

THE RELATIONSHIP BETWEEN EXPORTS AND ECONOMIC GROWTH IN KENYA

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other university. To the best of my knowledge and belief, the research project contains no material previously published or written by another person except where due reference is made in the research project itself.

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This Research proposal has been submitted for examination with my approval as the supervisor.

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Abstract

This paper evaluates the existence of a relationship between the exports and economic growth in Kenya. The study aims to improve and develop the policy in this area. The main variables this study include GDP and exports. Univariate and multivariate time series were used to examine the relationship. The univariate time series helped to evaluate stationarity of the variables. The results showed that both exports and GDP were non-stationary. The multivariate time series examined the long run and short run relationships. The evaluation of a long run and short run equilibrium relationship showed that there is a long run equilibrium relationship between exports and GDP. The mediating variable openness portrayed that there is an existence of a short run equilibrium relationship. It was worth note that there was unidirectional causality between exports and economic growth, with the exports Granger Causing GDP.

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1.0 INTRODUCTION

1.1 BACKGROUND

Economic growth has become the target of most governments in the developing economies of the world. Through the years a number of measures have been adopted to accelerate growth and development in domestic economies. A need that stems from the macroeconomic goals of reduced unemployment, improved living standards of the citizens, increase in capacity utilization, and increase in foreign exchange earnings (Ahmad, 1991). Goals that have led to vibrant economic policies in developing countries of the world. The economic growth process is attributed of various variables, it is dependent on factors such as trade, price fluctuations, political stability, economic features and capital accumulation. Particularly interest in economic growth and exports has been of great significance to scholars and policy makers from as early as the 1960s (Balassa, Exports and Economic Growth: Further Evidence, 1978). Most African countries switched regimes from import substitution to an export oriented strategy from the early 1990s (Bigsten, 2010). The switch was motivated by the success of other regions that implemented an export oriented strategy for example the East Asian countries.

Rapid growth occurred in a number of Asian economies between 1960 and 1996 was accompanied by a major change in the structure of their economies. The East –Asian countries namely Korea, Taiwan, Singapore, and Hong Kong transformed themselves from technologically backward and poor economies to relatively affluent and modern economies. During the period of growth, each country experienced more than a fourfold increase of per capita income, such growth rates took the United Kingdom, the United States, France and Germany about eighty years to achieve. The growth performance is now called the Asian Miracle, since these countries vastly exceeded the economies of virtually all other economies that had comparable productivity and income levels in 1960. The East Asian success was due to the adoption of outward-oriented policies, which in turn was equated with reliance upon the free markets. Korea, Taiwan and Singapore initially started out with import substitution but later switched to more liberal trade policies that provided substantial export incentives while gradually lowering trade barriers. Individual firms, therefore had strong incentives to improve efficiency to enable them to export

rather than engage in rent seeking in the domestic market. The overall macroeconomic context that these countries were operating in was stable characterized by limited inflation.

Generally most countries in Sub-Saharan Africa (SSA) had a decade of either slow or negative growth per capita Gross Domestic Product (GDP) which worsened the balance of payments, debt and financial crises and declining competitiveness. This economic downturn was attributed to various country specific factors, however the general reason behind the slowdown was the implementation of inappropriate domestic policies. The Sub-Saharan countries were at the time marginalized since they had increasing opaque and distortionary restriction to foreign trade. Due to this and other factors, outward-orientation approaches to growth became the convention for these countries. Almost all SSA countries initiated economic reforms to change their trade strategy to an export led approach.

Kenya has made considerable progress in trade reforms since independence in 1963, advancing from import substitution a reform propagated by the colonial master to an export-oriented economy. The motivation behind embarking on an export-oriented strategy was from the successful East Asian economies. Kenya's export market is mainly concentrated on primary products. This study aims to determine the relationship between exports and economic growth in Kenya, with a specific focus on evaluating the export-led growth hypothesis.

Development policies have changed in the last three decades from the mid- 1970s when there was preference for import substitution. Import substitution encouraged countries to build up their own domestic manufacturing capacity and substitute domestically produced goods for imports (Lin, 2007). However, after this period countries opted to switch to the exact opposite of import substitution which is the export-led growth hypothesis. The change in development strategy was largely driven by the economic troubles that emerged in the 1970s. Countries that previously prospered under the model claimed that the model had exhausted its benefits and the possibilities for growth by substitution had been used up. Thereby beginning the mass shift to the Export-led growth hypothesis.

The Export-led growth hypothesis blossomed due to the change in the intellectual outlook amongst economists in favour of market directed economic activity (Lin, 2007). Economists then portrayed import substitution as a model that contributed to productive inefficiency and economic distortions since governments erected high barriers to foreign goods in the form of

tariffs and quotas that encouraged local production (Balassa 1985). Finally the shift was propelled by the IMF that advised its member states to change strategy.

The export-led growth hypothesis describes the growth in exports of a country as an important factor to economic growth of a country. The theory implies that economic growth does not primarily depend upon an increase in labour and capital stock but instead, it depends on the growth in exports (Ahmad, 1991). The plausible ideas that support this theory are explained by trade theory. The export led growth strategies are more outward looking development strategies that include government support for manufacturing sectors in which a country has a potential competitive advantage. As a result, resources from the inefficient non-trade sector are re-allocated to the trade sector. The benefit resulting would affect the entire economy, due to the dynamic spillover benefit derived from the growth in the export sector.

This theory could imply that there exists a notion that exports and economic growth exhibit a feedback mechanism relationship (Feder, 1982) indicating that there is a simple concurrent relationship between the two variables. This study would like to explore this relationship in Kenya from the year 1960 to 2014.

1.2 STATEMENT OF THE RESEARCH PROBLEM

Many developing countries have struggled with achieving sustainable growth over the years. The major development outcome is to achieve high levels of growth and the export oriented approach was used to achieve this goal.

Kenya has had a unique set of economic circumstances since 1960 up to date that warrant a study of its own. Emerging economies like the Kenyan economy can be characterized by potentially unique monetary policy and macroeconomic transmission mechanisms that are arguably very different from those of fully developed countries. In effect, the relationship between exports and economic growth in Kenya could take on a different long term relationship, and is therefore essential to examine this relationship to understand the cause and effect channel between the variables.

In Kenya exports are considered critical to economic growth and to the development of the country. Kenya is at a critical stage in its development process where there is continuous expansion of different industries. In order for Kenya to achieve the development and economic growth goals that it has laid out for itself in Vision 2030, a better understanding between the export and economic growth nexus is essential to chart out the optimal trade strategy.

There may be wide disparities in the macro dynamics governing trade policy transmission between developing and developed economies. Therefore, results on the causal effects of trade and exports are country specific. Kenya may not exhibit all the drawbacks that developing economies suffer, but the drawbacks in the economy affect the dependent relationship between exports and economic growth.

Therefore, this study aims to investigate the relationship between exports and economic growth in Kenya by incorporating time series data from 1960 to 2014. The time period will enable the effects of a long term relationship to be evaluated which would serve as a robust indicator for policy recommendations.

1.3 OVERALL RESEARCH OBJECTIVE

The overall objective of this study is to determine the direction of causality between export growth and economic growth.

