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Analysis of Macroeconomic Factors Affecting the Performance of Manufactured Exports in Kenya

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Abstract:

Many developed countries have recognized the advantages of globalization and policies of improving manufactured exports performance and competitiveness in order to promote manufacturing sector. The purpose of this study was to analyze macroeconomic factors that affect manufactured exports performance in Kenya for the period 1976 - 2015. The specific objectives of the study were to determine the effect of terms of trade, trade openness, real effective exchange rate, gross domestic product and foreign direct investment on performance of manufactured exports. The study adopted International Trade Theory, Heckscher-Ohlin (H-O), Rybczynski Theory and Stolper- Smuelson Theory and employed explanatory research design. The study was carried out in Kenya manufacturing sector and used content analysis to obtain annual time series data from Kenya National Bureau of Statistics and World Integrated Trade Solution. The study used descriptive statistics and Johansen and Juselius co-integration test and the Vector Error Correction Method (VECM) was employed in the empirical analysis to evaluate the relationship among the variables. Results indicate that the series had unit root and were integrated of order one and the variables also had structural breaks that were variable specific. Results of Johansen co integration showed that there were long run co integrating relations. Results of Vector Error Correction Model showed that Foreign Domestic Investment ($p=0.000$), Real Effective Exchange Rate($p=0.000$), Trade Openness($p=0.000$) and Terms of Trade($p=0.000$) had significant and positive effect on Kenya's manufactured exports. GDP($p=0.002$) had negative and significant effect on Kenya's manufactured exports. The results of this study contributed to the existing body of knowledge and will assist manufacturing managers to make long-term decisions based not on long-standing rules and regulations but based on thorough scanning of environments.

Keywords: *Manufactured exports Performance, Stationary Time Series, Error Correction Model (ECM), Trade Openness (TO), Terms of Trade (TOT), Real Effective Exchange Rate (REER)*

1. Introduction

1.1. Background of the Study

Kenya's vision 2030 aspires to achieve middle income status by 2030 of which GDP growth rate should be at 12 percent. Export sector is the engine of the GDP in any economy of the world especially manufacturing exports because it has an impact on the economic growth of a country, creation of employment and opening up of other subsectors which will assist in uplifting the economic growth of a country. Kenyan manufactured exports enjoy a strong position with regard to exports to EAC market over the last 25 years (Megha, 2013).

Regional integration is the coming together of two or more states through reciprocal preferential agreements (Fondad, 2005). The benefits of regional integration include the ability to foster competition, subsidiarity, access to wider markets, larger and diversified investment and production and socio-economic and political stability for countries involved. Firms still encounters challenges which are not only perceived to be real gains or losses for firms of member countries but also increases competition among supplies of goods and services providers within the regional integration area. This is due to customer's tastes and preferences for products and services within the economic bloc. The strong commitment by member countries in the implementation of the agreed arrangements, arbitration mechanism and equitable distribution of the gains and costs of regional integration will determine the success of integration (EAC, 2010). The coming together of EAC regional integration has necessitated the need for manufacturing firms in Kenya to embrace Trade Openness, Terms of Trade, Foreign Direct Investment inflows, Real Effective Exchange Rate and Gross Domestic Product as important tools influencing manufactured exports performance. The challenges of regionalism are lower production and marketing costs, competing firms, larger markets and pressure on firms to integrate. The growing volume of trade causes increase to a country's incomes (Greenway et al, 2002). The collapse of many African countries economies since independence has been the collapse of their exports. The development of Asian tigers' economy was based on the growth of their manufacturing exports. Many African countries have not emphasized on manufactured exports as the gateway to economic prosperity.

Exports have become a significant topic of debate worldwide in this time of economic integration and protectionism. Many advanced countries have accepted the potentials of globalization and have changed their techniques accordingly, including enhanced performance in manufacturing firms (Singh, 2004). Industrial efficiency should be provided priority to any industry in order to enhance its economic performance. Increased trade diversification from manufacturing exports can stabilize the economy because manufactured export earnings can provide support for stable growth compared to primary products (Helleiner, 1995). Early development economists generally endorsed this perspective, arguing that policies for import substitution and large scale investment in industrial sectors would allow developing nations to take advantage of technical developments and economies of scale. In addition, developing nations, including Kenya, need to become competitive to carve a niche on the world market and fulfill its long-term objective of becoming an industrialized nation in 2030 as specified in Kenya's 2030 vision. Structural adjustment programs and export diversification also need to be undertaken by developing nations to enhance price competitiveness as a long-term growth strategy (Kotane *et al.*, 2012). Countries with better production factors therefore gain more export incomes and can buy imports thus decreasing the balance of payments deficit, which is a challenge for most developing countries. Trade negotiations and reforms as well as competition between nations have resulted to global market liberalization. Despite the worldwide decrease in trade barriers, many countries have differed significantly in their export performance since trade liberalization (Fugazza, 2004). Kenya was highly driven by the Asian Tigers export-led growth policies in significant manufacturing reforms. In the 1980s, the manufacturing sector grew to become the second source of sub-public service jobs (KNBS, 2009). In 2009, the sector grew by 3.9 percent in the face of challenges such as post-election violence, contributing to the country's gross domestic product on average by 14 percent. In technological change, the industry is rather slow, unable to achieve economies of scale and also restricted by foreign exchange shortages.

The four Asian tigers (Hong Kong, South Korea, Singapore and Taiwan) and the Newly Industrialized Countries (such as Malaysia, Indonesia and Thailand) used economic growth to support the argument that trade openness through export leverage is a mechanism for accelerated economic development (Giles and Williams, 2000). Export-Led Growth Hypothesis (ELGH) tends to be supported in practice but this may not be universal; fast growth in exports has led to the notable record of steady and sustained economic growth in East Asia. The growth proof in these markets has given incentive to the perspective of the neoclassical economists that the approach of ELGH can contribute to growth. Also, many nations pursuing economic growth have benefited most from international trade.

Many developing countries have been concerned about the need to push for supply factors that determine an economy's export potential. Increased export earnings also enhance an economy's employment and productivity. Increasing a country's export development is crucial to an economy's financial strength and stability. Exports are being widely recognized in economic growth (Santos-Paulino, 2000). Export activities stimulate development in many respects, including expanded productivity and consumer demand, economies of scale owing to bigger global markets, enhanced efficiency through specialization, the implementation of sophisticated innovations embedded in foreign capital goods, training outcomes and human resource enhancement.

In increasing exports and imports, these nations have encountered increased levels of economic growth. Trade liberalization seemed to have influenced Kenya to embrace a development approach driven by exports. Trade liberalization is essential for developing economies to boost export quantities that promote investment in industries where a nation has the biggest comparative advantage (Martin, 2001). Foreign market integration contributes to economies of scale attributed to the existence of global element by growing national markets.

During Structural Adjustments Programmes (SAPs), the Kenyan government created export compensation schemes and export promotion programs that included bond production (BMU) and export processing areas (EPZs) to support manufactured goods which are primarily labor intensive (KNBS, 2010). The aim of the MUB and the EPZs were to use the abundant semi-skilled labor to create labor intensive products for foreign markets such as clothing and footwear. Over the years, Kenya's produced exports have held a supreme place on the worldwide market serving local and international markets. In 2004, the industry contributed about 13 percent of GDP. The industry rose from 4.5 percent in 2004 to 5 percent in 2005 with a 12.8 percent increase in the value of produce in this industry. This good performance is attributed in part to the year-round stable macroeconomic environment, tax exemption on certain intermediate-use imports (KNBS, 2009). The development of the sector grew by 3.8 percent in 2008, being the lowest in the last years compared to a 6.5 percent increase in 2007. However, direct official employment by EPZs decreased marginally in the same year by 0.03 percent in 2009, the industry reported a growth in employment by 0.5 percent. Over the first medium-term period (MTP), formal employment in the industry rose by percent from 264,800 in 2008 to 277,900 in 2012, while casual jobs rose by 17 percent from 1,57 million in 2007 to 277,900 in 2012 and in 2011 there were 1.83 million (KNBS 2013). More jobs were established by the informal sector than by the formal sector, with the private sector contributing the biggest proportion of manufacturing employment (NESC 2007).

Eastern Africa Community (EAC) remains Kenya's largest manufactured export destinations in Africa. The industry has experienced difficulties such as low productivity rates and high manufacturing costs, aggravated by high inflationary pressures, Kenya shilling depreciation, post-election crisis, and strong competition from low quality imports from Western countries. The total value of exports to EAC rose by seventeen percent during the same period, representing 59.8 percent of total exports to Africa. Export-manufactured goods suffer from poor product quality, making them uncompetitive internationally except in regional markets (World Bank, 2013). The sector's growth since the 1990s has been hampered by energy shortages, bad infrastructure, high energy expenses and inexpensive product dumping in the nation.

1.1.1. Export Performance

Efficiency through specialization in products and services of manufacturing in which a country has complete price benefit over other nations affects a nation's competitiveness leading to expansion in exports. Long-term global competitiveness relies on organizations human and natural resources, infrastructure, management, capital, public intervention, and technology capability. A nation will achieve competitiveness if it can export products and services at a comparatively reduced cost, thus gaining a bigger share of the export market.

A nation's product has the capacity to control the world market under the prevailing circumstances that lead to export development through competition (Adams *et al.*, 2004). A nation's efficiency and competitiveness were determined by labor unit, which was the only factor in production, according to Classical economists. The absolute advantage theory of Adam Smith (1976) describes why nations freely participate in international trade. Kenya lacks competitiveness in exports and development against major rivals, particularly in the region, primarily owing to greater company expenses such as energy expenses, greater trade logistics expenses and absence of a competitive supply chain (EPC, 2012).

The competitiveness of the nation is the ability of a nation to achieve long-term economic growth driven by growth in exports and economic structure that adapts readily to changes in world markets (Kovacicet *al.*, 2004). Ricardo related competitiveness with effectiveness and added that if it generates at a reduced price than the other nation, a nation would have a competitive advantage. A nation will therefore export products that it has the biggest comparative advantage and import those that have the least comparative advantage. A country will be competitive by reducing production costs and goods and services prices as a result of an economy's increased productivity compared to other economies. National policies, openness to trade, trade agreements, processed and distinguished products and technology are considered as the modern problems affecting the efficiency and competitiveness of produced products.

A nation's performance seems to mean the capacity for a high standard of living based on resource and labor productivity to be achieved and maintained (Enright *et al.*, 1996). Export performance or competitiveness can be described as the extent to which a nation produces products and services that fulfill the overseas competition criterion under free and open market circumstances while maintaining its people's national real income over the long term.

