EXPORT LED GROWTH HYPOTHESIS:

EVIDENCE FROM KENYAN DATA

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DECLARATION

I declare this is my original work and it has not been presented for an academic award or any other kind of award in any other institution. Secondary sources used in the research paper have been given due acknowledgement.

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DEDICATION

This study is dedicated to my dear parents Mr. James Muhoro Wahome and Mrs. Faith Waitherero Muhoro for their huge sacrifice in educating and showing me the discipline and value of education. They are my inspiration, guiding stars and are precious gifts from the Almighty God. Thank you for your relentless encouragement, understanding, love and prayers during this period of study.

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ACRONYMS AND ABBREVIATIONS

ADF	Augmented Dickey Fuller
ARDL	Autoregressive Distributed Lag
AGOA	African Growth and Opportunity Act 2000
BLUE	Best Linear Unbiased Estimators
COMESA	Common Market for Eastern and Southern Africa
EAC	East African Community
ECM	Error Correction Model
ELG	Export Led Growth
ELGH	Export Led Growth Hypothesis
EPC	Export Promotion Council
EPPO	Export Promotion Programmes Office
EPZ	Export Processing Zones
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GNP	Gross National Product
HOS	Hecksher-Ohlin-Samuelson
IMF	International Monetary Fund
ISI	Import Substitution Industrialization
KETA	Kenya Export Trade Authority
KIPPRA	Kenya Institute for Public Policy Research and Analysis

LDC	Least Developed Country
MUB	Manufacturing Under Bond
NAFTA	North America Free Trade Area
OLS	Ordinary Least Squares
PP	Philips Perron
SAP	Structural Adjustment Programmes
USA	United States of America
VAR	Vector Auto Regression
VAT	Value Added Tax
VECM	Vector Error Correction Mechanism
WTO	World Trade Organisation

ABSTRACT

The Export-Led Growth Hypothesis (ELGH) postulates that export growth is one of the key determinants of economic growth. This paper aims to investigate the Export-Led Growth Hypothesis in Kenya using annual time series data from 1976 to 2011 and dynamic time series techniques of Vector Error Correction Model, Auto Regressive Distributed Lag and 2-Stage Least Squares. The 2-Stage Least Squares is used to correct for the endogeneity problem of the variables involved. A seven-variable Vector Auto Regression (VAR) model (GDP, Exports, Imports, Household Consumption, Government Consumption, Gross Fixed Capital Formation and Foreign Direct Investment) is developed from a national income identity that links output to its contributing factors. The results indicate that there is unidirectional causality running from exports to economic growth. This implies that export-led growth hypothesis can be supported in the Kenyan economy in the short run. Besides, our results suggest that the growth rate of household consumption and Gross Fixed Capital Formation have positive and statistically significant impacts on economic growth. Hence, in the case of Kenya, export enhancing policies that will improve the quantity, quality and value of exports in the overall GDP contribution of exports are recommended in promoting and sustaining economic growth.

CHAPTER ONE

INTRODUCTION

1.1 Background

Economic growth is a major concern for many countries in the world. In both developing and developed nations, they are keen to achieving and sustaining high-level growth rates of their output through use of different economic policies. Increasing a country's output has the potential of attracting resources that are needed to drive other economic activities like investments in key sectors hence uplift the people's living standards. One such strategy that a country can explore is increasing its exports. However, past investigations on the potential of exports to increase the growth of output have produced varied results raising several important questions: Do exports contribute positively to growth of output? Are there other factors that have a statistically significant impact on growth of output? And does Kenyan data support the export led growth hypothesis?

Studies on the role of exports as a major driver of economic growth can be traced many decades ago. The traditional rationale for the gains of trade is derived from comparative advantage that suggests a country that frees up its borders can be certain on the rewards of trading with other countries. The Ricardian model explains the welfare gains from trade that a country can enjoy if it specializes in producing goods whose opportunity cost of production is lower at home than in another country. This is what he termed as comparative advantage. The Hecksher-Ohlin-Samuelson (H-O-S) model illustrates the welfare gains in a 2-country, 2-factor, 2 goods model where each country specializes on the basis of their factor endowments. Goods that require more of a country's abundant factors of production and less of scarce factors are exported and traded in with commodities that need much of the scarce production factors and less of the abundant factors within the country.

Export activities fuel growth in a number of ways including economies of scale on account of larger international markets for goods, production and demand linkages, increased efficiency and productivity because of specialization, generating employment opportunities within various sectors and industries, learning effects and development of human capital and embracing advanced technologies embodied in foreign capital goods (Basu et al, 2000) and (Were et al, 2002).

In previous studies, the augmented production function with real output dependent on labour, capital, exports and non-export industrial production was used to demonstrate that growth of exports advanced economic growth of a country (Olugbenga and Oluwole, 1998). If export growth was found to have a positive relationship with growth of real output, it signified that export oriented policies enhance economic growth.

The neoclassical economists explanation of the high rapid growth rates achieved by the East Asia countries from the 1960's points to suitable macro-economic environments that promoted domestic markets and enabled orientation towards international trade. The governments of the 4 Asian Tigers namely Hong Kong, Taiwan, South Korea and Singapore adopted free-market policies and incentives that favoured production of exports (World bank, 1993).