1.3.1 SUB OBJECTIVES

- To test the properties of the series using univariate analysis
- To estimate and test for causality in a multi-variate framework

1.4 RESEARCH QUESTION

What is the relationship between exports and economic growth in Kenya?

1.5 SIGNIFICANCE OF THE STUDY

1.5.1 ACADEMIC SIGNIFICANCE

The empirical findings will contribute to the knowledge that is available in this field, since the results will indicate the direction of causality of the two series in the Kenyan context. Depending on the findings, a conclusion based on the nature of the relationship can be drawn; either a unidirectional, bi-directional or a concurrent relationship may exist between exports and economic growth in Kenya. The study will capture both periods when Kenya was using the import substitution approach and after when it implemented the export oriented growth. The study will therefore serve as a means to compare the two strategies and which one is most effective.

1.5.2 POLICY SIGNIFICANCE

The results on the causal effect of exports and economic growth aim to evaluate the relationship that exists between the two variables. The findings will be able to be relied upon to act as a foundation for sound economic policy on exports and economic growth, by determining the most adequate policy transmission to improve the variables.

The results of this study will help policy makers improve Kenya's growth potential. By understanding the dynamic relationship between exports and economic growth, policy makers will know which strategies to employ to make the variables less susceptible to economic shocks, depending on how the variables move together. As a result, they would be able to determine the appropriate trade strategy to be employed in Kenya that will result in optimal economic growth.

Kenya hopes to increase its competitiveness both regionally and globally. This study is relevant to policy makers in Kenya in view of the current initiative for structural transformation as documented in Vision 2030. The relationship between exports and economic growth has significant implications for Vision 2030 since economic growth is one of its goals, therefore this study will provided an avenue to knowing how to achieve optimal growth.

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

This literature review is subdivided into theoretical literature and empirical literature so as to have a thematic structure as well as to ease comparison between the sections. The theoretical literature will focus on the broad views on economic growth and trade and the various theoretical underpinnings that are a result of the different theories. The empirical literature is divided into literature from the developed countries, developing countries, from Sub-Saharan Africa and lastly literature from Kenya.

2.2 THEORETICAL LITERATURE

The theoretical literature is driven by two broad schools of thought, the Keynesian view and the Keynesian view on trade. Different scholars have had a preference for either of the two views with regard to trade; there points of view convergence on the support of the export oriented growth strategy.

The literature on international trade which suggests that exports have a positive impact on economic growth is known as the Export Led Growth, a view that is shared by Roll 1953, Feder 1982, Ahmad 1991 and Fosu 1990. A number of reasons have been proposed for explaining the support for the export led growth. The simplest explanation is that as the contribution to growth made by domestic consumption is limited to the size of regional or national markets, sales to foreign markets represents an additional consumption demand which increases the amount of real output provided in the economy (Feder, 1982) Another more elaborated explanation is that exporting is associated with more productive firms (Ahmad, 1991) and thus export-led growth at aggregate level may be the result of both the accumulation of within-firm productivity gains from export participation, or the re-allocation of resources from comparatively less productive non-exports to more productive exporters (Fosu, 1990)

International trade provides a theoretical justification for the relevance of exports in boosting the economy (McCombie, 1999). Roll's stance on foreign trade differs from McCombie's, According to Roll 1953 foreign trade is seen as indispensable engine of economic growth and

prosperity. Profitable trade was considered when there was a positive balance of trade, therefore implying that the most crucial aspect of international trade is exports. Further implying that, if all countries obtained a surplus in international trade then many barriers to the flow of foreign trade and a high level of protections could be achieved by each country. However McCombie believes that such traits would be incompatible with the existence of globalization. The robust theoretical underpinning for international trade lie in the classical theory of competitive advantage. The theory of competitive advantage states that global output will reach its optimum level if every country specializes in the production of the commodity or commodities in which it has comparative cost advantage over others. A view that Grossman 1990 and Ahmad both share with regard to competitive advantage, the underpinnings of their view on competitive advantage promote the concept of the ELG hypothesis. Further support to this theory is given by the dominant model of comparative cost advantage known as the Heckscher-ohlin theory. The Heckscher-ohlin theory implies that returns to labour in poor countries will increase to the levels in rich countries by increasing free trade specialization in production. This increment in factor endowments would tend to bring about factor price equalization that leads to an increase in labour returns. International trade therefore suggests that exports have the ability to mitigate the disparity in the distribution of wealth and income between and within nations.

(Lin 2007) disagrees with the arguments postulated by Grossman and Ahmad. He argues that the trade theory of comparative advantage is a static theory. The model usually starts with given endowment, while development should entail changing endowment. Like other neoclassical theories, growth is not endogenized in the trade model, and hence cannot be explained by trade either. Shifting from being a closed economy to free trade will bring only one-time gain, but no growth effects. So nowhere in the trade theory does it tell us that free trade will deliver higher growth rates. There is a rather ambiguous climbing-the-ladder hypothesis, which claims that the developing countries can keep moving up on the ladder of comparative advantage as they develop, but it does not specify the mechanism through which the moving will take place.

The neoclassical growth model specifies exports as an endogenous variable in the mechanism through which exports impact economic growth. In addition to this theory Grossman and Helpman (1990) proposed a two-nation growth model with technological progress as an endogenous variable. Economic growth is accelerated by exports since they promote technology and knowledge. The introduction of exports as a variable in the production function brings about

econometric problems since the how of it is not unanimously agreed upon. Some econometricians add the export variable as the third variable in the production function while others use different methods. The other approach to study this relationship takes the demand-side perspective. The demand-side approach is called the post-Keynesian analysis.

Traditional Keynesian theory stipulates that one of the factors that can cause an increase in demand is an increase in exports which will in turn increase output (McCombie, 1999). This approach has not been widely used due to the preference for the supply-side rather than the demand-side. Most people believe this because economic growth is stimulated by increases in factor inputs and improvements in economic efficiency. This view is not supported by proponents of the demand-oriented stance that argues that growth in exports is the major stimulant of aggregate economic activity and growth.

(McCombie, 1999) and (Feder, 1982) and others later advocated for the Keynesian model by highlighting certain overlooked features of the model. The pillars supporting this framework was that long-term phenomena such as economic growth could be analyzed better using the Keynesian model. The second feature was that exports are an autonomous component of demand and the role of exports is as important in a closed economy as in an open economy. The last feature highlights the role of the balance of payments as a constraint on economic growth is important. These features are salient representations of the Export-Led growth hypothesis, which will now explore.

The ELG growth hypothesis claims that exports act as an “engine for growth” since it is the main factor if economic growth. Coupled with an increasing amount of capital and labour in the economy, export expansion can lead to economic growth. Efficiency is enhanced by growth in exports due to the fact the exporters compete in an international market and as a result local industries are nurtured because of improvements in technology (Vohra, 2007).

2.3 EMPIRICAL LITERATURE

This section will be structured into developed countries and developing countries studies that have been conducted on the relationship between the exports and economic growth, followed by the Kenyan case literature.