Country's export growth contributes to continuous high GDP per capita growth levels, while the United States National Competitiveness Council argues that competitiveness is the capacity to attain market achievement that contributes to better living standards for all. Therefore, if a nation can sell its products at a reduced or equal cost and receive the same or greater return as its rivals, then it can be referred as competitive.

Variables such as favourable terms of trade, real effective exchange rates and foreign direct investment net inflows, trade openness and gross domestic product through the use of better technical abilities and the growth of human resources, as well as economies of scale, have a higher impact on the extent of the competitiveness and performance of export products in the globalized environment. Export development can lead to an awareness of wealth distribution, both nationally and abroad, through enhanced competition. It refers to both national income and international trade performance when implemented at domestic level, especially in relation to particular industries that are crucial in terms of jobs or productivity and development potential (UNCTAD, 2004). This study examined variables that are from a macroeconomic view are likely to affect trends in Kenya's export performance and competitiveness. These products are mainly the manufactured products under Standard International Trade Classification (SITC) class 3. Despite the creation of regional integrations, these products did not perform well in the domestic market. The study recognized the factors that affect these products being manufactured.

1.2. Statement of the Problem

Manufacturing development has played a bigger role in Kenya's development strategies in the post-independence time. Policy makers lead in the process of transforming the country's economy from low productivity to higher productivity which in the end will lead to economic growth of a country.

Since independence, Kenya has had undiversified and small industrial sector. Strategies and efforts have been made to realize improved industrial development in the manufacturing sector. This is in tandem with the evolution of country's industrial development since independence. The manufacturing sector suffered from some phases which include the collapse of East African Community, Structural Adjustment Programs and Trade Liberalization.

Some manufacturing subsectors have grown constantly while others have remained inactively over time. For policy purposes, the research intended to analyze the macroeconomic factors affecting the performance of manufacturing sector which deals with exports of goods across East African Community. The underpinning reason for the study was the desire to learn from practical experience of the successful cases in the country and correctly guide policies that are focused to the acceleration of manufacturing sector in terms of growth.

1.3. Objectives of the Study

1.3.1. General Objective

The overall objective of the study was to analyze macroeconomic factors affecting the performance of Kenya's manufactured exports.

1.3.2. Specific Objectives

The specific objectives were;

- To determine the effect of Terms of Trade on performance of manufactured exports in Kenya
- To evaluate the effect of Trade openness on performance of manufactured exports in Kenya

- To establish the effect of Real Effective Exchange rate on performance of manufactured exports in Kenya
- To determine the effect of Gross Domestic Product on performance of manufactured exports in Kenya
- To investigate the effect of Foreign Direct Investment on performance of manufactured exports in Kenya

1.4. Research Hypotheses

The study tested the following null hypotheses;

- H₀₁: Terms of Trade does not significantly affect the performance of manufactured export in Kenya
- H₀₂: Trade openness does not significantly affect the performance of manufactured export in Kenya
- H₀₃: Real Effective Exchange Rate does not significantly affect the performance of manufactured export in Kenya
- H₀₄: Gross Domestic Product does not significantly affect the performance of manufactured export in Kenya
- H₀₅: Foreign Direct Investment does not significantly affect the performance of manufactured export in Kenya

1.5. Justification of the Study

Export industry success depends on ability of managers to make long-term decisions based not on long-standing rules and regulations but based on thorough scanning of internal and external environments. To ensure that the industry provides services of high-quality managers need the right information so that right decisions can be made to improve current situation on quality of manufactured goods. Since the environment is becoming more and more complex export manufacturing industries requires adapting to the changes. This study will assist in finding out the macroeconomic variables that might affect the performance of the manufactured products in the world market.

2. Literature Review

2.1. Rybczynski Theory

It argues that an increase in the endowment of one factor will boost the production of the product intensive in the factor at steady commodity rates and decrease the production of the other product by a higher percentage. In particular, the theory says that a nation will tend to export commodities with reduced autarky relative costs and import products with greater relative costs in pre-trade isolation (Suranovic, 2010). If only labor increases in one country, commodity production extends more than proportionately, while other commodity production decreases at a steady rate.

2.2. International Trade Theory

International trade theory offers a helpful structure for evaluating a nation's notion of competitiveness, a significant concept to explain export performance and thus trade patterns. Removing trade obstacles generates competitive pressures and technology transfer possibilities leading to productivity gains and economic reorganization. Free trade advocates assert that there is economic prosperity in international trade. However, trade advantages come with enhanced expertise where a nation generates its comparative advantage. Some literature argues that an economy's development may be continuously lowered by mistaken expertise where a nation does not generate according to its comparative benefit (Karolyet al, 2006).

2.3. Stolper-Samuelson Theory

It postulates that an increase in the relative price of a commodity raises the return or earnings of the factor used intensively in the production of the commodity. This implies that with an imposition of a tariff, the real return to a nation's scarce factor of production will rise (Pomfret, 2008). When capital abundant nation imposes an import tariff on a commodity its prices rises for domestic producers and consumers and also the real wage of labor. The expansion in the production of a commodity requires labor and capital ratio to be of higher proportion than is released by reducing the output of another commodity.

2.4. Empirical Literature Review

A significant determinant of a country's export performance is linked to its export terms of internal market access (UNCTAD, 2005). Foreign market access contributes to trade partners measures and the implementing nation is also prepared to offer a cost benefit to its exports (McCarthy, 2008). Trading partners affect a country's export performance through trade, tariff and non-tariff policies. Access to global markets has been enhanced due to these and other trade agreements (Biggs, 2007). The contribution of global linkages to export results was explored by Venables (2008). They research discovered that the evolution of external elements over the course of three centuries can lead to variations in the export performance of different nations and areas.

Research showing export expansion in certain industries can redistribute economic and political power and strengthen institutional quality, yielding associated developmental gains (Robison *et al* 2005). The model has become an economic geography and international trade workhorse. Companies move to bigger markets due to low transport expenses, where inexpensive intermediaries are easily accessible leading to regional economies organized in an industrial heart (Johnson and Technical advancement is central to the dynamic comparative advantage in decreasing the cost of manufacturing, thus determining the competitiveness of an economy.

These traditional models concentrate on countries relative expenses or market involvement, subsidies distort expenses and market shares. International trade theories should include technical advances and dynamic gains that are endogenous to trade as these benefits are much greater than any static gains. Ordinary Least Squares (OLS) assessment

technique was used to study manufacturing performance determinants in Ethiopia using the 1970-2004 annual data (Mulualem,2000).The model findings showed that Ethiopian manufacturing exports were positively and substantially affected by GDP proportion , complete productivity factor, and foreign earnings, while efficient exchange rates were found to have relatively insignificant export effect. Srinivasan analyzed India's 1963-1994 exports using manufactured exports as the dependent variable and real exchange rate, and national GDP as log-transformed explanatory variables (Srinivasan, 1988). It was discovered that annual GDP and exchange rates had a positive association with increased exports from India.

Real exchange rates however had a deep impact on export performance in particular. The supply reaction to real exchange rate price incentive depreciation for products and services exports is significant. Contrary, there were mixed outcomes from the other explanatory variables. Investment as a share of GDP used as a proxy for supply limitations had a beneficial and substantial effect on coffee export volumes but not on other products and services for exports. With liberalization, certain industries like the coffee industry seem to have been adversely impacted as the liberalization dummy reveals.

The long-term comparative advantage is largely driven by the overall productivity factor which measures an economy's output relative to the size of its primary factor inputs, and this explains why most less developed countries are likely to export primary products due to the lack of factor inputs in the production process (Echevarria,2008).Geographical position, competitive monopoly, capital and labor migration, transportation expenses and differentiated products as significant determinants of trade. Location implication of increasing returns keeps an industry in a specific location, where it is difficult to be completed by industries of another country.

In determining the pattern of international trade, the distribution of technical advancement is essential. The theory of the product life-cycle indicates that trade liberalization leads to geographical relocation of manufacturing where the product can even be imported by the initial invention nation, which is mostly a developed country (Fischet *al*, 1997). The theory shows that a nation with a comparative advantage in producing a product is changing from developed to developing nations. The model applies labor-saving and capital-intensive products for high-income organizations production moves to developing nations at a reduced price as manufacturing becomes standardized and bad nations are the only markets for the product. High living standards are according to Porter, the nation's primary objective and to attain this objective a country needs to use its resources productively. The author focuses on country's competitiveness at global level in attempting to look at how nations compete with each other by exporting and locating their operations overseas. Porter's competitiveness assessment therefore focuses on productivity and seeks to understand why one nation can create ability to attain elevated rates of domestic overtime productivity relative to other nations (Porter, 1990).Claims that it is essential to know why certain particular sectors that are extremely effective are situated in the same region or even nation in order to comprehend domestic competitiveness. Foreign market access and circumstances of production capability are similarly essential from literature for the growth of the external sector of a country (Fugazza, 2004). A huge liberalization of world trade has occurred in the world economy since 1950, first through the General Tariff and Trade Agreement (GATT) and now under the World Trade Organization (WTO) (Thirlwall, 2000). Previous trade theories indicate that product differentiation, economies of scale, and national policies have an impact on performance, hence an economy's export development. The models presume that there are exogenous variations in nations that miss the dynamics of trade. Trade is increased by various products by diversifying exports and goods or products that determine competitiveness vary across nations (Samuelson *et al*.1977).

A significant barrier to trade and performance and competitiveness is the poor transport infrastructure that characterizes most emerging nations (Bacchetta,2007). Development of infrastructure in developing nations can contribute to better export performance. FDI is another factor that affects a country's export production ability. In many developing countries, domestic infrastructure is a significant determinant of export performance, particularly in the early phases of growth of the export industry. Impoverished transportation infrastructure results in high transportation costs leading to uncompetitive and expensive exports which reduces export foreign exchange. However, in explaining the observed difference in export performance, inner elements linked to supply ability such as inner geography and environmental quality also played important part. Factors influencing Kenya's export volumes were examined by breaking down total goods and services exports into two classifications: traditional agricultural exports of tea, coffee and other goods and services exports Were *et al*. (2002).In each of the three export classifications, an empirical model was defined as explanatory variables along conventional trade models incorporating actual exchange rate and actual external earnings. To capture the supply limitations, an extra variable of GDP was included. The results were found to be inconsistent in the case of tea, there was no cointegration and therefore no model for error correction.