There is also the alternative view that the success of Taiwan and South Korea had little to do with export orientation and free market economies but more with investment and targeted government intervention which created growth and spurred exports. Dani Rodrik, (1994) reasons that a sharp increase in investment stimulated by the governments of both countries through investment subsidies, tax incentives, trade barriers, administrative guidance, co-ordination of both public and private enterprise investments and subsidised credit allocation shifted comparative advantage in the right direction since most of the investment went into

exportables. He argues that in both countries the basic export incentives necessary for export growth were in place in earlier years before the export boom hence the incentives alone were not sufficient for export growth.

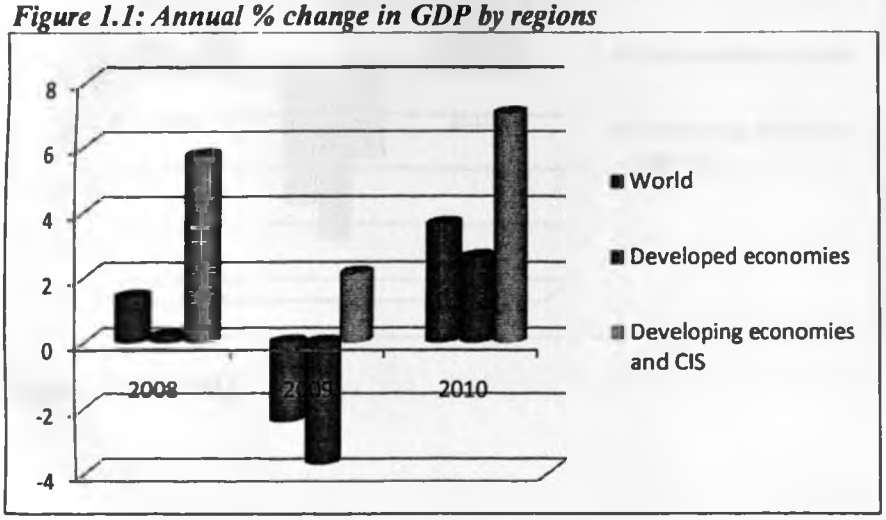
Martin and Masson, (2001) reaffirms that from recent years cross-country growth disparities, the majority of the countries pursuing economic growth fruitfully have engaged more in international trade than others. These countries have seen soaring levels of economic growth within the framework of rapid expansion of exports.

1.2 Recent Trends in World Economic Growth and Trade

This section compares growth of output to trade volume trends. In some instances world economic growth rises with increasing exports while in others exports rise with a dismal growth in output. This implies there are other conditions necessary for export-growth nexus.

Figure 1.1 shows that in 2010, World GDP grew by 3.6% after a 2.4% unforeseen reduction in 2009 following the financial crisis. Developed economies output in 2010 rose by 2.6% after a 3.7% drop in 2009 as developing economies and Commonwealth of Independent States recorded 7.0% output growth from 2.1% registered in 2009.

Figure 1.1: Annual % change in GDP by regions

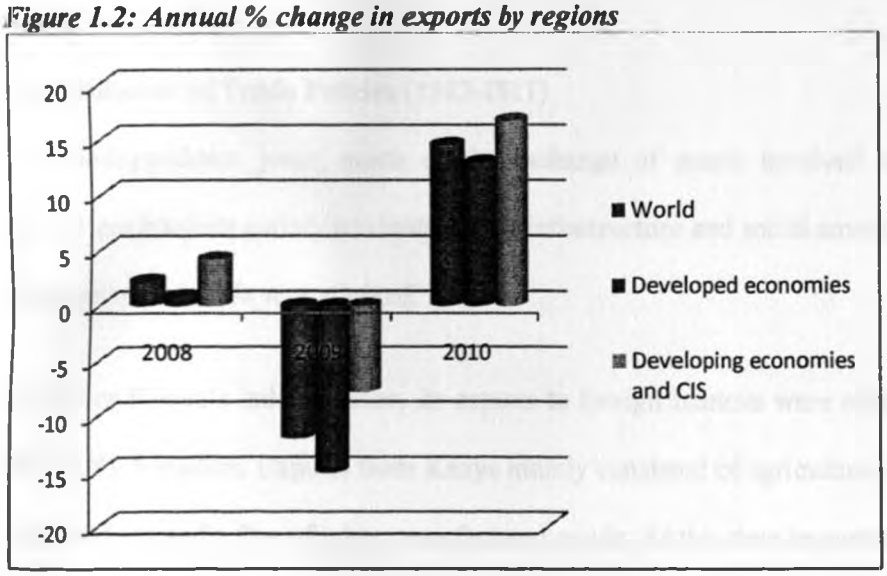


Source: WTO 2011

In the year 2010, Asia's GDP growth of 8.8% was the highest compared to other developing regions with China's increase of 10.3% and India's 9.7%. The Asia region also recorded 23.1% export growth with China's and Japan's export volumes growing by a huge 28% Brazil's 7.5% strong recovery also steered a dynamic growth of 5.8% in South and Central America. Nonetheless, the highest average rate of GDP growth of 4.7% between 2005 and 2010 was realised in Africa (WTO, 2011).