The export-led growth hypothesis was analyzed for Germany and France using co-integration and causality techniques. Co-integration is found for Germany and France in the time period from 1978-2010 after the oil shocks shook various world economies. Furthermore, the causal relationship was found to be unidirectional from export to GDP revealing support to the hypothesis and an outward oriented policy.

The empirical finding of a study examining the association of exports and economic growth in India, Malaysia, Pakistan, Thailand and the Philippines was undertaken by Vohra (2001). Time series data from 1973-1993 was used to estimate two models, one in an export sector only and the other when both export and non-export sectors exist. The variables estimated are labour, capital and exports. No long run relationship between exports and economic growth was detected but in the short run, exports promoted economic growth especially for middle income countries.

Shirazi took a different approach from Vohra, he broadened the approach of the study. Shirazi (2004) used annual data for 1960-2003 for Pakistan to determine the existence of a relationship between exports, economic growth and any long-run equilibrium among real exports, real imports and real GDP using modern time series regression methods of Engle and Granger, Johansen Maximum Likelihood and Granger causality. The findings revealed a unidirectional relationship that runs from exports to output but no correlation between exports and imports. This approach was more explanatory than the approach taken by Vohra since Shirazi examined the economy in its dynamic state by incorporating real export, real imports and real GDP.

Keong, Yusop and Sen (2005) and Al Mamum (2005) both used an industrial production index to serve as a proxy for GDP since during the time period of the study, they both lacked the complete set of GDP data. However the results and methods used were different in the respective

studies. The export output relationship in Bangladesh over the period 1976-2003 was determined using quarterly time series data on industrial production index, exports of goods and services and exports of goods only (Al Mamun and Nath, 2005). The ECM and Engle and Granger procedures are used to test the long run equilibrium between industrial production and exports. No short run relationship existed between industrial production and exports but in the long run exports cause growth. Keong, Yusop and Sen (2005) looked into the export output growth relation in Malaysian time series data over the period 1959-2000. Modern time series analysis techniques of 2-stage least squares, Johansen & Juselius, ECM and Granger causality were used to test any existing long run and short run equilibrium among the variables estimated which were real GDP, real exports, real imports of consumption goods, Gross Fixed Capital Formation, population and exchange rate. All variables other than exchange rate granger caused economic growth hence export led growth was supported in the Malaysian economy.

The studies done by Musonda and Jordaan for Zambia and Namibia had a similar approach whereby more variables were used to serve as mediating factors between the exports and economic growth nexus. Musonda (2007) examined the direction of export output growth hypothesis in Zambia over time series data for 1970-2003. Time series analysis techniques of Johansen & Juselius Maximum Likelihood, ECM and Wald restriction were used to test for long run and short run causality between exports and economic growth. The variables estimated were real GDP, real exports, real imports, real Gross Fixed Capital Formation, skilled and unskilled labour force, real exchange rate, terms of trade and degree of openness. A long run bi-directional causality running from exports to economic growth and economic growth to exports was found. The limitation of the study was the unavailability of labour force data hence the use of population data.

A country study of the causality between exports and economic growth in Namibia was undertaken by Jordaan and Eita (2007) covering 1970-2005. They estimated exports, GDP and GDP per capita and also exports, imports and GDP per capita using Granger causality, Johansen Maximum Likelihood and ECM. It was seen that exports cause GDP and GDP per capita but imports do not cause GDP per capita. They also found that exports, imports and GDP are cointegrated and a bi-directional causality exists between exports and imports.

The initial studies done for Kenya and other African countries lacked a comprehensive methodology to test the causality between the variables. Ukpolo (1994) study was one of such studies which looked at 8 African LDC's namely Kenya, Tanzania, Congo, Morocco, Nigeria, Senegal, Sierra Leone, and Togo over the period 1969-1988. Using time series data for each of the countries, real GDP was regressed on manufactured exports and non-manufactured exports. The findings showed a unidirectional causality running from non-manufactured exports to output.

A recent study for Kenya undertaken by Were and Karingi (2007) tested for short run and long run relationship between exports and GDP growth and between exports and imports using annual time series data for 1980-2000. Other variables included the exchange rate, labour force and a dummy variable signifying the 1985 economic liberalization period in Kenya. The time series techniques used included Autoregressive Distributed Lag (ARDL), Vector Error Correction Model, Granger causality and Wald restriction. They found a long run unidirectional causality running from exports to GDP growth hence export led growth hypothesis was supported and export enhancing policies were recommended for promotion of growth.

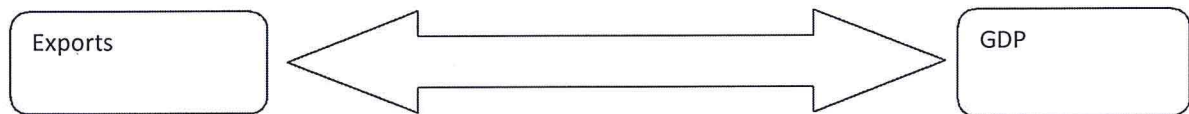
2.4 LITERATURE GAP

The study conducted in Kenya failed to capture the dynamics of more frequent data, the use of a longer time frame and the use of additional variables make the relationship more comprehensive. This study looks to contribute to the trade sector by using a larger time frame from 1960 to 2014 which is a longer time period than previously done. The study will be done at a macro level where the exports used will be aggregate exports changing the focus from specific commodity groups that were previously focused on.

The previous studies that have been carried out between the relationship between exports and economic growth have focused on particular sectors of the economy and their relationship with growth. Little literature exists to explain this relationship with aggregate figures of exports which can lead to lack of comprehensiveness.

2.5 CONCEPTUAL FRAMEWORK

The question of the direction of causality between exports and economic growth which will be measured by GDP, from a theoretical point of view, causality may go in both directions.



Within growth literature an economy that is more outward driven usually has an increasing economic growth. An outward driven economy is usually identified by how much each company is able to export. The structural changes in exports and economic growth are said to exhibit a relationship that is country specific, that either changes in exports cause a change in GDP or the reverse relationship will occur. This is the basis of this research.

2.5 RESEARCH HYPOTHESIS

Null hypothesis: There is a significant causal relationship between exports and economic growth.

Alternative Hypothesis: There is no significant causal relationship between exports and economic growth

3. RESEARCH METHODOLOGY

3.1 INTRODUCTION

To achieve the objective of this study, I will incorporate times series techniques in my methodology. In an attempt to assess the relationship between exports and economic growth, the research will first undertake univariate time series techniques followed by multivariate time series techniques. The univariate time series techniques will involve testing for a unit root and thereafter testing for causality between the series. The multivariate time series techniques will incorporate other variables that will serve as mediating variables between exports and economic growth.

3.2 RESEARCH DESIGN

This study is exploratory in nature since it aims to evaluate the relationship between the variables so as to offer a comprehensive understanding of the situation. The exploratory design is selected on the basis that the result of this study ideally should produce explanations to the dynamics as they manifest in the economy. Therefore, through the study of the relationship between exports and economic growth, the results will be able to inform future trade strategies in the Kenyan context.