FDI improves capital stocks leading to effective use of current resources, job creation and productivity growth (Seetanah and Khadaroo, 2007). Development economists agree that FDI plays a major role in explaining receiving countries growth. If the aim is to capture the national market, this may not lead to export development, but if the motivation is to exploit the comparative advantage of a country, FDI can add to export development. Whether or not FDI contributes to export development, is dependent on the policy system (Sharma, 2000). The reason for such investment relies on FDI in export promotions. Real Effective Exchange Rate (REER) also impacts export supply, thus determining the export performance, diversification and global competitiveness of economically generated products (UNCTAD, 2005). To expand and diversify exports, this factor needs close government oversight. This is because excellent REER management can impact export performance across a wide range of distinct products. Trade liberalization, technology adoption, organizational structures and resource endowment, national income affected by resource endowment and manufacturing organisation and the links between these characteristics are significant competitiveness and performance determinants (Biggs, 2007).

Charoenratet *al* (2012) used the 2007 Thai Industrial Census to empirically examine the effects of company-specific and industry-specific factors on the company's export decision and export performance of 63000 Thai manufacturing SMEs classified into eight sub-production groups. Six econometric models have been recognized to capture linear and nonlinear effects of company-specific variables as well as to evaluate each industry-specific impact for Thai SMEs. The probit model, the logit model, the linear probability model and the Tobit model used four limited dependent variable models to explore the factors influencing the export choice of a company and its export performance. With regard to company particular variables that affect a company's export decision and export performance, foreign investment and skilled labor have been discovered to be substantially and favorably linked to the export involvement and export performance of a company. Focusing on the impacts of industry industries on a company's export decision and export performance, concentration of producers has been discovered to have a substantial and beneficial impact on the export decision and export performance of a company but a substantial and negative outcome has been discovered for foreign investment.

Moreover, in explaining export quantities of other exports of products and services than coffee exports, revenue from trading partners was discovered to be more essential. Like similar studies, however, the study acknowledged that input costs, labor costs, access to credit, other non-price factors play a vital role in the production and export production contribution. Miano (2009) studied factors that determine the availability of tea exports in Kenya using information from the 1970-2007 time series using OLS. Real exchange rate, input prices and structural adjustment programs were the factors under account. The research results showed that tea prices, actual exchange rates, input prices have important effect on the production of tea exports. Structural adjustment programs and input cost variables for salary rates had little meaning in explaining the availability of tea for exports.

Gravity model with panel data was used by Taye to study the determinants of Ethiopia's export performance between 1995 and 2007 using 30 Ethiopian trading partners (Taye,2006). The model was predicted using the Least Squares Generalized Two Stages (G2SLS) method. The results implied that supply side circumstances were a significant factor in the export performance of Ethiopia. The findings also showed that excellent institutional quality and inner transport infrastructure seemed to be major determinants, while the real exchange rate and FDI had no statistically significant impact on the export performance of Ethiopia. Furthermore, Ethiopian exports have been favorably impacted by the development of domestic national income and overseas market access circumstances also play an important role. The findings showed that import obstacles enforced by trading partners from Ethiopia played a significant part in determining the quantity of imports from Ethiopia. Comparative analysis of determinants of South Africa's export supply using 28 manufacturing sub-sectors over the period 1970-2002 annually was conducted by Edwards and Alves (2006). They used pooled estimation model with export volume as the dependent variable and exchange rate, infrastructure costs, tariff rates and variable cost as the explanatory variables. The generalized method of moment results indicated that all explanatory variables used are important determinants of export performance. The relationship between competitiveness and performance of exports and investment in machinery between 1967-1990 among 14 developed countries and 25 developing countries was done by Mody and Yilmaz (2002). The study estimated a function of translog export prices, export-oriented developing nations and imported panel data to replace developing economies. The explanatory factors were GDP, capital stock, pay rate and exchange rate. The findings showed that export competitiveness and performance is affected by the exchange rate.

The study on the impact of exchange rates, terms of trade and lagged export development on export performance was done by Musinguzi (Musinguzi and Obwona, 2000). The study discovered a marginal but statistically significant effect on export performance in terms of trade and exchange rate. Declining trade conditions with export income contraction were interlinked (Parimal,2006). An instance of Burundi which was eighty seven percent of GDP dependent on coffee and tea like Kenya. When Burundi's coffee and tea prices dropped by thirty percent and twenty percent respectively, its annual exports dropped by fifty-four million in 2005.

3. Research Methodology

3.1. Area of Study

The study was carried out in manufacturing exports sector in Kenya.

3.2. Research Design

Explanatory research design deemed appropriate for this study since the main aim of the study was to identify causal relations between the variables that pertain to the study problem and to determine the dynamic relationship between selected macroeconomic variables and Kenyan manufactured exports.

3.3. Data Sources

The sources of the data were the Kenya Bureau of Statistics (KNBS) and World Integrated Trade Solution.

3.4. Data Analysis

Both descriptive and inferential statistics were employed. Stata Software was used to analyse the data. The process started by giving the general characteristics of time series data. Stationarity of the data was tested using the Augmented Dickey Fuller, KPSS and Philip Perron. Unit root test with structural breaks was equally tested using Zivot Andrew test. Johansen procedure was employed in determining the cointegration rank and cointegration relation

3.4.1. Descriptive Statistics

3.4.1.1. Normality Test

The JB test is an asymptotic test to test the skewness and the kurtosis of the OLS residuals using the following statistic

$$JB = n \left[\frac{s^2}{6} + \frac{(K-3)^2}{24} \right] \dots \dots \dots 3.1$$

3.4.2. Econometric Estimation Model

The data collected was fitted into a multivariate econometric regression model of the form;

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_3 x_{i3} + \beta_4 x_{i4} + \beta_5 x_{i5} + \varepsilon_i$$

Where y is the dependent variable, $x_{i1} \dots x_{i5}$ are independent variables, $\beta_{i1}, \dots, \beta_{i5}$ are regression

The study used equation 3.6 to reduce multicollinearity

$$\exp = f(a_0, fdi^{a1}, gdp^{a2}, reer^{a3}, to^{a4}, tot^{5s})$$

The equation 3.6 point the variables that affect performance of manufactured exports. The long run equilibrium relationships are expressed by the equation 3.7 which is specific;

$$l exp_t = b_0 + b_1 l fdi + b_2 l gdp_t + b_3 l reer_t + b_4 l to_t + b_5 l tot_t + \varepsilon_t$$

Where;

$l exp_t =$ log of manufactured exports, $l fdi_t =$ log of foreign direct investment, $l gdp_t =$ log of gross domestic product, $l reer_t =$ log of real effective exchange rate, $l to_t =$ log of trade openness, $l tot_t =$ log of terms of trade. This shows the long run relationships among variables.

3.4.3. Stationarity Test

Regressing a time series variable on another time series variable may lead to obtaining spurious results, a case where one obtains a very high R^2 value even though the variables do not have a significant relationship. If a vector y_t is integrated of order d , represented as $(y_t - I(d))$, then the variables in y_t needs to be differenced d times to induce stationarity. If the individual series has a stochastic trend it means that the variable of this series does not revert to average or long run values after a shock strikes and its distribution does not have a constant mean and variance. The study will employ the Augmented Dickey and Fuller (1979) and Philips and Perron (1988) tests to determine stationarity. If the probabilities for both are less than 0.05 at first difference then the variables are stationary.

To determine the stationarity of an autoregressive (AR) consider the AR (1)

$$y_t = \delta + \theta y_{t-1} + \varepsilon$$

With $\theta = 1$. This is a first order autoregressive process with unit root $\theta = 1$ also referred to as a random walk. The null hypothesis is to test $\delta = 0$ and $\theta = 1$ jointly or test only that $\theta = 1$. It is possible to test using the t statistic. However, using the standard tables leads to rejection of a unit root too often. The model is extended to test for a deterministic time trend rather than a unit root. This caters for a situation where the non-stationary is caused by a deterministic time trend rather than by the presence of a unit root. AR (1) is extended to

$$y_t = \delta + \theta y_{t-1} + \gamma t + \varepsilon$$

With $|\theta| < 1$ and $\gamma \neq 0$. In this case, it has a non-stationary process because of the linear trend. The non stationarity is removed by regressing y_t against a constant t and then considering the residuals of this regression. To test whether y_t follows a random walk against the alternative it follows a trend stationary process in equation (3.4) the regression below is run.

$$\Delta y_t = \delta + (\theta - 1)y_{t-1} + \gamma t + \varepsilon$$

The null hypothesis is that the process is a random walk rather than trend stationary. It is given as $H_0: \delta = \gamma = \theta - 1 = 0$. If the null hypothesis is rejected it means that y_t is a stationary time series with a deterministic trend (Verbeek, 2004). Therefore, cointegration analysis should be done but if the data is non-stationary, it is regressed y_t against a constant t and then considering the residuals of the regression, if stationary cointegration should proceed using Johansen and Juselius method (1990).

3.4.5. Co-integration Analysis

The study applied the Johansen and Juselius (1990) maximum likelihood method test to investigate the existence of a long-run relationship between the dependent variable and the independent variables. If co-integration among the variables exists, the vector error correction model (VECM) was established. The model was adopted because it allows testing of more than one cointegrating relationship unlike the Engle Granger Model which is based on the Dickey Fuller test for unit root in the residuals from a single cointegrating relationship. The only short coming of the model is that it is only best in variables integrated of order one ($(y_t - I(d))$). Given the mean of the co-integrating equations and that of the differenced variables is constant and their trends constant, and the co-integration rank r the VECM can be written as

$$\Delta Y_t = a + \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t \dots \dots \dots 3.14$$

Where;

Y_t Is a variable at time, t

Y_{t-i} Shows Lagged variable

$\Gamma_i =$ showing short-run coefficients of lagged variables.