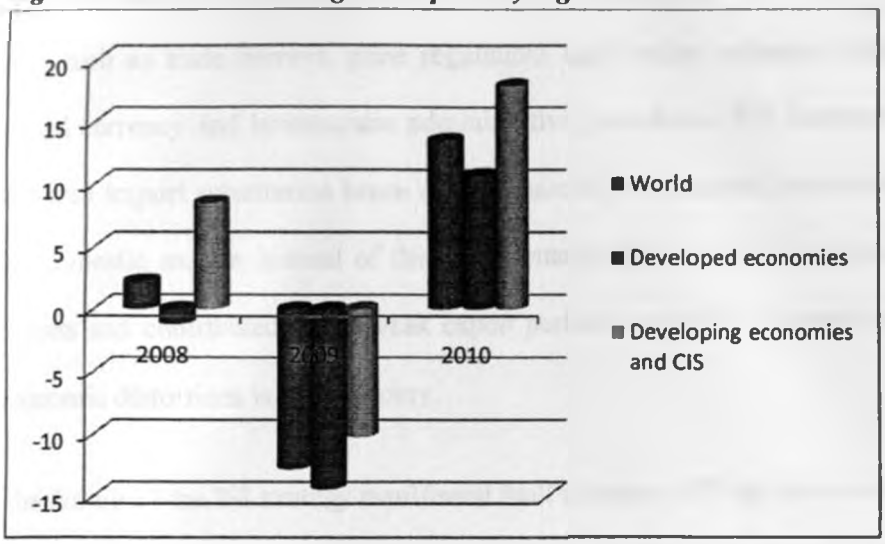
On the other hand in 2010, the world export of goods rose 14.5% while imports increased by 13.5% as illustrated in Figure 1.2 and 1.3. Developed economies registered export growth of 12.9% in 2010 while developing economies and Commonwealth Independent States realised an impressive 16.7% growth. Imports of developed countries rose 10.7% in 2010 in contrast to a 12.9% increase in exports while developing countries and other transitional economies realised an import growth of 17.9% and an export growth of 16.7%.

Figure 1.2: Annual % change in exports by regions



Source: WTO 2011

Figure 1.3: Annual % change in imports by regions



Source: WTO 2011

1.3 The Evolution of Trade Policies and Economic Growth in Kenya

It is vital to detail the evolution of trade policies pursued in Kenya since independence in order to appreciate their impact on Kenya's exports and consequent effects on economic growth.

1.3.1 Evolution of Trade Policies (1963-2011)

In pre-independence years, much of the exchange of goods involved barter trade. The colonial government mainly concentrated on infrastructure and social amenities development and international trade was minimal.

Just before Kenya's independence, its exports to foreign markets were relatively low at less than K£ 81.5 million. Exports from Kenya mainly consisted of agricultural products namely coffee and tea and a few of other manufactured goods. At this time imports exceeded exports hence creating a deficit in the current account (Economic Survey, 1964).

At independence, the Government of Kenya embraced the Import Substitution Industrialisation Strategy (ISI) which was to enable the country attain economic

independence (Were et al, 2002). The inherent features of the policy were high protection rates such as trade barriers, price regulations and foreign exchange restrictions, an over-valued currency and bureaucratic administrative procedures. The incentive framework also favoured import substitution hence a large share of the industrial production was directed to the domestic market instead of the export market because of the returns. This depressed exports and contributed to the weak export performance of the industrial sector and macro-economic distortions in the economy.

The failure of the ISI strategy manifested itself after the 1973 oil crisis and the disintegration of the EAC in 1977 which had a negative effect on the performance of import-substitution economy. The government realised the need for an industrial policy that is export-oriented in the late 1970's and by early 1980's it had began to accept liberalization and adopted an outward-looking strategy, a major move from import-substitution to export-promotion strategy (Were et al, 2002).

The flat repayment export compensation scheme instituted in 1976 was ineffective as it only benefited traders who exported merchandise in large volumes. In an effort to increase manufactured exports, various export promotion schemes which were more effective were introduced in the late1980's. One such scheme is the Manufacturing Under Bond (MUB) initiated in 1988 that allowed customs authorities to waive import duties on imported inputs used in production of export goods.

In 1990, other major developments that followed included a duty and Value Added Tax (VAT) import exemption following the abolition of the sales tax and Export Processing Zones (EPZ). Duty/VAT import exemption was mainly for companies that had export contracts and past export performance while EPZ aimed at attracting new industries that would produce goods mainly for exports (Economic Survey, Various editions). The EPZs

expanded largely through African Growth and Opportunity Act 2000 (AGOA) which increased exports in the textile and garments industry.

As EPZ and MUB progressed over the years, their contribution to exports was found to be minimal with only 1% of total exports in 1993-1998. The import duty exemption had boosted 35% of total exports (Glenday and Ndii, 2000). Kenya's export dropped from 8% to 2% of GDP between 1988 and 1993 which coincided with a further decline in real wages and a sharp depreciation of the Kenya shilling. As an immediate remedy, trade licensing and foreign exchange allocations were eradicated to try and save the situation.

Currently, to effectively compete with other nations in the world market, various export promotion programmes have been initiated. This includes the Green Channel and the Export Guarantee and Credit Scheme. Other incentive schemes for export promotion included the re-establishment of institutions such as Kenya Export Trade Authority (KETA), Export Promotion Council (EPC) and the Export Promotion Programmes Office (EPPO) for tax refunds on imported inputs for production of exports.