3.3 SOURCES OF DATA

The data to be used will be primary data due to the nature of the research. The data will include, annual GDP rates, aggregate exports and openness to trade. I will obtain the data from the International Monetary Fund website as well as the Central Bank Website. The sample period is from 1960 to 2014 which will enable me to achieve my objectives to examine the variables long term relationship.

3.4 UNIVARIATE TIME SERIES ANALYSIS

The objective of univariate time series analysis is to find the dynamic dependence of X_t that is the dependence of X_t on its past values (X_{t-1}, X_{t-2}, \dots). In this case the X_t variable will be exports and Y_t will be economic growth. This study aims to establish how the individual variables behave with relation to their past values so as to know how best to proceed from the results. We would need to examine whether the variables are stationary for each individual time series. Most macro-economic data are non-stationary; they tend to exhibit a deterministic and/or stochastic trend, exports and economic growth should ideally be non-stationary, however it is important to check. Therefore, it is recommended that a stationarity (unit root) test be carried out to test for the order of integration. A series is said to be stationary if the mean and variance are time-invariant (Gujarati, 2003). A non-stationary time series will have a time dependent mean which makes the standard assumptions for asymptotic analysis in the causality test will not be valid. Therefore, to test for stationarity we would use a unit root test.

3.4.1 UNIT ROOT TEST

The basic objective of the unit root test is to determine the null hypothesis that $\phi = 1$ in:

$$Y_t = \phi Y_{t-1} + \mu_t$$

Against the one sided alternative $\phi < 1$. Thus the hypothesis of interest are:

H_0 : Series contains a unit root

H_1 : Series is stationary

To test for a unit root in each series, we use the Augmented Dickey Fuller test. The ADF test is estimated by the following regression;

$$\Delta Y_t = a_0 + Z_t + a_1 Y_{t-1} + \dots + \sum_{i=1}^p a_i \Delta Y_{t-i} + \varepsilon_t$$

Where; a_0 is a constant

t is a deterministic trend and enough lagged difference are included to ensure that the error term becomes white noise. If the autoregressive representation of Y_t contains a unit root,

the t-ratio for a_1 should be consistent with the hypothesis $a_1 = 0$. The unit root test will be carried out separately on each variable: exports and economic growth.

3.5 MULTI-VARIATE TIME SERIES ANALYSIS

Multivariate time series analysis is used when one wants to model and explain the interactions and co-movements among a group of time series variables. The multivariate time series analysis incorporated in this study will be a co-integration test as well as causality under multi-variate framework.

3.5.1 COINTEGRATION TEST

Time series data can be non-stationary but 'move together' over time because there exists some influences on the series which imply that the two series are bound by some relationship in the long run. A cointegrating relationship may also be seen as a long term or equilibrium phenomenon, since it is possible that cointegrating variables may deviate from their relationship in the short run but their association would return in the long run (Gujarati, 2003). In this context a common trend between the export and economic growth variables means that in the long run, the behaviour of the common trend will drive the behaviour of the two variables and that there exists some convergence of policies.

A cointegrating relationship would imply that the underlying transmission mechanism would mean that the Export-led hypothesis is stable and thus more predictable over long periods. Furthermore, the long run trend will be observed since the shocks that are unique to one time series will quickly dissipate as the variables adjust back to their common trend. (Gujarati, 2003)

The concept of Granger causality implies precedence whereby a cause cannot come after its effect. More precisely, variable X is said to Granger-cause another variable, Y, if the current value of Y (y_t) is conditional on the past values of X ($x_{t-1}, x_{t-2}, x_{t-3}, \dots, x_0$) and thus the history of X is likely to help predict Y. (Gujarati, 2003). This study aims to investigate the direction of causality between the variables; either exports will Granger cause economic growth or vice-versa.

The long run equilibrium relationship between the variables will be investigated by employing the maximum-likelihood test procedure established by Johansen and Juselius (1990) and Johansen (1991) Specifically, Y_t is a vector of n stochastic variables, then there exists a k -lag vector auto regression with Gaussian errors of the following form:

$$\Delta Y_t = \alpha + \Gamma_1 \Delta Y_{t-1} + \dots + \Gamma_{k-1} \Delta Y_{t-k} + \Pi Y_{t-1} + Z_t$$

Where $\Gamma_1, \dots, \Gamma_{k-1}$ and Π are co-efficient matrices, Z_t is a vector of white noise process and α contains all deterministic elements. The focal point of conducting Johansen's cointegration test is to determine the rank (r) of the $p \times p$ A matrix. There are three possible ranks in the application. A full rank would imply that the variables are given by a stationary process which would contradict the earlier finding that the two variables are non-stationary. The rank of A can be zero which indicates that export growth and economic growth have no long run relationship. In instances when A is of either full rank or zero rank, an appropriate estimate to the model in either levels or first differences respectively (Gujarati, 2003). The last rank is a case where $0 < r < p$ which is a reduced rank. The reduced rank expresses there are r cointegrating relations among the elements of Y_t and $p-r$ common stochastic trends. The number of lags used in the vector autoregression is chosen on the evidence provided by Akaike's Information Criterion.

The trace test and the maximum eigen value are likelihood ratio test statistics complement the cointegration procedure. These tests aid in determining which of the three possibilities is supported by the data. I will carry out both test to observe the sensitivity of the results to different tests. The null hypothesis for the trace statistic maximum eigen value is that there are at most r cointegrating vectors whereas the alternative hypothesis that there at least $(r+1)$ cointegrating vectors.

3.6 VECM FRAMEWORK

Causality inferences in the multi-variate framework are made by estimating the parameters of the following VECM equations.

$$Gdp = \alpha + \sum_{j=1}^n \gamma_j Exp_{t-j} + \sum_{k=1}^0 \delta Open + \theta Z_{t-1} + \varepsilon_t$$

Where Gpd and Exp denote GDP and export respectively, openness to trade defined as (Exports + imports)/ GDP and z_{t-1} is the error correction term which is the lagged residual series of the cointegrating vector. The error correction term measures the deviations of the series from the long run equilibrium relation. Thus, the VECM representation allows us to differentiate between the short- and long-run dynamic relationships.

This study intends to conduct the empirical analysis using annual observations of GDP, imports and exports, where Y represents the variable being used either GDP, exports or imports. The openness variable acts as a mediating variable between the relationship between economic growth and exports. The openness variable was motivated by existing literature as being an important determinant of economic growth.

3.7 VECTOR AUTOREGRESSIVE MODELS

The VAR model has proven to be especially useful for describing the dynamic behaviour of economic and financial time series and for forecasting. It often provides superior forecasts to those from univariate time series models and elaborate theory-based simultaneous equations models. The VAR model is also used for structural inference and policy analysis. In structural analysis, certain assumptions about the causal structure of the data under investigation are imposed, and the resulting causal impacts of unexpected shocks or innovations to specified variables on the variables in the model are summarized. These causal impacts are usually summarized with impulse response functions and forecast error variance decompositions.

The section that follows constitutes of Granger Causality, hypothesis testing impulse response and variance decomposition.