$\Delta =$ first difference operator.

$$\Delta \begin{bmatrix} IX_t \\ IGDP_t \\ IREER_t \\ ITOT_t \\ IOP_t \\ IFDI_{t,t} \end{bmatrix} = \begin{bmatrix} a_1 \\ a_2 \\ a_3 \\ a_4 \\ a_5 \end{bmatrix} + \begin{bmatrix} A_{11} & \dots & A_{1r} \\ \vdots & \ddots & \vdots \\ A_{k1} & \dots & A_{kr} \end{bmatrix} \begin{bmatrix} B & \dots & B_{1r} \\ \vdots & \ddots & \vdots \\ B_{k1} & \dots & B_{kr} \end{bmatrix}' \begin{bmatrix} IX_t \\ IGDP_t \\ IREER_t \\ ITOT_t \\ IOP_t \\ IFDI_{t,t} \end{bmatrix} + \sum_{i=1}^{L-1} \Gamma_i \Delta \begin{bmatrix} IX_t \\ IGDP_t \\ IREER_t \\ ITOT_t \\ IOP_t \\ IFDI_{t,t} \end{bmatrix} + \begin{bmatrix} \varepsilon 1_t \\ \varepsilon 2_t \\ \varepsilon 3_t \\ \varepsilon 4_t \\ \varepsilon 5_t \end{bmatrix} \dots 3.15$$

Where Δ denotes the difference operator and a signifying the matrix of constants. A and B stand for matrix that contain adjustment coefficients and long-run relationship coefficients respectively in the model. Γ represents a matrix of short-run coefficients, t for time periods, ε representing the model residual. $\ln X_t = \log$ of export volume, $\lgdp_t = \log$ of gross domestic product, $ITOT_t = \log$ of terms of trade, $IOP_t = \log$ of trade openness, $IFDI = \log$ of foreign the direct investment, $IREER_t = \log$ of real exchange rate, and $a_1, a_2, a_3, a_4,$ and a_5 represent are vector parameters representing constants in the short run (Lutkepohl H,2005).

The study used Akaike's information criterion (AIC) and the Hannan and Quinn information criterion (HQIC), Schwarz, Bayesian Information Criteria and Final Prediction Information Criteria to determine the lag order. The determination of correct number of lags is crucial to mitigate serial correlation and avoid over parameterization (Gujarati, 2004). Johansen's method uses two test statistics for the number of cointegration vectors, the trace test (λ_{trace}) and maximum eigenvalue (λ_{max}) test, λ_{trace} statistic tests the null hypothesis (H_0) that the number of distinct cointegration vectors is less than or equal to r against the alternative hypothesis of more than r cointegration vectors (Cameron and Trivedi, 2005). The second statistic tests H_0 that the number of cointegration vectors is r against the alternative of $r + 1$ cointegration vectors. Therefore, the cointegration model was estimated using trace test statistics.

3.4.6. Diagnostic Tests

Diagnostic tests play a crucial role in finding and validating a good predictive relationship among the dependent variables and determining whether the model is stable. The following diagnostic tests were used to undertake autocorrelation.

3.4.6.1. Correlation

It is a common problem in the time series data. Breusch-Godfrey serial correlation was used to test for autocorrelation. Montgomery *et al.* (2001) notes that, because most regression problems involving time series data exhibit positive autocorrelation, the hypothesis usually considered in the Durbin Watson test is:

$H_0: \rho = 0$3.16

$H_1: \rho > 1$3.17

Where:

H_0 : is the null hypothesis which states that there is no autocorrelation if the probability of the regression equation equals to zero ($\rho = 0$)

H_1 :is the alternate hypothesis which states that there is autocorrelation if the probability of the regression equation is more than one ($\rho > 1$)

The solution for autocorrelation is to transform the original autoregressive error term into one with non-autocorrelated error term so as to permit the use of OLS procedures; let:

$Y_t = \beta_1 + \beta_2 X_{2t} + \dots + \beta_k X_{kt} + e_t, t=1, \dots, T$ 3.16

$e_t = \rho e_{t-1} + V_t \quad (0 < \rho < 1)$

Where both e_t and V_t have zero expected values and the constant variances through time, e_t are autocorrelated but V_t are not. The former defines a standard first-order autoregressive model: ρ is the correlation coefficient between errors in the time period t and errors in the time period $t-1$, *but it is not contemporaneously* affected by them; and so on. Therefore, we follow Sims (1980) work that suggested starting with the most exogenous variable in the system and ending with the most endogenous one.

3.4.6.2. Engel-Granger Method

The first step is to Pre-test the variables for their order of integration. By definition, cointegration necessitates that two variables be integrated. Thus, the first step in the analysis is to pre-test each variable to determine its order of integration. If the variables are stationary, it is not necessary to proceed since standard time –series methods apply to stationary variables. If the variables are integrated of different orders, it is possible to conclude they are not cointegrated in the usual sense of the term. However, if some variables are $I(1)$ and some are $I(2)$, the variables are determined whether they are multicointegrated. Secondly, Estimate the long-run equilibrium relationship. If the results of step 1 indicate that both manufactured exports performance and its determinants are cointegrated, the next step is to estimate the long-run equilibrium. When a model deals with only two endogenous variables, the Engel-Granger methodology is a suitable tool (Aslan & Taşdemir, 2009). According to (Banerjee *et al.*,1993) Engel-Granger testing procedure is convenient because the

dynamics do not need to be specified until the error –correction structure has been estimated. The Engel-Granger (1987) propose a two-step procedure to determine if two variables are cointegrated of order CI(1, 1) (Enders, 2004):

3.5. Hypotheses Testing

The null hypotheses, terms of trade, trade openness, gross domestic foreign direct investment and real exchange rate does not significantly affect export performance in Kenya is accepted if the $p \geq 0.05$ otherwise rejected after regression analysis.

4. Results and Discussions

4.1. Summary of Descriptive Statistics

	Exports	FDI	GDPV	REER	TO	TOT
Mean	2,706,614.	-4.98X10 ⁸	3.19X10 ¹⁰	63.85517	68,6173.9	0.354967
Median	625,756.2	-74,966,363	1.74X10 ¹⁰	72.23542	411,348.7	0.331436
Maximum	8,755,957.	1,803,111.	7.58X10 ¹⁰	98.62000	3,589,861.	0.830719
Minimum	102,257.8	-1.79X10 ⁹	5.75X10 ⁹	16.22574	-943,203.0	0.189723
Std Dev.	3,316,512.	6.74X10 ⁸	2.50X10 ¹⁰	23.98138	877,856.7	0.172371
Skewness	0.888687	-0.969802	0.482079	-0.916138	1.957084	0.876303
Jarque-Bera	6.935559	7.565550	5.023365	5.823946	54.69594	5.119833
Probability	0.031186	0.022759	0.081132	0.054368	0.000000	0.077311

Table 1: Descriptive Statistics

Source: Author's, 2017

The first step of the analysis was to compute the descriptive statistics reported in Table 1. This was done in order to get a general view of the individual variables and to identify any potential outliers. The mean for exports was 2,706,614 with a maximum of 8,755,957 and a minimum of 102,257.8. Export values were skewed to the right. FDI reported a mean of 0.6177 and for the case of trade openness it was 57.6366. FDI registered an average of -4.98E+08 with a maximum of 1803111 and a minimum of -1.79 X 10⁻⁹. This was an indication that there were years when there was capital flight instead of FDI inflows. Jacque-Bera test for normality for FDI was 7.5655 and probability of 0.0228 showing that the variables were normally distributed. The value of GDP had central value of 3.19X10¹⁰ and a minimum of 5.75X10¹⁰. This was an indication that GDP was strongly trended variable. The Jacque-Bera for GDP was 5.0234 with probability 0.0811 showing that it was normally distributed. The mean of REER was 63.85517 and maximum of 98.62000. This was also an indication that Kenya Shilling was depreciating against the US dollar. Normality test showed that Jacque-Bera was 5.8240 and probability of 0.0544 showing that it follows normal distribution. The mean of TO was 686173.9 and maximum of 3589861. This indicated that Kenya's trade activities had been increasing overtime. Jacque-Bera test showed that it was normally distributed. Jacque-Bera statistics was 54.6960 with probability of 0.0000. The mean of TOT was 0.354967 and maximum of 0.830719 which shows that the terms of trade have been favourable overtime. TOT Jacque-Bera statistics was 5.1198 and probability of 0.0773 showing it is normally distributed.

4.2. Correlation Analysis

Partial Covariance Analysis: Ordinary						
Included observations: 40						
Partial analysis controlling for: EXPORTS FDI REER GDPV TO TOT						
Covariance	EXPORTS	FDI	GDPV	REER	TO	TOT
Correlation	EXPORTS	FDI	GDPV	REER	TO	TOT
EXPORTS	-1.12E-17					
	-1.000000					
FDI	-0.400000	-3.44E-13*				
	-2.04E+14*	-1.000000				
GDPV	-1.85E-15	3328.000*	-3.01E-11*			
	-0.100480	1.03E+15	-1.000000			
REER	5.96E-09*	1.62E-06	1.98E-21	-1.36E-13		
	4818259.*	7483565.*	9.78E-10*	-1.000000		
TO	3.66E-05*	0.003125	7.91E-16*	-5.21E-26*	-2.08E-20*	
	7.59E+13*	3.70E+13*	1.000000	-9.78E-10*	-1.000000	
TOT	-2.07E-25*	-1.19E-08	4.77E-08*	3.55E-16*	3.64E-13*	-1.25E-17
	-1.75E-08	-5750876.*	2459689.*	0.272166*	714103.4*	-1.000000

Table 2: Correlation Analysis

Source: Author's Data, 2017 Significance at 0.05 Percent Level

4.3. Test for Multivariate Normality

Having established the correlation levels that existed among the variables it was necessary to test for multivariate normality. For this Doornik-Hansen test showed that the variable followed normal distribution and hence test like z – distribution and t – distribution was suitable for the analysis. The $\chi^2 (12 \text{ df}) = 87.941 \text{ Prob} > \chi^2 = 0.0000$. This showed that the distribution was normal.

4.4. Unit Root Tests

4.4.1. Unit Root Tests without Structural Breaks

Having established the multivariate normality among variables unit root test were done on each of the individual time series variables. Both first generation unit root test (Dickey-Fuller and Phillips-Perron and second generation (Elliot-Rothnberg-Stock and Kwiatkowski-Phillips-Schmidt-Shin) were applied to check on robustness. Results are presented in the following sections.