Kenya's main export markets currently include the EAC, COMESA, the European Union and United States of America due to African Growth and Opportunity Act 2000 (AGOA) framework. The major export countries in 2004 were Uganda, UK, Tanzania, Netherlands and Pakistan with 17.29%, 10.45%, 8.36%, 7.97% and 5.3% of total exports respectively (Ramesh and Boaz 2007). In 2006, Kenya exported tea, coffee, fish, horticultural products, petroleum products and cement valued at 3.4 billion US dollars. The major markets for Kenyan exports were Uganda with 15.9% of total exports followed by the United Kingdom at 10.3%, the USA at 8.2% of total exports and lastly Netherlands, Tanzania and Pakistan consumed 7.9%, 7.7% and 4.9% respectively (Workman, 2008)

1.3.2 Evolution of Kenya's Economic Growth

The Kenyan Gross Domestic Product growth has been erratic over the years. In the period 1964-1972, GDP increased by an average of 6.6% p.a. However, from 1974, economic growth decelerated with an average annual growth rate of 5.2% in 1974-1979, 4.0% over the period 1980-1989 and 2.3% during the period 1990-2000 (Republic of Kenya, 2001). This decline in performance can be attributed to poor macro-economic policies in the 1970s and 1980's for example, price controls, exchange rate controls and import substitution policies rather than export promoting strategies. This combined with poor governance made Kenya unattractive for both foreign and domestic investment. In the early 1980's while there was an attempt to initiate policy changes through the Structural Adjustment Programmes (SAP's) pushed by the IMF and World Bank, the government's poor commitment to reforms, continued poor governance as well as high corruption levels hampered its success causing the continuation of low economic growth rates in Kenya. However the Kenyan economy started to recover with growth rate of 1.2%, 1.8%, 5.1 %, 5.8%, 6.4% and 7.1% consecutively in 2001-2002, 2003, 2004, 2005, 2006 and 2007 respectively.

The Kenya Vision 2030 for the period 2008 to 2030 aims to transform Kenya into a new industrialised middle-income country providing high quality standards of living to all its citizens by the year 2030 (Kenya Vision 2030, 2007). The vision is founded on economic, social and political pillars as the main drivers of attainment of this goal. The economic pillar aims at attaining an average GDP growth rate of 10% every year from 2012 and exports is a means of stirring the economic growth rate of Kenya.

Various trade reforms in Kenya evidence the importance attached to trade. There has been substantial evolution in Kenya's trade reform since the attainment of independence in 1963, moving from import substitution in the colonial era to an export-oriented economy. The

ELGH policies of the East Asian countries which realised high rates of economic growth on the basis of rapidly increasing exports is partly the reason why Kenya decided to adopt these trade policies (Ramesh and Boaz 2007).

1.4 Statement of the Problem

Contribution of exports to economic growth has remained an important debate overtime. Most arguments have centred on exports as a main source of growth. To investigate this, many studies have been conducted to validate the export led growth proposition in an attempt to provide policy recommendations geared towards enhancing growth of exports and subsequently economic growth of countries. Despite having numerous studies on this subject, no definite conclusive evidence has yet been reached on the causality: Does export growth lead to economic growth or does economic growth lead to export growth? The mixed results could be attributed to among other factors: different characteristics for various countries and their experiences, different variables used, different econometric analysis methods and different time frames applied in various studies.

This study builds on these to come up with a time frame that encompasses export promotion strategies executed in Kenya and adopts a simple but a comprehensive methodology on the analysis of contribution of exports to economic growth with the aid of modern time series analytical techniques. By doing this, it is expected that the study output will be relied upon and offer a solution to developed study gaps and thereby form a solid foundation for sound economic policies on exports and economic growth.

1.5 Objective of the Study

The broad objective of this research is to investigate the ELGH for Kenya by examining the export data over the sample period.

1.5.1 Specific Objectives of the Study

Specifically the study seeks to:

1. Examine the contribution of exports to economic growth in Kenya
2. Determine the direction of causality between exports and economic growth
3. Make appropriate policy recommendations based on the results of the study

1.6 Organization of the Study

The rest of this research paper is organized as follows: Chapter 2 reviews the relevant theoretical and empirical literature in the export growth literature; the methodology, data type and sources used is presented in Chapter 3 while Chapter 4 presents the empirical results and discussion of the findings. Finally, Chapter 5 concludes and offers some policy recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews ELGH literature beginning with theoretical literature that examines the various trade theories and hypothesis. This is followed by the empirical literature mainly for the developed, emerging and developing countries before focusing on Kenyan studies.

2.2 Theoretical Literature

Arguments for trade were advocated by Mercantilism during the sixteenth to eighteenth century and later by the classical economists- Adam Smith, David Ricardo, Torrens, James Mill and John Stuart Mill.

According to mercantilism, a country prospered or became rich by exporting more and importing less. They recommended that imports be restricted and exports be promoted so as to accumulate precious metals of silver and gold hence increase growth and wealth in the country. In order to encourage exports and make them competitive in the international market, they advocated for reduction in taxes, low wages and interest rates of a country.

However the mercantilist ideas were contested by Adam Smith arguing that the wealth of a nation would be increased through increasing productive capacity in an environment where people are free to pursue self interest. This was the advent of Absolute Advantage Theory. A nation has absolute advantage over the other if it uses lesser amount of factors of production to produce one unit of a commodity than the other country. He applied his ideas to specialization and exchange between countries and demonstrated that countries could gain by trading if they have differences in absolute advantage.