Granger Causality Test

The standard Granger causality test (Gujarati, 2003) seeks to determine whether past values of a variable helps to predict changes in another variable. The definition states that in the conditional distribution, lagged values of Y_t add no information to explanation of movements of X_t beyond that provided by lagged values of X_t itself (Gujarati, 2003)

We should take note of the fact that the Granger causality technique measures the information given by one variable in explaining the latest value of another variable. In addition, it also says that variable Y is Granger caused by variable X if variable X assists in predicting the value of variable Y . If this is the case, it means that the lagged values of variable X are statistically significant in explaining variable Y .

Impulse responses and variance decomposition

An examination of causality will suggest which of the variables in the model have statistically significant impacts on the future values of each of the variables in the system. But will not, by construction, be able to explain the sign of the relationship or how long these effects require to take place. That is, the results will not reveal whether changes in the value of a given variable have a positive or negative effect on other variables in the system, or how long it would take for the effect of that variable to work through the system. Such information will, however, be given by an examination of the VAR's impulse responses and variance decompositions (Gujarati, 2003)

Impulse responses trace out the responsiveness of the dependent variables in the VAR to shocks to each of the variables. So, for each variable from each equation separately, a unit shock is applied to the error, and the effects upon the VAR system over time are noted (Gujarati, 2003)

CHAPTER 4: FINDINGS OF THE STUDY

Introduction

The data analysis involved a preference for the use of logarithms since they reduce the fluctuations of the data. I based my results on a 5% level of significance throughout the analysis to either accept or reject the particular hypothesis.

This section is sub-divided into two sections, where section I involves understanding the univariate characteristics of the data and section II involves evaluating the multivariate characteristics of the time series data.

Section I: Univariate Characteristics

Unit Root Test

Unit root tests, test for stationary in a series. The two main variables in this research were subjected to the unit root test; these variables were total GDP and Total exports.

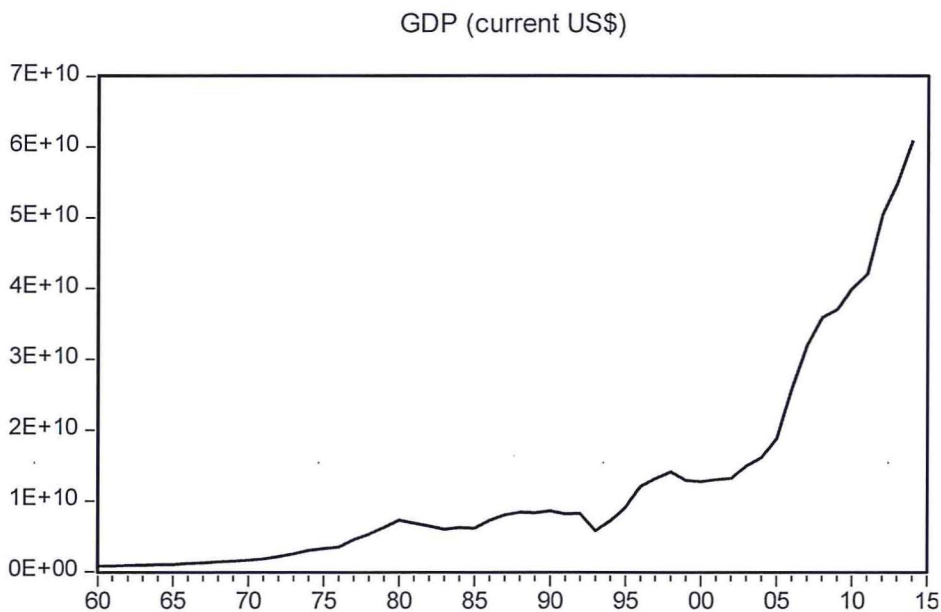


Figure 1, Graph of GDP

The figure above shows GDP growth in Kenya. The graph aids in determining how to proceed with the stationarity test. The graph shows that GDP has a trend and therefore the stationarity test will have a constant and linear trend. The general conclusion from the graph is that the GDP is growing however the graph does not have a constant mean and constant variance therefore implying that the data is non-stationary.

The unit root test is conducted below with the use of the Augmented Dickey Fuller:

Null Hypothesis: LGDP has a unit root		
Exogenous: Constant		
Lag Length: 1 (Automatic - based on SIC, maxlag=10)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.415400	0.8987
Test critical values:	1% level	-3.560019
	5% level	-2.917650
	10% level	-2.596689
*MacKinnon (1996) one-sided p-values.		

Figure 2: Unit root test for GDP

At 5% level, the P-value for the test was 89.87%, therefore the null hypothesis for the presence of a unit root cannot be rejected, the series is non-stationary. To confirm this we use the Phillips Perron test to augment the results from the ADF test, as shown below;

Null Hypothesis: LGDP has a unit root		
Exogenous: Constant		
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel		
	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-0.034314	0.9509
Test critical values:	1% level	-3.557472
	5% level	-2.916566
	10% level	-2.596116
*MacKinnon (1996) one-sided p-values.		
Residual variance (no correction)		0.011673
HAC corrected variance (Bartlett kernel)		0.011673

Figure 3: PP Test for GDP

The Phillips Perron test confirmed the results of the ADF Test at a significance level of 5% the GDP series is non-stationary, the null hypothesis of the presence of a unit root problem is

rejected. Differencing the series would make total GDP stationary depending on the order of integration of the series.

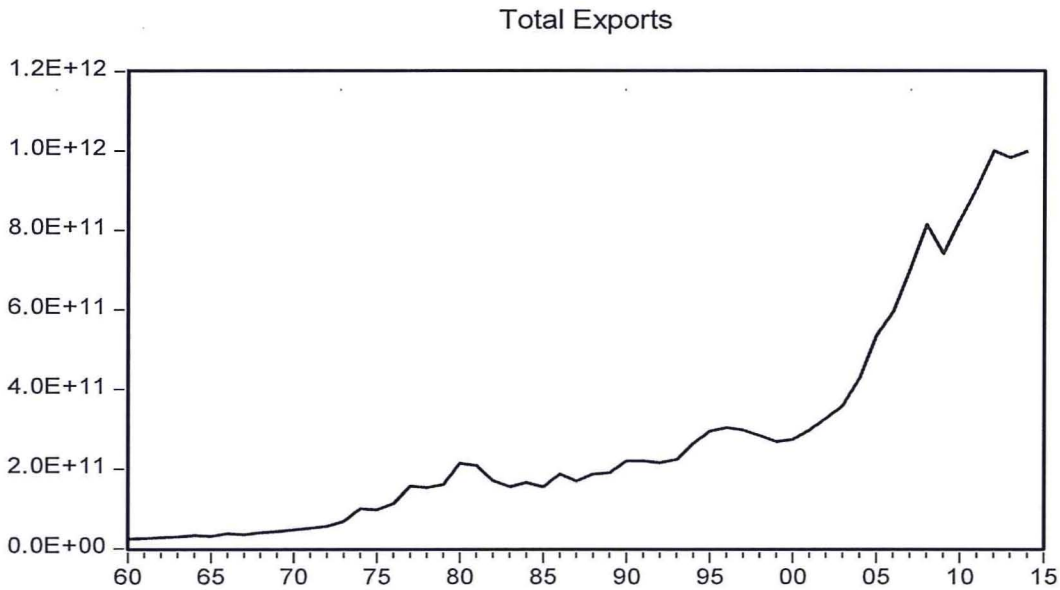


Figure 4: Graph of Total exports

The graph of Total Exports shows that the graph exhibits a general upward trend which implies that the data can be tested for stationarity with a trend. The Augmented Dickey Fuller test can therefore be conducted with a trend and the result are below:

Null Hypothesis: LTOTALEXPORTS has a unit root		
Exogenous: Constant, Linear Trend		
Lag Length: 0 (Automatic - based on SIC, maxlag=10)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.725885	0.7260
Test critical values:	1% level	-4.137279
	5% level	-3.495295
	10% level	-3.176618
*MacKinnon (1996) one-sided p-values.		