4.4.2. Results of Augmented Dickey-Fuller

Variable	Intercept		Intercept and Trend		None		Remark
	T – Stat	Prob	T – Stat	Prob	T – Stat	Prob	
Level							
EXP	-0.6315	0.8513	-2.1077	0.5247	0.0205	0.6830	Unit root
FDI	-0.3513	0.9076	-1.8961	0.6374	0.4212	0.7997	Unit root
GDP	1.2256	0.9978	-1.7269	0.7201	3.9088	0.9999	Unit root
RER	-1.4319	0.5569	-1.8566	0.6575	1.3694	0.9547	Unit root
TRO	-6.7160	0.0000	-6.8949	0.0000	-1.9491	0.0501	Unit root
TOT	-2.5240	0.1197	-3.3330	0.0759	-3.8606	0.0004	No unit root
First Difference							
EXP	-4.1378	0.0025	-4.2560	0.0091	-2.0530	0.0399	No unit root
FDI	-7.3133	0.0000	-7.4016	0.0000	-7.0693	0.0000	No unit root
GDP	-4.7876	0.0004	-5.1589	0.0008	-1.7919	0.0498	No unit root
RER	-5.7241	0.0000	-5.7108	0.0002	-5.2639	0.0000	No unit root
TRO	-13.4211	0.0000	-13.2543	0.0000	-13.6000	0.0000	No unit root

Table 3: Results of Augmented-Dickey-Fuller Test Results

Source: Author's 2017

Results of Augmented Dickey-Fuller presented in Table 3 showed that exports, Foreign Direct Investment, Gross Domestic Product, Real Effective Exchange Rate and Trade Openness had unit roots while Terms of Trade had no unit root. Trade openness was stationary when the test was carried out with intercept and also with intercept and trend but was non-stationary when tested with none. Exports were found to be non-stationary when tested with intercept, intercept and trend and none of them similar for Foreign Domestic Income, Gross Domestic Product, Real Effective Exchange Rate and Terms of Trade were also non-stationary as per Augmented Dickey-Fuller tests results.

4.4.3. Results of Phillips-Perron Unit Root Test

Variable	Intercept		Intercept and Trend		None		Remark
	T – Stat	Prob	T – Stat	Prob	T – Stat	Prob	
Level							
EXP	0.1206	0.9634	-1.6337	0.7610	1.1127	0.9282	Unit root
FDI	0.1938	0.9309	-1.8012	0.6849	0.6220	0.8465	Unit root
GDP	0.9286	0.9949	-1.7414	0.7134	3.0223	0.9991	Unit root
RER	-1.4138	0.5657	-1.9150	0.6277	1.3694	0.9547	Unit root
TRO	-6.7013	0.0000	-6.8595	0.0000	-4.6927	0.0000	No unit root
TOT	-1.2146	0.6585	-3.3330	0.0759	-0.9771	0.2884	Unit root
First Difference							
EXP	-4.253	0.0018	-4.3938	0.0064	-3.7864	0.0004	No unit root
FDI	-7.2826	0.0000	-7.3980	0.0000	-7.0109	0.0000	No unit root
GDP	-4.8776	0.0003	-5.1589	0.0008	-3.6981	0.0005	No unit root
RER	-5.7147	0.0000	-5.7090	0.0002	-5.2641	0.0000	No unit root
TOT	-6.7823	0.0000	-6.7295	0.0000	-6.8423	0.0000	No unit root

Table 4: Results of Phillips-Perron Unit Root Test

Source: Author's, 2017

Results of Phillips-Perron are presented in Table 4. Results showed that EXP, FDI, GDP, RER, TRO and TOT were non-stationary in levels agreeing with Augmented Dickey-Fuller test results. However, it disagreed with Dickey-Fuller by showing TRO was stationary yet ADF showed that TRO had no unit root.

The results of unit root test are presented in Table 4. The results of Augmented Dickey-Fuller rejected the presence of unit root in EXP, FDI, GDP, RER, TRO and TOT with intercept, intercept and trend and none.

The Augmented Dickey-Fuller and Phillips-Perron Unit Root Tests, also referred to as the first-generation tests (classical tests) cannot distinguish between unit root and near unit root stationary processes (Nyongesa, 2013). The power of the tests is low if the process is stationary but with a root close to the non-stationary boundary. The tests are poor at deciding, for example, whether $\phi = 1$ or $\phi = 0.95$, especially with small sample sizes.

4.4.4. Unit Root Tests with Structural Breaks

Variable	Trend		Intercept	
	T-Stat	Prob	T-Stat	Prob
Exports	-5.3434	0.0230*	-3.9614	0.0059
FDI	-3.0565	0.0721	-3.0565	0.0721
GDP	-3.3504	0.0820	-3.2326	0.0248*
REER	-3.4332	0.0502	-3.8859	0.0374*
TO	-8.0894	0.0241*	-8.6087	0.0073*
TOT	-5.3434	0.0230*	-5.4089	0.1657

Table 5: Unit Root Test with Structural Breaks

Source: Author's Research, 2017

The Critical values of Zivot-Andrews test were -4.80 at 1%, -4.42 at 5% and -4.11 at 10% with trend and were -5.34 at 1%, -4.93 at 5% and -4.58 at 10% with intercept.

The next step of the analysis was testing for unit root with structural breaks and results are presented in Table 5. Exports had significant structural break when tested with trend and at 5 percent level of significance. When tested with intercept the structural break was not significant. FDI had no significant structural both when tested with trend and intercept. The structural break of GDP was not significant when tested with trend but when tested with intercept the break was significant. The structural break of REER was not significant when tested with trend but when tested with intercept the break was significant. TO had significant structural breaks both when tested with either trend or intercept. TOT had significant structural break when tested with trend but when the break was tested with intercept it was not significant.

The results of unit root test with structural break showed that wide GDP, REER and TO had a significant break during the period under study. This was brought by the change in government massive policy changes and change of government brought significant break in both trend and intercept. These policies brought by Structural Adjustments Programmes, establishment of Export Promotion Zones and Rapid Industrialization for Sustainable Development. Results of unit test with structural breaks are presented below.

4.5. Co-integration Analysis

Co-integration is the presence of a long-run equilibrium relationship that exists between variables in the regression system. Disregarding the test for existence of Co-integration when it exists can result to possible model misspecification. Integrated variables of any order cannot be regressed using the usual OLS technique due to their nonstationary property but applied special case of the Johansen's normalization method to estimate the parameters of the underlying model. The study employed the vector error correction model to test the long-run relationships and short-run behaviors of the variables. VECM is well applicable for $I(1)$ variables. The idea of bringing nonstationary variables into a linear combination that is stationary using error correction by Granger (1983) was developed into a VECM model by Johansen (1995) to be able to estimate parameters for inference.

To determine the nature of exports in Kenya the current study applied Johansen's 1991 cointegration analysis. This technique was chosen because it is applicable where there is multivariate relation as opposed to Engle-Granger that applies to bivariate relationship (Lutkepohl, 2005; Hamilton, 1994). The analytical technique also has advantages over other cointegration methods because it does not suffer from a normalization problem and is robust to departures from normality (Gonzalo, 1994; Nyogesa, 2013). The optimality of the Johansen-Juselious (1991) has been shown by Phillips (1991) in terms of symmetry, unbiasedness and efficiency property (Daly, 1996; Nyongesa, 2013). This involved estimation of cointegration relationship between EXP, FDI, GDP, REER, TRO and TOT.

To determine Johansen's cointegration test there was need to estimate appropriate lag length and unrestricted VAR model, cointegration rank and parameter. The log likelihood object provided a general, open-ended tool for estimation of a broad class of specification by maximizing likelihood function with respect to parameters of the model.

4.5.1 Determination of Lag length

Sample: 1980 - 2015				Number of observations = 36				
Lag	LL	LR	Df	P	FPE	AIC	HQIC	SBIC
0	-2037.1				7.9e+41	113.506	113.598	113.77
1	-1891.6	291.01	36	0.0000	1.9e+39*	107.422	108.067	109.27*
2	-1870.09	43.008	36	0.0196	5.0e+39	108.227	109.425	111.658
3	-1831.61	76.963	36	0.0000	7.2e+39	108.09	109.84	113.104
4	-1753.6	156.03*	36	0.0000	2.4e+39	105.75*	108.05*	112.353

Table 6: Lag length Determination
Source: Author's, 2017

In economics, a dependent variable say Y does not respond instantaneously due to the effects of a dependent variable X. it takes Y a lapse of time to complete the intended changes it undergoes caused by the forces created by X variable. This lapse of period of time after which the effect is complete is referred to as a lag. To test for co-integration rank of the long-run equilibrium relationship between variables and consequently fit the VECM model so as to produce estimates for inferential purpose, one needs to determine the lag order first. This study applied a model that produces results that are consistent in the manner that effects created in the system will cause an impact that is does not die off over time, hence can be used for prediction of future effects. This implies that consistency is meaningful in determining the model lag order in this study. Log Likelihood ration(LR), Akaike Information Criteria(AIC), Hannan and Quinn Information Criteria(HQIC) test identified the lag length to be four(4).However, Schwarz Bayesian Information Criteria (SBIC) and Final Prediction Information Criteria (FPE) identified the lag length to be one(1) hence the lag length was taken to be four(4) because it was identified by three criterion's.

4.5.2. Cointegration Rank

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.680080	43.30800	40.07757	0.0209
At most 1	0.547418	30.12589	33.87687	0.1315
At most 2	0.454354	23.01985	27.58434	0.1726
At most 3	0.352912	16.54035	21.13162	0.1948
At most 4	0.171123	7.131964	14.26460	0.4737
At most 5	0.003905	0.148662	3.841466	0.6998
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Table 7: Cointegration Rank
Source: Author's, 2017

The co-integration rank was determined using Johansen and Juselius (1990) maximum likelihood method. The Johansen's testing procedure starts with the test for zero co-integrating equations (a maximum rank of zero) and then accepts the first null hypothesis that is not rejected. In the output below Table 7, reject the null hypothesis of no co-integration and accept the null hypothesis of at most more than one co-integrating equation. Thus, accept the null hypothesis that there is one (1) co-integrating equation in the model. The results are displayed in Table 7. The co-integration rank was therefore determined as (1) as shown by maximum eigen values in Table 7.

4.5.3. Cointegration Parameter

Sample: 1980-2015	Observations.	36		AIC	107.6094
LOG LIKELIHOOD	-1811.968			HQIC	109.5284
DET(SIGMA_ML)	2.11e+36			SBIC	113.1077
EQUATION	PARMS	RMSE	R-SQ	CHI2	P>CHI2
D_EXPORTS	20	400375	0.7600	50.65588	0.0002
D_FDI	20	2.0e+08	0.6201	26.12134	0.1618
D_GDPV	20	2.0633	0.6009	24.08568	0.2387
D_REER	20	6.87811	0.5746	21.61315	0.3619
D_TO	20	924386	0.7907	60.44259	0.0000
D_TOT	20	0.077297	0.4694	13.08083	0.8739

Table 8: Summary Statistic Results of Vector Error-Correction Model
Source: Author's, 2017

This part of the model shows how fitting each equation is using the R-squares and mean square error (RMSE). Information about the sample size and the overall fitting of variables in the model is also displayed, using the log likelihood and the information criteria value.

