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.124062	0.0285
Test critical values:	1% level	-3.510259	
	5% level	-2.896346	
	10% level	-2.585396	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP,2)
Method: Least Squares
Date: 11/09/14 Time: 19:24
Sample (adjusted): 1993Q2 2014Q1
Included observations: 84 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.733687	0.234850	-3.124062	0.0025
D(GDP(-1),2)	-0.446005	0.179563	-2.483835	0.0151
D(GDP(-2),2)	-0.594410	0.124777	-4.763778	0.0000
D(GDP(-3),2)	-0.805061	0.068608	-11.73420	0.0000
C	2206.254	784.8542	2.811037	0.0062

R-squared	0.953641	Mean dependent var	-221.6071
Adjusted R-squared	0.951293	S.D. dependent var	17821.30
S.E. of regression	3933.084	Akaike info criterion	19.44991
Sum squared resid	1.22E+09	Schwarz criterion	19.59461
Log likelihood	-811.8964	Hannan-Quinn criter.	19.50808
F-statistic	406.2707	Durbin-Watson stat	1.592674
Prob(F-statistic)	0.000000		

Null Hypothesis: D(GDP) has a unit root
Exogenous: None
Lag Length: 3 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.352050	0.1623
Test critical values:	1% level	-2.592782	
	5% level	-1.944713	
	10% level	-1.614233	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP,2)
Method: Least Squares
Date: 11/09/14 Time: 19:24

Sample (adjusted): 1993Q2 2014Q1
Included observations: 84 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.180997	0.133869	-1.352050	0.1802
D(GDP(-1),2)	-0.860644	0.106724	-8.064172	0.0000
D(GDP(-2),2)	-0.870888	0.080027	-10.88246	0.0000
D(GDP(-3),2)	-0.945685	0.048936	-19.32511	0.0000

R-squared	0.949004	Mean dependent var	-221.6071
Adjusted R-squared	0.947091	S.D. dependent var	17821.30
S.E. of regression	4099.236	Akaike info criterion	19.52144
Sum squared resid	1.34E+09	Schwarz criterion	19.63719
Log likelihood	-815.9003	Hannan-Quinn criter.	19.56797
Durbin-Watson stat	1.657727		

Appendix 1. 4 Johansen cointegration test

Hypothesized No.of CE(s)	Eingenvalue	Trace Statistic	0.05 Critical value	Max-Eigen Statistic	0.05 Critical value
None	0.289787	67.46378*	47.85613	29.42843*	27.58434
At most 1	0.269566	38.03535*	29.79707	27.01399*	21.13162
At most 2	0.116432	11.02136	15.49471	10.64564	14.26460
At most 3	0.004359	0.375720	3.841466	0.375720	3.841466

Trace test indicates 1 cointegrating equation(s) at the 0.05 level

Max-eigenvalue test indicates 2 cointegratingeqn(s) at the 0.05 level

*denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis(1999) p-values

Appendix 1. 5 Error Correction Model

Variable	Coefficient	Standard Error	t-Statistic
Dlog(EXR)	0.059038	0.090378	0.653238**
Dlog(CLIMP)	0.026256	0.052506	0.499982**
Dlog(GDP)	-3.986775	6.732946	-0.592129*
ECM(-1)	-0.577600	0.100887	-5.725221**
C	0.014470	0.189222	0.076470

t-ratio of estimates,* and ** denote a t-ratio significant at the 1% and 5% respectively.

R^2 =0.292289

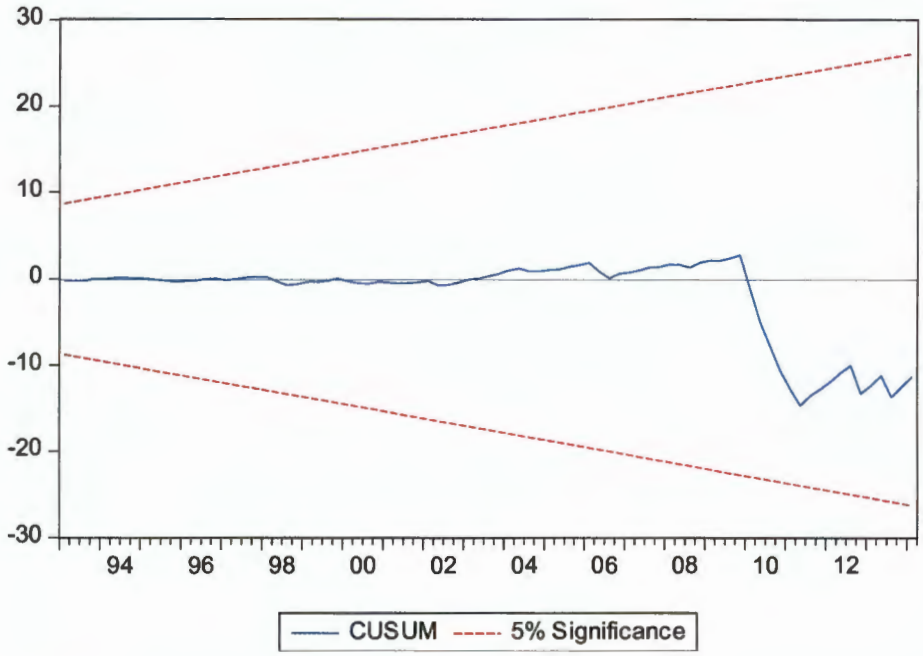
Adjusted R-squared = 0.2581838

Appendix 1. 6 Diagnostic and Stability Test Output

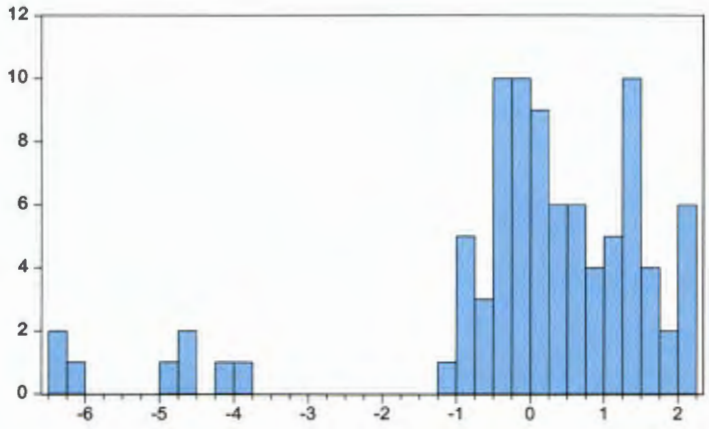
Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	8.170766	Prob.F(3.82)	0.0001
Obs*R-squared	20.48209	Prob. Chi-Square(3)	0.0001

HeteroscedasticityTest:ARCH			
F-statistic	44.24917	Prob.F(1.86)	0.0000
Obs*R-squared	29.89598	Prob. Chi-Square(1)	0.0000
Ramsey reset test on residuals	Value	Df	Probability
F-Statistic	1.510062	(3.82)	0.2181
Likelihood ratio	4.785892	3	0.1882

Cusum test



Appendix 1. 7 Histogram



Series: Residuals	
Sample 1992Q1 2014Q1	
Observations 89	
Mean	-3.78e-15
Median	0.241146
Maximum	2.164303
Minimum	-6.299784
Std. Dev.	1.840848
Skewness	-1.934430
Kurtosis	6.780478
Jarque-Bera	108.5062
Probability	0.000000