Figure 5: ADF test for exports

The total exports have the presence of a unit root thereby failing to reject the null hypothesis at a

5% significance level. To guarantee robustness of the test, the results are complimented by the use of the Phillip's Perron test whose results are as follows:

Null Hypothesis: LTOTALEXPORTS has a unit root		
Exogenous: Constant, Linear Trend		
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel		
	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-1.994542	0.5910
Test critical values:	1% level	-4.137279
	5% level	-3.495295
	10% level	-3.176618
*MacKinnon (1996) one-sided p-values.		
Residual variance (no correction)		0.011347
HAC corrected variance (Bartlett kernel)		0.015852

Figure 6: Phillips Perron test for exports

The results from the Phillip's Perron test confirmed the existence of a unit root in the total exports series. The results from the ADF and the PP test for unit roots show that total GDP and total exports are non-stationary and must be differenced once to become stationary and as a result we can conclude that both exports and GDP are subject to erratic fluctuations in each series since they both lack a time invariant mean and variance. The results are consistent with theory that macroeconomic variables are usually non-stationary. In (Vohra 2001) find that in 5 developing countries both variables were found to be non-stationary when they carried out a unit root test by use of either Augmented Dickey Fuller or by use of the Phillip's Perron test. The results of this study are consistent with other studies done on the same subject.

Non-stationarity implies that the shocks in the system are persistent through time, which further implies that strong policy action is required to correct or to reduce this problem. From a policy perspective, the GDP and exports variables would require strong policy action to curb the shocks to the series.

To check the integrated order of the data, Augmented Dickey Fuller provides further results that show the number of times that the data needs to be differenced to make it stationary. The output

of the test is shown as follows:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP_CURRENT_US\$_(-1))	-0.493292	0.126574	-3.897272	0.0003
C	-5.98E+08	4.37E+08	-1.366643	0.1779
@TREND("1960")	43385051	15945926	2.720761	0.0089

Figure 7: GDP at first difference

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOTAL_EXPORTS(-1))	-0.885313	0.141351	-6.263204	0.0000
C	-7.95E+09	9.84E+09	-0.807128	0.4234
@TREND("1960")	8.66E+08	3.37E+08	2.564949	0.0134

Figure 8:Exports at first difference

The tables above show that both GDP and exports are I(1) based on a significance level of 5% where the presence of a unit root problem is rejected. The variables therefore need to be difference once to make the variables stationary.

Section II: Multivariate Characteristics

Co-integration

Time series data can be non-stationary but 'move together' over time because there exists some influences on the series which imply that the two series are bound by some relationship in the long run such a relationship is called a co-integrating relationship.

The long run equilibrium can only be tested with variables that are non-stationary; that is variables that have a higher integrated order than zero. Both variables are I(1) as shown in the uni-variate section of the data analysis which allows us to adequately evaluate the co-integration relationship between exports and economic growth. If the variables are co-integrated it would imply that there exists a long run equilibrium relationship between the variables where the variables will merge to become stationary despite the individual properties of non-stationarity.

Engle-Granger Test for Co-integration

The Engle-Granger Test is based on running a regression on the variables tested for co-integration, taking one of the variables to be the dependent variable which is total exports in this case and the other to be the independent variable which is GDP. The results for the test are as shown below:

Dependent Variable: LGDP				
Method: Least Squares				
Date: 11/07/15 Time: 15:47				
Sample (adjusted): 1960 2014				
Included observations: 55 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTOTALEXPORTS	1.118922	0.017698	63.22475	0.0000
C	-6.349708	0.458229	-13.85706	0.0000

Figure 9: Least squares estimation

The null and the alternative hypothesis are as follows:

H_0 = unit root in co-integrating regression's residuals

H_1 = residuals from co-integrating regression are stationary

At a 5% significance level, the null hypothesis is rejected because the P-value is 0 which implies that there is no unit root in the co-integrating regression's residuals. However the disadvantage of this method is that it had low power in finite samples, and therefore we would need to use a more robust test like the Johansen test for co-integration. The results for the test are below:

Johansen Co-integration test

Date: 11/07/15 Time: 15:54				
Sample (adjusted): 1962 2014				
Included observations: 53 after adjustments				
Trend assumption: Linear deterministic trend				
Series: LTOTALEXPORTS LGDP				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.192011	11.94737	15.49471	0.1595
At most 1	0.012141	0.647414	3.841466	0.4210
Trace test indicates no cointegration at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Figure 10: Johansen Co-integration test

At a 5% significance level, the P-value is 0.15 which implies that we should fail to reject the first instance that says that there is no co-integrating relationship between the variables. In the second instance where there is at most 1 co-integrating relationship we also accept the null since the P-value is 0.42. We can therefore conclude that there exists a long run equilibrium relationship between exports and economic growth in Kenya. Further implying that from a policy point of view, it is important not to implement policies that are not contrasting since the variables have a long run relationship and contrasting policies would be counterproductive in the long run.

Smith 2001 studies a long run equilibrium relationship between GDP and exports in Brazil, Mexico and Argentina. He conducts this test by the use of the Johansen tests for cointegration which provides similar results as in the context of this study. Another study done by Keong et al show that there was a long run relationship between exports and GDP in Korea, Philippines and Malaysia.

Shirazi 2004 carried out a cointegration test on GDP and exports in Pakistan and the result was that there is no long run equilibrium between the variables. He used similar methods and the result was different, therefore implying that the results on the long run equilibrium are country specific, and the variable react differently in different macroeconomic environments and conditions.

VAR Analysis

VAR analysis is used to compliment the co-integration tests because VAR models add onto understanding the relationship by providing short term information. In this section we will look at a Vector error correction model, Granger causality and impulse response.

Vector Error Correction Model

The results of the Vector error correction model are as follows, I included a mediating variable called openness in the model.