4.5.4. Summary of Statistics for Short-run Behaviors

	Coef.	Std. Err.	Z	P>z	[95% Conf.	Interval]
D_exports						
_ce1						
L1.	0.1362049	0.474095	2.87	0.004	0.432839	0.2291258
_cons	53641.62	114852.7	0.47	0.640	-171465.6	278748.8
D_fdi						
_ce1						
L1.	-12.1082	23.95304	-0.51	0.613	-59.05529	34.83889
_cons	1284.285	5.80e+07	0.00	1.000	-1.14e+08	1.14e+08
D_gdpv						
_ce1						
L1.	4.77e-05	2.44e-05	1.95	0.051	-1.60e-07	9.56e05
_cons	-7694518	0.5918838	-1.30	0.194	-1.929523	0.3906191
D_reer						
_ce1						
L1.	-1.27e-04	8.14e-05	-1.56	0.118	-2.87e-06	3.24e-05
_cons	.300882	1.973072	1.52	0.127	-0.8583295	6.87597
D_to						
_ce1						
L1.	-0.178869	0.109459	-1.63	0.102	-3934055	0.0356658
_cons						
D_tot						
_ce1						
L1.	-0.44041.43	265171.7	-0.17	0.868	-563768.4	475685.6
_cons						
D_tot						
_ce1						
L1.	8.88e-05	9.15e-05	0.97	0.332	-9.06e-09	2.68e-05
_cons						
D_tot						
_ce1						
L1.	-0.0087251	0.0221736	-0.39	0.694	-0.0521845	0.0347843

Table 9: Summary of Statistics for Short-Run Behaviors

Source: Author's, 2017

When variables are cointegrated there is long run relationship between them however in the short run there may be disequilibrium. This disequilibrium can be expressed as vector error correction model Gujarati (2009). The result for the vector error correction model are reported in Table9. Long run causality is confirmed if the error correction term (ECT) represented by L1 is significant. From the model, the ECT is 0.1362049 and it is statistically significant at 5% confidence level. Therefore, the study concluded that there is long run causality which runs from the independent variables to the dependent variable. The coefficient of lagged variables in Table9 represents short-term causality with that of the dependent. The p-values for all the lagged variable coefficients indicates that they are not significant.

4.5.5. Summary of Statistics for Co-integration Equation

Equation	Parms	χ^2	$p > \chi^2$				
_ce1	5	1717.08	0.0000				
	Beta	Coef.	Std. Err.	Z	P>z	[95% Conf. Interval]	
_ce1	Exports	1	.	.	.	.	.
	Fdi	.0067243	.0002888	23.28	0.000	.0061581	.0072904
	Gdpv	-313767.4	103526.1	-3.03	0.002	-516674.8	-110860
	Reer	-247112.1	17626.89	-14.02	0.000	-281660.2	-212564.
	to	4.556109	.379903	11.99	0.000	3.811513	5.300705
	tot	-3.78e+07	2448012	15.45	0.000	4.26e+07	3.30e+07
	_cons	30.85324	.	.	.	.	.

Table 10: Summary of Statistics for Co-Integration Equation

Source: Author's 2017

The co-integrating relation for model one is given as below.

$$\text{MANEXP} = 30.8 + 0.0067\text{FDI} - 313767.4\text{GDP} - 247112.1\text{REER} + 4.5561\text{TO} - 37800000\text{TOT} \\ (0.0002888) \quad (103526.1) \quad (17626.89) \quad (0.379903) \quad (2448012) \dots\dots 4.1$$

The results for the co-integrating relation are as shown above in equation 4.1. The results show that;

- H_{01} : Foreign Direct Investment does not significantly affect export performance of Kenya

Foreign Direct Investment was significant to manufactured exports given that the P value is less than 0.000 < 0.05 and coefficient of .0067243. This indicates that 1 percent change in foreign domestic investment can cause 67 percent change in manufactured exports. This was as anticipated with regard to the formulated hypothesis. This result was also similar to the previous result of total exports. Moreover, the same was similar with the previous studies. Amelia and Santos (2000) and Hoekman and Djankov (1998) in their studies concluded that FDI has a positive and is significantly influences export performance. This shows that besides foreign direct investment, exporting is one of the most important channels through which developing countries can link with the world economy. Exporting allows firms in developing countries to enlarge their markets and benefit from economies of scale. In addition, several scholars have pointed out the importance of exporting as a channel of technology transfer (Pack, 1993). In order to formulate trade and industrial policies aimed at stimulating exports, it is important to understand which factors stimulate or deter firms to enter foreign markets.

- H_{02} : Gross Domestic Product does not significantly affect export performance of Kenya

The study found that GDP had negative and significant effect on exports indicating that when GDP increases, the value of exports decreases, 1 percent change on gross domestic product causes 313,767 change in manufactured exports. The coefficient and p are (-313,767.4) p (0.002) which is less than 5 percent. This was as anticipated with regard to the hypothesis formulated and some of previous studies. For instance, Ngeno (1996) and Kumar (1998) in their studies found a positive relationship between GDP and export performance. In the study by Allaro (2014) the results also showed that the estimated coefficients of real output (Ry) and nominal exchange rate (e) are statistically significant. In Kenya this situation could be contributed by low capacity in production which leads to low output and certainly no surplus for exportation.

- H_{03} : Real Exchange Rate does not significantly affect export performance of Kenya

In the study REER was found to be statistically significant to manufactured exports. The results further showed that 1 percent change in real effective exchange rate caused 247112 change on manufactured exports and has a positive effect. The coefficient and p values were -247112.1 and 0.000. This finding supports Wignaraja (1998) who examined the influence of macroeconomic factors (real effective exchange rate, real wages and real manufacturing output) on Sri Lanka's manufactured export performance in 1974-91 using an econometric model. The econometric technique used, based on cointegration analysis and error correction models, is different to previous work on developing countries. The stability of exchange rate has a great impact on Kenyan manufactured exports. However, this finding has found to be in consistency with the previous studies like that of Sharma (2006) and Cline (2004).

- H_{04} : Trade openness does not significantly affect export performance of Kenya

The findings found out that Trade openness had positive and significant effect on exports. This means that 1 percent change on trade openness causes 4.5561 change in manufactured exports and the relationship is significant since the coefficient and p values are 4.556109 and 0.000. This shows that the substitution effect associated with exports competitiveness dominate income effect. An improvement in Trade openness implies more favorable export prices. The increase in export earnings leads to a rise in aggregate demand thus resulting in price increases. This finding is consistent of Agasha (2006) who found a positive impact of trade openness on Uganda's export growth rate.

- H_{05} : Terms of Trade does not significantly affect export performance of Kenya

The findings found that Terms of trade had negative and significant effect on export performance. This means 1 percent change on terms of trade causes 3.78 percent change in manufactured exports and the relationship is significant, the coefficient is -3.78e+07 and p is 0.000. It was expected that favorable terms of trade are associated with increased export growth rates and unfavorable terms with low export growth rates. Therefore, according to the result terms of trade in Kenya is of high important to manufactured exports. This situation could be contributed by the fact that some of manufactured exports are exported as unfinished materials and therefore little is earned compared with the final products. Svedberg (1990) argued that in the 1990s, Sub Saharan Africa had unfavorable terms of trade which negatively impacted on export. The Ministry of Finance Planning and Economic Development in Uganda reported in 1995 that exports in Uganda increased from period 1991 - 1994 due to dramatic improvement in terms of trade for coffee due to tripled coffee prices following the frost that hit the Brazilian coffee crop.

4.6. Diagnostic Tests

The next test performed was the diagnostic test of Langragian Multiplier test for residual autocorrelation

4.6.1. Lagrangian Multiplier Test for Residual Autocorrelation

Null Hypothesis: No Serial Correlation		
Lags	LM-Stat	Prob
1	35.26877	0.5032
2	32.81102	0.6211
3	41.42752	0.2458
4	39.50163	0.3163

Table 11: Results of Lagrangian Multiplier Test
Source: Author's 2017

- H_0 : No autocorrelation

The results from from lagrangian multiplier tests are presented in Table 11. The results showed that there was residual autocorrelation among the modeled variables since the p values were all > 0.05 hence the null hypothesis was rejected. Following Lutkepohl (2005) the result were interpreted to imply that there were linear dependencies among the modeled variables.

4.6.2. Lominick-Jacque Bera Test for Normality

Component	Jarque-Bera	Df	Prob.
D_exports	21.43448	2	0.0000
D_fdi	22.85806	2	0.0000
D_gdpv	4.007578	2	0.1348
D_reer	13.60034	2	0.0011
D_to	6.104524	2	0.0473
D_tot	5.296956	2	0.0708
Joint	73.30193	12	0.0000

Table 12: Lominick-Jacque Bera Test for Normality
Source: Author's 2017

The result for Lominick-Jacque Bera test for normality are reported in Table 12. The result showed that the univariate time series variables for Gross Domestic Product and terms of trade were not normally distributed p-values 0.1348 and p-value 0.0708 are greater than 0.05. The results of Foreign Direct Investment, Real Effective Exchange Rate were normally distributed p-values 0.000,0.0011,0.0473 < 0.05 . The result further showed that the multivariate modeled variables followed normal distribution p-value 0.0000 < 0.05 .

4.6.3. Test for Normality based on Skewness

Component	Skewness	Chi-sq	Df	Prob.
D_exports	-0.542556	1.815266	1	0.1779
D_fdi	-1.105930	7.542337	1	0.0060
D_gdpv	0.775026	3.704102	1	0.0543
D_reer	1.144606	8.079085	1	0.0045
D_to	0.582709	2.093887	1	0.1479
D_tot	0.745870	3.430657	1	0.0640
Joint		26.66533	6	0.0002

Table 13: Normality Test based on Skewness
Source: Author's 2017

The result for Lominick-Jacque Bera test for normality are reported in Table 13. The results showed that the univariate time series variables for Gross Domestic Product, trade openness and terms of trade were not normally distributed. The results of foreign direct investment and real effective exchange rate were normally distributed p-value (0.000 < 0.005). The results further showed that the multivariate modeled variables followed normal distribution p-value (0.0000 < 0.005).