David Ricardo did not object Smith's analysis but demonstrated that countries can gain from trade even if one of them is more productive than others in all lines of production so long as one country is not equally less productive in all lines of production. This is what he called Comparative Advantage Theory. Each country has a comparative advantage over its trading partner in the production of a good if the opportunity cost of producing that good is lower at home than in the other country. The gains from trade may be explained by comparing the terms of trade in a closed economy and terms of trade in an open economy.

Heckscher and Ohlin of the H-O-S theory explain the reason why countries have different opportunity costs of producing goods. The source of comparative advantage is the difference in factor endowments between countries and this causes trade between trading partners. The factor endowment is measured in terms of factor prices and in terms of the physical amount of the factors. The argument of the model is that production of export goods that utilize intensively its factors of production that are plentiful and importation of goods that intensively uses scarce factor of production induces more growth.

Demand for exports has a vital role in economic growth as shown by Kaldor's Export-Led Growth model. He asserts that the level and rate of output growth depends on the level and the rate of exports growth. He denotes the dependency of output on exports using the foreign trade multiplier $Y=\frac{1}{m}X$ where (Y) the level of output is the multiple of (X) the exogenous level of exports and (m) the reciprocal of the propensity to import (Antonella Palumbo, 2003). In a state of balanced trade, a rise in the level of exports increases the output level through the Keynesian multiplier creating a trade surplus. The increase in output attracts more net investment subsequently growing more output and consumption. In the long run foreign trade becomes newly balanced at a higher level of productivity.

Countries participate in international trade because of differences in factor endowments, technology, production lines and patterns. Bernard and Jensen (1995) undertook a study to establish the role of exporters in the US manufacturing sector at the plant or firm level. Using large cross-sectional data on manufacturing plants they focused on differences at industry level to determine their importance in terms of volume of exports, employment and wages. The results showed that the exporters are important in productivity, creation of employment, absorption of international modern technology and thus boosts productivity and output growth. Exporters also pay higher wages. They also found that plants that export exhibit more growth specifically exporting firms benefit from learning, competition, economies of scale and exposure to ideas, foreign customers and markets. They however demonstrated that exports are a result of successful firm performance but not a measure of future success in productivity growth.

In sectors that produce conventional goods with little learning and technology, free trade may make countries specialize based on their comparative advantages which may reduce long run growth. This is the infant industry argument, the basis of import substituting policy that hurt growth in Africa (Bigsten, 2002). The high levels of tariff and protection have lead to inefficiency and corruption. The long term impact of trade reforms towards export oriented activities is capital formation, foreign investment and economic growth. However it concluded that other aspects of the economy have to be considered before opening up.

Manufacturing sector is important for African economic growth. Inter-country differences in institutional framework and business climate generates comparative advantage mostly felt in manufacturing sector which relies on logistics, regulation and infrastructure that may hinder a firm from supplying goods for export competitively (Bigsten and Söderbom, 2010). A policy framework supporting export production by the manufacturing firms through tax exemptions,

subsidies and EPZ may improve their competitiveness and growth hence generate employment, technological progress and reduce vulnerability to weather shocks. They however concluded that African manufacturing firms may not have comparative advantage because of poor economic conditions and even when comparative advantage is present economies may not be able to shift because of low investment.

2.3 Empirical Literature

In study of 41 countries, Michaely (1977) used time series data for 1950-1973 on GNP per capita growth and growth of export share. Spearman's rank correlation was used to test the relationship between exports and GNP per capita growth and the results agreed with the export promotion hypothesis. The study's drawback is that it explained economic growth in terms of export expansion alone hence omitting important variables that could have influenced the GNP growth.

The results of a study done by Balassa (1978) on 11 developing nations from 1960-1966 and 1967-1973 revealed export growth promoted GNP growth. OLS and Spearman correlation test was applied on real GNP growth, real exports growth, labour force, domestic investment and foreign investment as a share of output. The study's short coming is the use of simple OLS regression and rank correlation on cross-sectional data which do not provide an insight into the direction of causality hence the results could be misleading.

In a study conducted in Nigeria by Fajana (1979), the findings supported export led growth hypothesis in Nigeria. Time series for the period 1954-1974 on real GDP growth, real exports as a share of real GDP and foreign capital were estimated using OLS.

The results for time series data covering 1950-1981 for 37 LDC'S obtained by Jung and Marshall (1985) did not support the export led economic growth in 33 countries except in

Egypt, Costa Rica, Indonesia and Ecuador. They used OLS and Granger causality test to estimate real GDP or real GNP, real exports growth, lagged GNP and lagged GDP growth.

Ram (1987) set out to examine the causal relationship between real exports growth and real GDP growth for Fiji. He did a cross-country study of 88 developing countries including Fiji. The model estimated included real GDP, real exports, labour force and Gross Domestic Investment share for cross-sectional data for the period 1960-1972 and 1973-1982. Fiji together with 38 other countries supported the export economic growth hypothesis. However the reliability of results from OLS regression has been questioned since it cannot clearly explain the direction of causality.

A cross-sectional study of 28 African developing countries was done by Fosu (1990) for two time periods 1960-1970 as well as 1970-1980. The production function together with the OLS estimated real GDP on merchandise exports, labour and Gross Domestic Investment. Exports had a positive and significant effect on economic growth in all the countries studied hence export led growth hypothesis was supported.