Vector Error Correction Estimates			
Date: 11/07/15 Time: 18:57			
Sample (adjusted): 1963 2014			
Included observations: 52 after adjustments			
Standard errors in () & t-statistics in []			
Cointegrating Eq:		CointEq1	
LGDP(-1)		1.000000	
LTOTALEXPORTS(-1)		-1.011890 (0.03738) [-27.0717]	
LOPENNESS(-1)		3.120686 (0.49525) [6.30122]	
C		-9.105870	
Error Correction:		D(LGDP)	D(LTOTALEXP D(LOPENNESS ORTS))
CointEq1		0.254080 (0.11671) [2.17704]	-0.061843 (0.13831) [-0.44712]
D(LGDP(-1))		0.021866	-0.286993 (0.09521) [-3.01439]
			-0.252229 -0.330664

	(0.31059)	(0.36808)	(0.25337)
	[0.07040]	[-0.68525]	[-1.30506]
D(LGDP(-2))	0.225872	0.184075	-0.324063
	(0.28681)	(0.33990)	(0.23397)
	[0.78754]	[0.54156]	[-1.38507]
D(LTOTALEXPORTS(-1))	0.195562	0.338265	0.403929
	(0.30409)	(0.36038)	(0.24807)
	[0.64310]	[0.93863]	[1.62828]
D(LTOTALEXPORTS(-2))	-0.167825	-0.071089	0.305311
	(0.30226)	(0.35821)	(0.24658)
	[-0.55523]	[-0.19846]	[1.23820]
D(LOPENNESS(-1))	-0.207114	-0.267885	-0.337109
	(0.38944)	(0.46153)	(0.31769)
	[-0.53183]	[-0.58043]	[-1.06112]
D(LOPENNESS(-2))	0.203542	0.182145	-0.330472
	(0.33909)	(0.40185)	(0.27662)
	[0.60027]	[0.45326]	[-1.19469]
C	0.059964	0.055578	-0.003655
	(0.02143)	(0.02540)	(0.01748)
	[2.79771]	[2.18806]	[-0.20902]
R-squared	0.289672	0.042542	0.430024
Adj. R-squared	0.176665	-0.109781	0.339346
Sum sq. resid	0.443268	0.622560	0.294988
S.E. equation	0.100371	0.118950	0.081880
F-statistic	2.563315	0.279287	4.742322
Log likelihood	50.10061	41.26933	60.68884
Akaike AIC	-1.619254	-1.279590	-2.026494
Schwarz SC	-1.319063	-0.979398	-1.726302
Mean dependent	0.081755	0.068877	-0.004081
S.D. dependent	0.110616	0.112913	0.100737
Determinant resid covariance (dof adj.)		1.59E-07	
Determinant resid covariance		9.66E-08	
Log likelihood		198.6263	
Akaike information criterion		-6.601011	
Schwarz criterion		-5.587865	

Figure 11: Vector error correction model

Granger Causality Test

Pairwise Granger Causality Tests			
Sample: 1960 2015			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
LOPENNESS does not Granger Cause LGDP	53	5.84823	0.0053
LGDP does not Granger Cause LOPENNESS		2.35439	0.1058
LTOTALEXPORTS does not Granger Cause LGDP	53	3.91033	0.0267
LGDP does not Granger Cause LTOTALEXPORTS		0.07849	0.9246
LTOTALEXPORTS does not Granger Cause LOPENNESS	53	2.24942	0.1165
LOPENNESS does not Granger Cause LTOTALEXPORTS		0.42061	0.6590

Figure 12: Granger causality test

The null hypothesis for “no Granger Causality” should be rejected in the case of GDP and openness, as well as in the case of exports and openness. These variables do not Granger Cause the mentioned variables. However openness Granger causes GDP, and exports Granger causes GDP which means that there exists short run equilibrium between these variables. From a policy perspective, these variables can be used to influence the complementing variable through policy in the Kenyan context. The direction of causality is uni-directional since it is a one way direction of causality.

The empirical relationship between GDP and exports was investigated by Smith 2001 for three countries; Brazil, Mexico and Argentina. Using a VECM model they examined the empirical relationship between exports and GDP, and investigated how the dynamics between them have changed when they included variables such as money supply (M_2) and investment.

Their findings suggested these countries could use different policy channels to alter the variables depending on the direction of causality. The causality is unidirectional running from exports to GDP in Mexico. However there is a bi-directional causality between investment and GDP in Brazil. Further from the results. In addition, there is unidirectional causality running from: exports to GDP, exports to investment, exports to money supply in Argentina.

Hypothesis testing

This involves imposing different restrictions on the β co-efficient of particular variables. I tested the significance of the variable openness and imposed a zero restriction on the variable. The result of the restriction is the following:

Vector Error Correction Estimates	
Sample (adjusted): 1963 2014	
Included observations: 52 after adjustments	
Standard errors in () & t-statistics in []	
Cointegration Restrictions:	
B(1,1)=1, B(1,2)=0	
Convergence achieved after 6 iterations.	
Restrictions identify all cointegrating vectors	
LR test for binding restrictions (rank = 1):	
Chi-square(1)	3.833873
Probability	0.050227

Figure 13: testing restrictions

The test results show that the p-value is 0.05 and so the restrictions are not supported by the data. The cointegrating vector is unique and in terms the long run relationship; openness is a significant variable in explaining the relationship between exports and economic growth in Kenya.

Impulse Response

Impulse responses trace out the response of current and future values of each of the variables to a unit increase in the current value of one of the VAR errors, assuming that this error returns to zero in subsequent periods and that all other errors are equal to zero. More generally, an impulse refers to the reaction of any dynamic system in response to some external changes. Taking the already established Granger Causality, it is subjected to impulse response test and presents the following output:

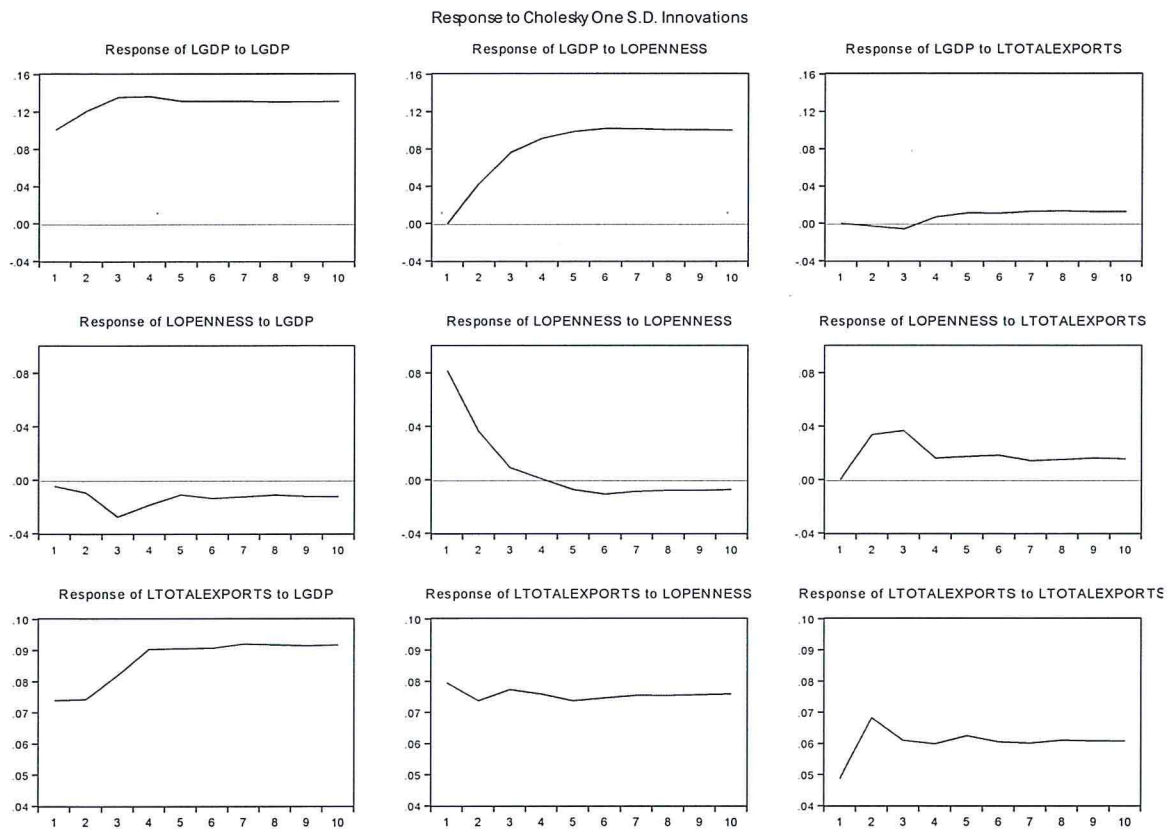


Figure 14: Impulse response

The impulse response results show that:

- i. A one standard deviation shock to GDP results in a positive change in GDP whose magnitude increases from period 2-4 but dies out thereafter.
- ii. A one standard deviation shock to openness results in a negative change in GDP from period 1-3 but which increases but remains negative from period 3-5 after which the shock dies out.
- iii. A one standard deviation shock to exports results in a positive change in GDP whose magnitude increases from period 1-4 and then dies out.

Ukpolo 1994 carried out the same test for Nigeria over a 50 year period; the relationship between the variables was bi-directional, between oil exports and GDP growth. The conclusion was of a positive impulse response of oil exports to changes in GDP with the difference being

that there was an equal relationship between GDP and exports. A one standard deviation shock to GDP resulted in a positive change in oil exports for the first five periods then the shock died out.

The results are not supported by theoretical expectations because the theoretical expectations are country specific study. Therefore each country's macroeconomic conditions will dictate how the shocks to the system will respond; there is no general rule to the expectations of this relationship.

Variance Decomposition

In the final analysis, I did a variance decomposition to determine the contribution of each variable in the model to the deviation in GDP.

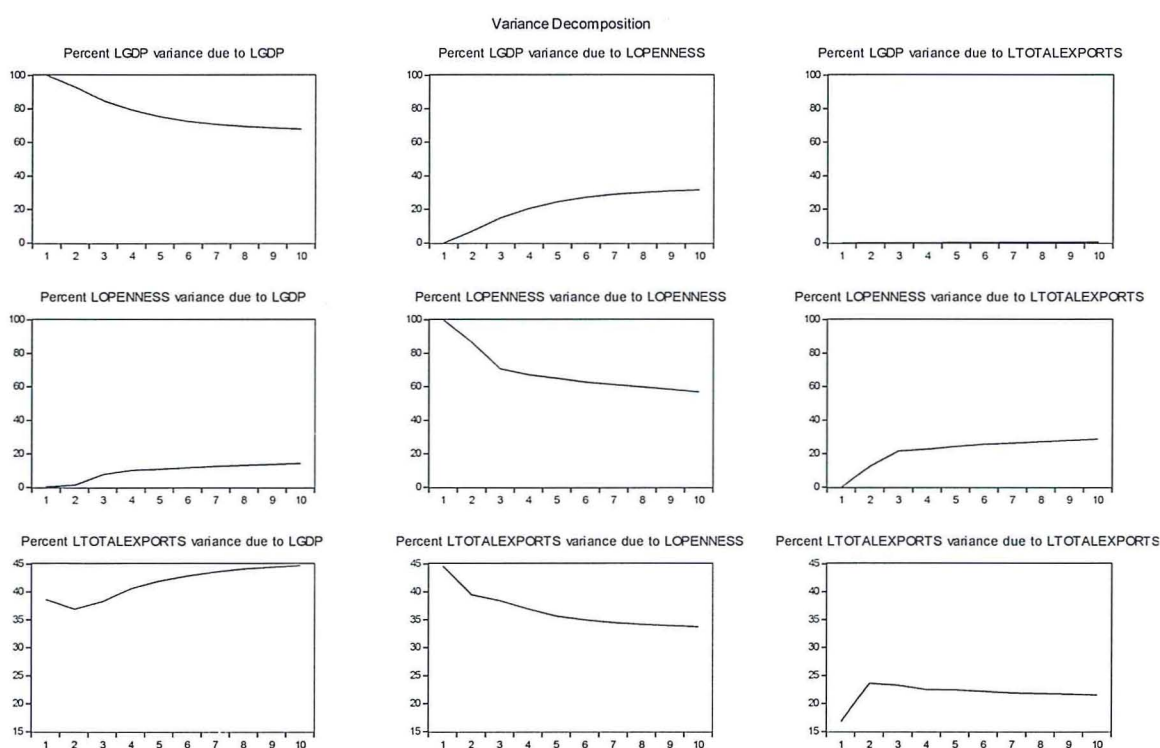


Figure 15: Variance Decomposition

The variance decomposition results indicate that:

- i. GDP explains the highest proportion of the deviation in itself, with the value of explained deviation decreasing overtime.
- ii. Exports explain the largest deviation in openness, with the value of explained deviation explained decreasing overtime, while the deviation in exports due to GDP increases from period 2-10.
- iii. The deviation in GDP due to openness increases from period 1-10, throughout the period under study
- iv. The deviation in GDP due to exports is negligible for the whole time period

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

The main objective of the paper was to evaluate the existence of a relationship between economic growth and exports in Kenya. The sub-objectives constituted of univariate and multivariate characteristics of the variables.

The first hypothesis to be tested was on the stationarity of exports and GDP which was used as a proxy for economic growth. The results showed that both variables were non-stationary and needed to be differenced once to become stationary.

The second hypothesis evaluated was on the multivariate characteristics of the data. The results of these tests showed that the variables have a long run equilibrium relationship by use of the Johansen test. The VAR models of Granger Causality and impulse Responses were used to evaluate the short run relationship between the variables. For the Granger Causality test, openness to trade Granger caused GDP and exports also Granger caused GDP. The variable of openness was restricted to zero and I found that it was an important variable to include in the model.

These results are similar to the findings of Grace Muhoro, who drew a conclusion of no relationship between exports and economic growth in Kenya. The difference between the two studies was mainly methodological and the time period under study. The study by Grace Muhoro took on an Auto-regressive Distributed lag model and a 2-least squares method, she found that exports granger cause exports.

The final conclusion is on the existence of a unidirectional relationship between exports and GDP where exports Granger Cause economic growth.

Policy Recommendations

This paper has shown that exports and GDP are non-stationary in Kenya. As a result, any time the policy makers intend to formulate policies to target the variables, they should be aware that the shocks to these two variables tend to persist for long periods of time and therefore strong policy action is required to resolve any issues associated with the variables.

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