4.7. Stability Tests

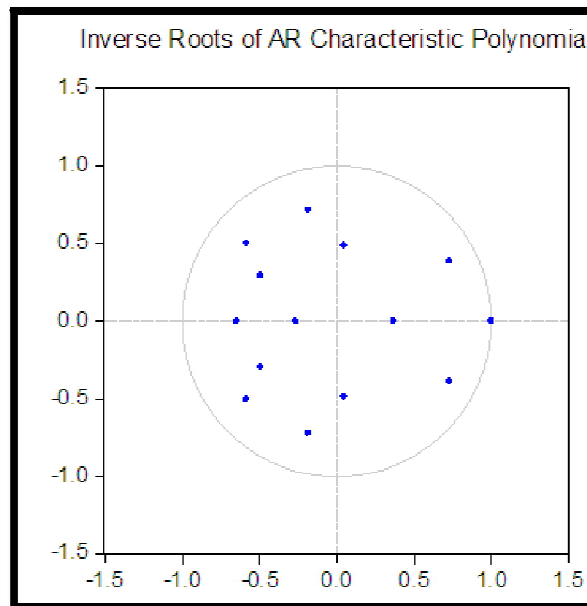


Figure 1: Roots of the Companion Matrix
Source: Author's 2017

Stability test entails both determining specification of the number of co-integration equation in the model and effects of structural changes on its stationarity. The specification of co-integration equations can be tested using the Eigenvalue moduli test. The test requires that if the model contained K endogenous variables and r co-integration rank there must be K moduli and $K-r$ of those must be equal to unit. The remaining r moduli should be less than unit and the further away from the unit circle they are the more the surety that the correct number of co-integration equations was specified. This study analyzed the reverse roots of characteristic polynomial by carrying out a VAR stability condition check test. The results showed that the moduli of the eigenvalues are actually less than one. The stability condition of VAR is confirmed by Figure 1 whose results indicate that no root lies outside the unit circle.

5. Summary of Findings, Conclusions and Recommendations

5.1. Overview

This chapter presents the summary of findings, conclusions and recommendations.

5.2. Summary of Findings

This study has examined the determinants of Kenya's manufactured export performance from 1976 to 2015 using Johansen's cointegration, Vector Error Correction Model, Granger causality, stability functions and variance decomposition techniques. The study provides additional insight into the determinants of Kenya manufactured export performance. First, descriptive statistics were computed. The mean of exports was 2706614 with a maximum value of 8755957, minimum of 102257.8 and was right kurtic. Foreign direct investment fluctuated throughout the period under the study and had a minimum of $-1.79\text{E}+09$ and mean of $-4.98\text{E}+08$ and was right kurtic. This indicate that Kenya was experiencing FDI outflows (capital flight) during the study period. (Orr, 1991) In the study of the impact of FDI on the exports performance in USA; found that steady growth in foreign control of United State manufacturing sector was as consequence of Foreign Direct Investment. The result showed that a significant increase in foreign ownerships of United State manufacturing firms would lead an expansion on United States exports, meaning a significant increase in Foreign Direct Investment will result to increase on export volume, an increase the nominal value, and finally an increase in trade balance.

GDP recorded a minimum of $5.75\text{E}+09$ and maximum of $7.58\text{E}+10$ and an average of $3.19\text{E}+10$ and was right kurtic. This was an indication that GDP was steadily increasing during the study period. This is consistent with Ahmed and Majeed (2006) in estimating developing countries export. They found that GDP of home country affects their export positively. This is due to the fact that output capacity of an economy has implication of supply capacity by maintaining a country's competitiveness in the international market in the long run.

REER had an average of 63.8552, minimum of 16.2257, maximum 98.6200 and was right kurtic. This indicated that KES had been depreciating against US \$ during the study period. (Xing, 2012) in a study evaluated the relationship between the manufactured exports performance and effective exchange rate in China. Through cointegration approach they estimated standard export and import equations and examined the existence of long-run relationships. They concluded that exports performance is much sensitive to changes in real effective exchange rate, no formal tests indicating causality between these variables was found in the study. (Baharumshah, 2001) employs an unrestricted Vector Auto regression model for the exports of Thailand and Malaysia with the United States and Japan for the period spanning 1980

to 1996. He concluded that there for a stable and positive long-run relationship between exports performance and the real effective exchange rate.

Trade openness was consistent with a mean of 686173.9. This was an indication that Kenya exports and import were increasing. (Alexander, 1952) The elasticity approach to exports performance which is based on a partial equilibrium framework, shows that the final effect of this policy depends on the extent to which import and export duties change and the price elasticities of imports and exports. Similarly, the absorption approach, which is based on a general equilibrium framework shows that the result of exports performance depends on how real income is affected relative to real absorption. In this case, the increment in real income may not improve the exports performance if the propensity to absorb imports is greater than one.

Terms of trade balance had a mean of 0.3550 indicating that Kenya's exports were always low against most of its' trading partners. Similarly, terms of trade had a maximum of 0.8307 however the low standard deviation showed that there was no large variation. (Tsen, 2006) Investigated the relationship between terms of trade and exports deficits using VECM. For Cote' Ivory they found a long-run relationship, but they point out that the exports earnings deficit cannot be explained by terms of trade alone. A strong unidirectional causality runs from the former to the latter. The dynamic simulations indicate that a significant portion of fluctuations in terms of trade is explained by exports deficits.

The study confirmed that structural change is an important characteristic of modern economies and affects the growth trajectories of developing countries. Results of unit root test with structural breaks indicated that all the variables had significant breaks that were variable specific. These breaks were associated with various economic episodes both domestic and foreign.

The variables were found to be cointegrated. FDI was significant determinant of Kenya's manufactured exports. GDP determined Kenya's manufactured exports similar with terms of trade that had positive and significant effect. Trade openness affected exports negatively. There were both significant short run and long run relationships. First difference of exports determined current exports negatively. First difference of FDI affected current FDI negatively and REER determined FDI.

5.3. Policy Implications

The findings of this study exhibit some important implications for policymakers in Kenya and other developing countries of similar characteristics and stage of development. The findings indicated that REER was a persistent feature of the Kenyan economy and that policy interventions are useful in addressing or containing the adverse shocks to the economy from the study.

The finding of trade openness implies that, regular and persistent increase in imports and exports may trigger financial crisis in the long run in Kenya. In other words, the trade openness path may be used as an indicator to predict financial crises and international competitiveness. Therefore, the policy implication arising from this analysis is that Kenya should implement policy measures to correct her unsustainable external imbalances in the long run.

There is need to apply the appropriate macroeconomic policy mix in the short run to mitigate the cyclical and short-term shocks that arise from terms of trade. However, to ensure that there is external stability in the long run, policies regarding structural improvement, such as export competitiveness enhancement, second stage import substitution and research and development, should be addressed.

The key policy implication of the findings about the terms of trade is that, prudent management of the exchange rate stability must be pursued. This will help reduce the trade openness associated with major trading partners. There is need to focus on the terms of trade in order to have a positive impact on the exports.

5.4. Conclusions

FDI, GDP, REER, TO and TOT affected Kenya's manufactured exports. Lagged value of FDI determined current value of FDI. Lagged value of exports determined FDI similar to GDP affected TOT. Lagged value of trade openness determined current value of TO in Kenya

Global trends show that there is tendency toward. The empirical estimation concluded that Foreign Direct Investment, Gross Domestic Product, Real Effective Exchange Rate, Trade Openness and Terms of Trade are salient variables in the long run factors affecting manufactured exports performance in Kenya. Trade Openness had a negative coefficient which means that it had negative influence on export's performances reduced exports and foreign aid inflows from the donor community. For developing economies like Kenya, this trend has a serious implication for economic growth and development activities. In order for the economy to be overtaken by events, it's appropriate to adopt strategies for reducing aid intensity hence dependency by continuously improving the institutional mechanism of foreign aid delivery. While Kenya has judiciously avoided acute overvaluation over the years, the empirical literature has become increasingly favourable to the view that undervalued exchange rates are good for exports performance.

However, Foreign Direct Investment, Gross Domestic Product, Real Effective Exchange Rate, Trade Openness and Terms of Trade are the major determinants of exports performance in Kenya and the appropriate policy issue assignment is important. Real Effective Exchange Rate has a profound effect on manufactured exports performance and the potential for export supply response is evident from the study results. This implies that exchange rate movements are in line with the fundamentals of the economic growth through exports. The empirical result suggests that an increase in the country's real effective exchange rate cause a gain in competitiveness of that country. Thus, a conducive and stable exchange rate policy has to be ensured. That is government has to control up rising movement of domestic price and allow further nominal depreciation of local currency in longer run in order to encourage more export. The conclusion also reveals that government should work more with the major trading partners to liberalize its trade. This can be done through bilateral

and multilateral trade agreements by reduction of tariff and other trade restriction mechanisms so as to maintain export growth.

5.5. Recommendations

The government should encourage foreign direct investment because it had negative minimum value and negative mean. This shows that there was a capital flight in the years under the study period. This may be done by creation of stable economic environment, political stability, and reduction of time taken to approve the investment. The government should regulate international trade to control the balance of trade. This may be done by use of tariffs and promotion of exports to equalize exports and imports hence improve manufactured export performance.

Domestic investment should be supported by the Government and other stakeholders. This can be done by promotion of savings and investment and provision of credit to private sector. Exports should be increased by promotion of export-oriented industries. This is to increase trade openness because trade openness had positive and significant effect. Real effective exchange rate should be controlled because it had some effects on exports performance. This can be done by pegging it with hard currencies like US dollar, the Euro and the Sterling Pound.

Foreign direct investment flow has been found to have a positive impact on export performance in different countries. Kenya must try to attract more foreign direct investment not only to improve its exports, but also to bring in foreign exchange, capital, technology & other important resources such as market knowledge.

5.6. Contribution of the Study

The study makes some important contributions to both the theory and practice of macroeconomics. It is particularly a significant response to calls by researchers for studies focusing on macroeconomics and international export performance and competitiveness. Specific contributions are as outlined in the following sections.

5.6.1. Contribution of the Study to Economic Theory

The findings of this study would be of importance to the academicians since it contributes to knowledge by empirically testing the economic theories that relate to the REER volatility in the developing world specifically Sub-Saharan Africa by using superior econometric methodology thereby adding value to the existing theories. The study appears to be among the first in-depth country analysis for Kenya using the REER macroeconomic performance nexus.

5.6.2. Contribution of the Study to Policy

The FDI and its impact on manufactured exports performance are of importance to the public and policy makers in trying to curb the macroeconomic imbalances and in detecting a country's international competitiveness. This would further enable the country to use the appropriate policy mix in trying to control the exchange rate in order to avoid the imbalances.

Additionally, a better understanding of the behavior of the exchange rate may assist policy makers in assessing whether policies aimed at attaining domestic economic objectives are compatible with a sustainable external position. Results from this study would therefore provide critical input to the formulation of a policy framework that would assist in reducing the impact of exchange rate and trade openness shocks to an economy.