Additionally, Ukpolo (1994) did a study of 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.

The existence of cointegration and causality from exports to growth in the cases of Israel and Turkey was found using Engle Granger cointegration and causality tests based on Error Correction Model for the period 1953-1991 in a study done by Dutt and Ghosh (1994).

Reizman et al (1995) investigated the export-led growth hypothesis for 126 countries from 1950-1990 by estimating bivariate, trivariate and 5-variable models. The variables included are real GDP, real exports, real imports, primary school enrolment and investment as a share of output. In the estimation of the bivariate model, exports growth Granger cause real GDP growth in 65 countries. However the results of the trivariate model that included imports supported the ELG hypothesis in only 30 countries while in 25 other countries GDP growth Granger cause exports. The limitation of the study is the unavailability of annual data on primary school enrolment hence it had to be estimated for most years in most countries since the data was only available after every 5 years.

Country studies like that for Costa Rica conducted by Smith (2001) using modern time series econometric techniques such as Engle and Granger 2 step procedure, Johansen Maximum Likelihood and ECM ascertained that exports had a positive and significant effect on economic growth in Costa Rica for the period 1950-1997. The study estimated an augmented Cobb-Douglas production function that included exports of goods and services hence incorporated a broad measure of externalities and productivity gains generated by this sector which stimulated the domestic economy. Population, Gross Domestic Investment and Gross Fixed Capital Formation were also found to determine economic growth for Costa Rica.

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.

Another Pakistan study is that by Shirazi (2004) for annual data for 1960-2003 to determine the existence of export 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.

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 exists between industrial production and exports but in the long run exports cause growth. The limitation of this study is the unavailability of quarterly GDP data hence the use of industrial production index.

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.

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, 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 is 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.

A study for Kenya undertaken by Ramesh and Boaz (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 1970-2004. 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.

A further study of Kenya on exports and economic growth was done by Ngumi (2009) on times series data for 1970-2007. The study concentrated on assessing the impact of manufactured exports on economic growth in Kenya vis-à-vis other exports. He estimated time series data on manufactured exports, non-manufactured exports, imports and terms of trade using Engle and Granger, Granger causality and ECM. He found that manufactured

exports do not Granger cause GDP growth but a unidirectional relationship runs from GDP to exports and a bi-directional causality exists between manufactured exports and other exports. A unidirectional relationship was also found from imports to GDP, manufactured exports and other exports. There was no causality between terms of trade and GDP.

2.4 Overview of Literature

Although the relationship between exports and economic growth is an important one, the direction of causality between the variables is still inconclusive. There are forceful arguments to suggest that exports drive growth but similarly forceful arguments suggesting that growth leads to exports. Different studies in different countries have varying conclusions. Some have found exports to cause growth while some have found economic growth to cause exports.

Past studies had a number of shortcomings such as reliance on rank correlation and simple OLS to test for ELG hypothesis which do not provide an insight into the direction of causality. A positive correlation between exports and economic growth using simple or multiple OLS was considered a confirmation of ELG hypothesis in studies such as Michaely (1977), Balassa (1978) and Fajana (1979). However a positive correlation can be equally compatible with causality from exports to growth, growth to exports or a bi-directional causality between exports and economic growth. Other studies such as Musonda (2007) ignored the endogenous association of variables in the model hence the results may have been biased and the conclusions there from may not have been valid.

Export Led Growth Hypothesis has been tested for Kenya in cross-country studies such as Ukpolo (1994) and studies specific to Kenya such as Ramesh and Boaz (2007) and Ngumi (2009). In contrast to these studies, this study contributes to literature on relationship between exports and economic growth in the following ways:

1. Including consumption, investment and FDI in the model specification to capture possible linkages between real output and domestic demand, physical capital accumulation, technology, foreign exchange inflows and external economies.
2. Adopting dynamic time series analysis such as Two Stage Least Squares to deal with the endogenous relationships of variables under study.

CHAPTER THREE

METHODOLOGY OF THE STUDY

3.1 Introduction

This chapter presents the theoretical framework of the model adopted for the study, the empirical model established, definitions and measurement of the variables, data types and sources.

3.2 Theoretical Framework

The study adopts its framework from a simple national income identity and links it to the study variables. The framework uses an accounting identity that linked output of a nation to the contributing factors.

$$Y = C + I + G + X - M \quad \text{...} (i)$$

Where:

Y = Output level taken as GDP in the study

C = Private Consumption and Government Consumption expenditures

I = Private and Public Investments

G = Government spending

X = Exports

M =Imports

The application of the above function to study variables requires equation (*i*) rewritten to (*ii*)

$$Y = \sum_{i=0}^{n} V + \varepsilon \quad \text{...} (ii)$$

Where:

Y = Output level taken as GDP in the study

V = Vector of factors that affect growth of output estimated in the model

ε = error term represents other factors not included in the model

i = 0, 1,..., n indicates the number of independent variables used in the model

To capture the contribution of independent variables to growth of output, we differentiated equation (ii) with respect to the regressors to obtain the equation below:

$$\dot{Y} = \sum_{i=0}^{n} V^{\cdot} + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. (iii)$$

Since V is a vector of independent variables, equation *(iv)* represents the contribution of various variables to growth.

$$Y_t = \beta_0 + \beta_i V_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (iv)$$

Where: $i = 1, 2, 3, 4, \ldots, n$ represents the number of variables in the vector V

The constant term (β_0) captures the output that does not depend on the factors under consideration in the study. (β_i) represents the individual contribution of factors to growth of output.

3.3 The Empirical Model under Estimation

The empirical model is specified as follows:

$$GDP = f\left(\overset{+}{EXP}, \overset{-}{IMP}, \overset{+}{HC}, \overset{+}{GC}, \overset{+}{INV}, \overset{+}{FDI}, \varepsilon\right) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (i)$$

Where:

GDP = Real Gross Domestic Product in constant prices

EXP = Real exports in constant prices

IMP = Real imports in constant prices

HC = Real household consumption expenditure in constant prices

GC = Real government consumption expenditure in constant prices

INV = Real Investment measured by Gross Fixed Capital Formation in constant prices

FDI = Foreign Direct Investment in constant prices

ε = error term captures other factors that explain real GDP not included in the model

The model estimated was defined explicitly as follows:

$$GDP_t = \beta_0 + \beta_1 EXP_t + \beta_2 IMP_t + \beta_3 HC_t + \beta_4 GC_t + \beta_5 INV_t + \beta_6 FDI_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots (ii)$$

The variables are as defined in (i) above.

3.4 Definition of the Variables and the Expected Signs

Table 1: Definition of Variables, Measurement and Expected Signs

Variables	Definition and Measurement	Expected Sign
GDP_t	Real GDP for each year t in constant prices. It is the value of goods and services produced in Kenya.	$\beta_0 > 0$
EXP_t	Real exports for each year t in constant prices. It is the value of exported goods and services.	$\beta_1 > 0$
IMP_t	Real imports for each year t in constant prices. It is the value of imported goods and services.	$\beta_2 < 0$
HC_t	Real household consumption for each year t in constant prices. It includes expenditure on food and beverages, clothing and footwear, housing (rent) and consumption in other goods and services.	$\beta_3 > 0$
GC_t	Real government consumption for each year t in constant prices. It includes expenditure on compensation of employees and use of goods and services such as fuel, water, electricity.	$\beta_4 > 0$
INV_t	Real investment for each year t in constant prices. It is proxied by Gross Fixed Capital Formation which includes the value of buildings and structures, transport equipment, other machinery and equipment, cultivated assets and intangible assets.	$\beta_5 > 0$
FDI_t	Real FDI for each year t in constant prices. It is the value of net inflows into Kenya.	$\beta_6 > 0$

3.5 Data Type and Sources

The study used annual time series data for the period 1976 to 2011. The data was extracted from the Economic Surveys published by the Kenya National Bureau of Statistics.

The data was analyzed by use of EViews Statistical software. The time series data collected was organised and examined for cleanup purpose including identifying any outliers. This entailed examination of the descriptive statistics. *Table 2* gives summary of the descriptive statistics of the data used in the study.

The unit roots of the time series variables were tested through use of the Augmented Dickey Fuller (ADF) test and Philip Perron (PP) test. This determined whether time series are stationary I (0) or non-stationary I (1) and their order of integration. This is to eliminate spurious regressions and erroneous inferences. The variables were found to be non-stationary and differencing was applied on the time series for stationarity to be achieved. The results are

shown in *Table 3* and the trend in Appendix 2. The study employed Granger causality test to determine the direction of causality and then cointegration test was carried out using Johansen Maximum Likelihood procedure that determined the long run equilibrium of the variables. The results are shown in *Table 4, 5 and 6.*

3.6 Descriptive Statistics

Table 2: Definition of Variables, Source and Descriptive Statistics

Variables	Definition in Ksh. Million (Constant prices 2001=100)	Source	Mean	Median	Std. Dev	Min	Max
LGDP	Real GDP	KNBS	565602.6	367146.0	518767.7	29072.0	1539306.0
LEXP	Real exports	KNBS	149784.4	141571.5	135079.9	9434.0	427123.0
LIMP	Real imports	KNBS	201007.3	127299.5	203642.0	9232.0	695931.0
LHC	Real Household consumption	KNBS	427216.1	230336.0	415604.8	17909.0	1206210.0
LGC	Real Government consumption	KNBS	87640.81	54513.0	76704.03	5076.0	238447.0
LINV	Real investment	KNBS	93848.33	16440.50	124749.8	5809.0	403457.0
LFDI	Real FDI	KNBS	4110.94	638.0	9508.41	7.0	49078.0

From the table, the average Real GDP is Ksh.565, 602 million with the minimum being Ksh.29, 072 million while the maximum is Ksh.1, 539,306 million. The standard deviation was equally high at Ksh.518, 767 million. Indeed looking at the dispersion, GDP has grown by 53 times from Ksh.29, 072 million in 1976 to Ksh.1, 539,306 million in 2011.

On average, the Real exports are valued at Ksh.149, 784 million with a standard deviation of Ksh.135, 079 million. The minimum is Ksh.9, 434 million while the maximum is Ksh.427, 123 million. The value of real export of goods and services has grown by 45 times.

On the other hand, the mean Real imports are worth Ksh.201, 007 million (standard deviation of Ksh.203, 642 million) with the lowest and highest value of imports recorded being Ksh.9, 232 million and Ksh.695, 931 million respectively. In a typical year, the share of imports is larger than that of exports and has grown by 75 times from its lowest of Ksh.9, 232 million.