5.7. Suggestions for Further Research

Drawing from the scope and limitations of the current study, the following areas are suggested for further studies;

- First, similar study should be done by using panel data techniques to cover many countries such as the regional economic trading blocks, for instance, to cover COMESA countries or even the Sub Saharan Africa.
- Second, another study could be conducted by trying to capture all the necessary variables that in theory ought to influence macroeconomic performance. For instance, application of gravity equation.
- Third, there is need for a study to be done on comparative advantage, government incentives and entrepreneurial dynamics as determinants of a country's manufactured export performance. The study particular attention should focus on the present situation and future perspectives of the less developed countries.

Fourth there is need to determine the factors affecting the export performance of firms in the main manufacturing sectors in Kenya. Specifically, firm-level characteristics like firm size, firm age and foreign affiliation should be identified and statistically tested to determine if it affects a firm's capability to export.

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Appendix

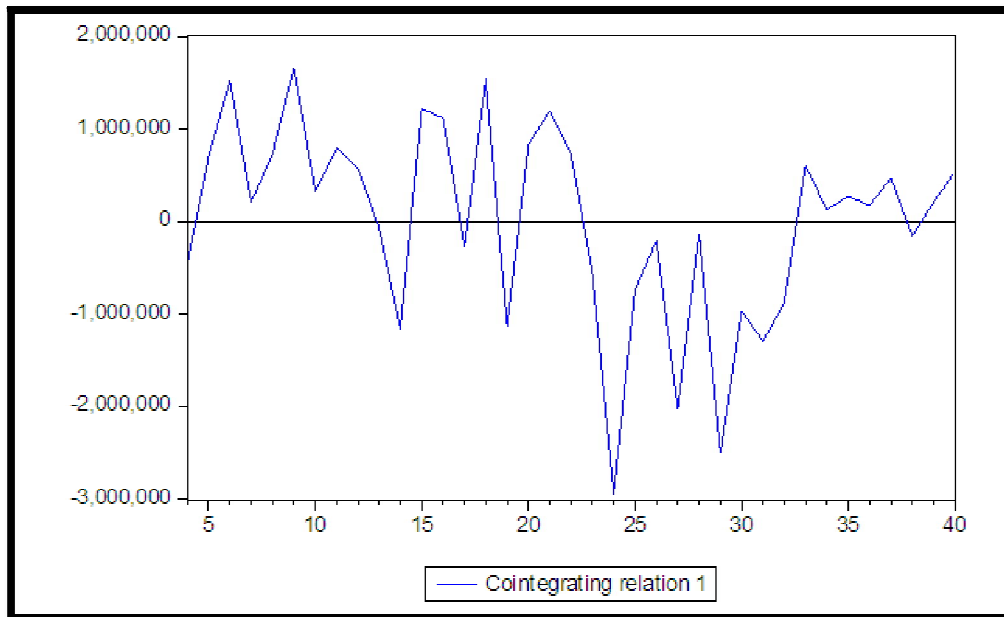


Figure 2: Cointegration Graphs

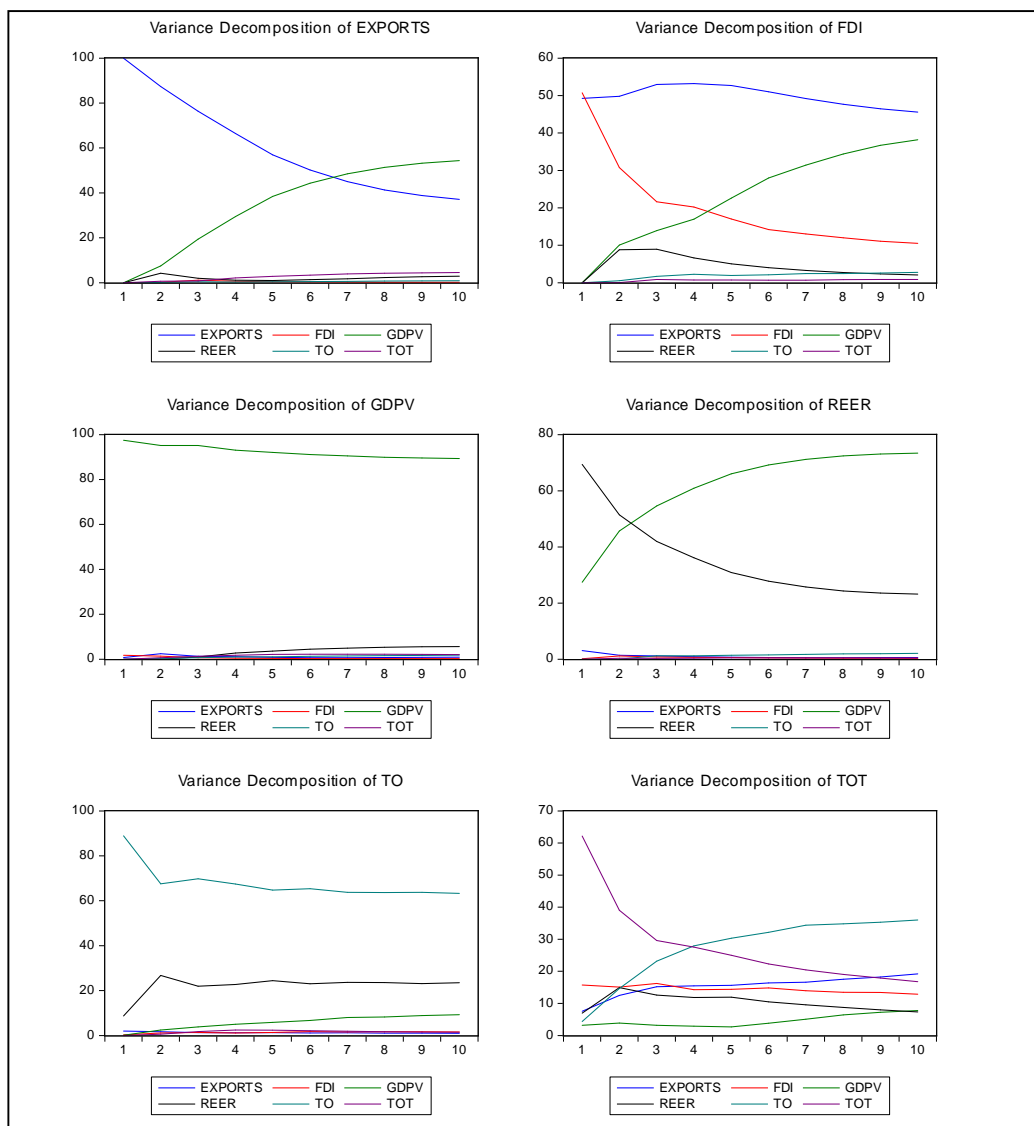


Figure 3: Variance Decomposition Graphs

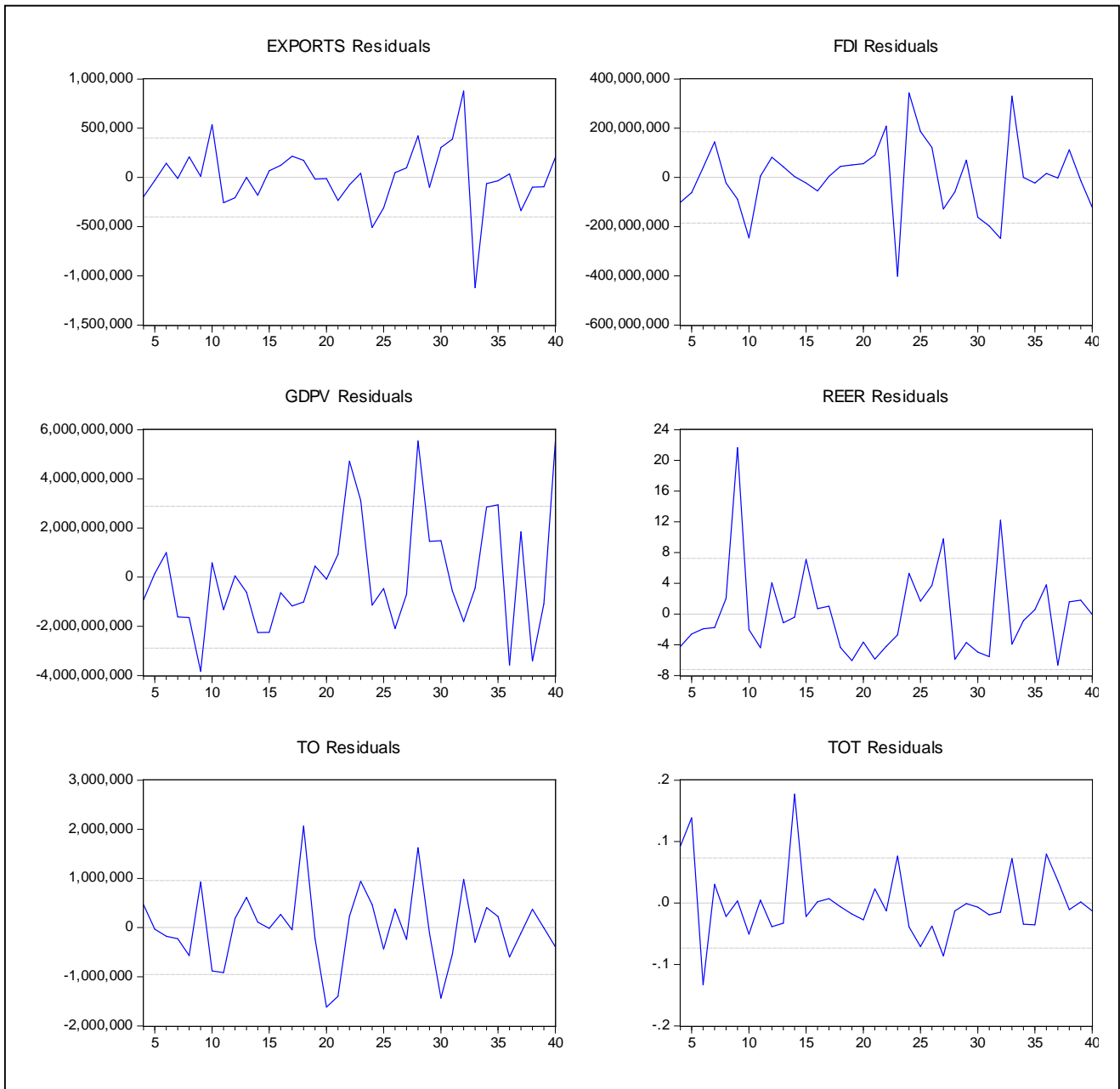


Figure 4: Residual Graphs