The Real Household Consumption averages Ksh.427, 216 million while that of Real Government Consumption is smaller at Ksh.87, 640 million. The minimum consumption values are at Ksh.17, 909 million and Ksh.5, 076 million respectively while the maximum consumption values are at Ksh.1, 206, 210 million and Ksh.238, 447 million. The standard deviation at Ksh.415, 604 million for Household Consumption is very high compared to Ksh.76, 704 million for Government Consumption.

Real investment computed from Gross Fixed Capital Formation averages at Ksh.93, 848 million annually. The minimum investment is at Ksh.5, 809 million while maximum investment recorded is Ksh.403, 457 million. The standard deviation is relatively high at Ksh.124, 749 million and investment has grown by 70 times. On the other hand, Foreign Direct Investment averages at Ksh.4, 110 million (standard deviation of Ksh.9, 508 million) with a low of Ksh.7 million and a high of Ksh.49, 078 million reported.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

In this chapter, the empirical results are analysed and presented. The methods and the findings in line with our a priori expectations and similar findings in this area of study are also discussed.

4.2 Testing for Unit Root

Table 3: Augmented Dickey Fuller (ADF) and Phillips Perron (PP) Tests

Variables	ADF		PP		Conclusion
	Levels	First Difference	Levels	First Difference	
LGDP	0.955697	-4.67319***	0.662524	-4.78535***	LGDP is I(1)
LEXP	-1.046	-6.07493***	-1.1747	-6.06159***	LEXP is I (1)
LIMP	-1.623	-6.09211***	-1.6409	-6.11739***	LIMP is I (1)
LHC	0.645781	-5.37407***	0.324481	-5.5012***	LHC is I (1)
LGC	-0.27478	-4.21861**	-0.77157	-4.27254***	LGC is I (1)
LINV	-1.97847	-5.97763***	-1.96968	-6.30681***	LINV is I (1)
LFDI	-5.1844***	-5.15632***	-5.1844***	-24.5061***	LFDI is I(0)

*, (**), [***] denote significance at 10%, (5) % and [1] % level respectively

Source: Own computation

The ADF test provides the tau statistics which are then compared with the critical values namely -4.25 (1% level), -3.54 (at 5% level) and -3.21 (at 10% level) to make inferences on the univariate characteristics of our variables. The PP test provides test statistics that confirmed the ADF tests. The PP tests statistics are compared with the critical values which are -4.25 (at 1 % level), -3.55 (at 5% level) and -3.21(at 10% level).

From the ADF and the PP test for unit roots, real GDP, real exports, real imports, government consumption, household consumption and investment are non-stationary and must be differenced once to become stationary and therefore integrated of order 1. FDI on the other hand is stationary at both levels and first difference in the two tests.

4.3 Testing for Granger Causality

Table 4: VAR Granger Causality Test

Dependent variable: LGDP				Dependent variable: LEXP			
Excluded	Chi-sq	df	Prob.	Excluded	Chi-sq	df	Prob.
LEXP	0.039759	1	0.8420	LGDP	0.936948	1	0.3331
LIMP	1.242101	1	0.2651	LIMP	2.511913	1	0.1130
LHC	0.782454	1	0.3764	LHC	5.359546	1	0.0206
LGC	1.596553	1	0.2064	LGC	8.862184	1	0.0029
LINV	16.00305	1	0.0001	LINV	6.944593	1	0.0084
LFDI	0.011734	1	0.9137	LFDI	0.001647	1	0.9676
All	32.30217	6	0.0000	All	19.92326	6	0.0029
Dependent variable: LIMP				Dependent variable: LHC			
Excluded	Chi-sq	df	Prob.	Excluded	Chi-sq	df	Prob.
LGDP	0.847630	1	0.3572	LGDP	0.665733	1	0.4145
LEXP	0.416856	1	0.5185	LEXP	0.594833	1	0.4406
LHC	1.267581	1	0.2602	LIMP	0.004662	1	0.9456
LGC	4.198951	1	0.0404	LGC	0.540273	1	0.4623
LINV	1.466168	1	0.2260	LINV	4.590786	1	0.0321
LFDI	0.624486	1	0.4294	LFDI	0.189690	1	0.6632
All	18.92772	6	0.0043	All	32.66802	6	0.0000
Dependent variable: LGC				Dependent variable: LINV			
Excluded	Chi-sq	df	Prob.	Excluded	Chi-sq	df	Prob.
LGDP	2.445046	1	0.1179	LGDP	0.900325	1	0.3427
LEXP	0.979806	1	0.3222	LEXP	0.193736	1	0.6598
LIMP	0.226115	1	0.6344	LIMP	0.037011	1	0.8474
LHC	0.891942	1	0.3450	LHC	0.120931	1	0.7280
LINV	21.78147	1	0.0000	LGC	1.159096	1	0.2817
LFDI	0.165594	1	0.6841	LFDI	0.683762	1	0.4083
All	41.76295	6	0.0000	All	6.127239	6	0.4091
Dependent variable: LFDI							
Excluded	Chi-sq	df	Prob.				
LGDP	0.308476	1	0.5786				
LEXP	0.087187	1	0.7678				
LIMP	1.292677	1	0.2556				
LHC	0.104844	1	0.7461				
LGC	0.000201	1	0.9887				
LINV	2.088666	1	0.1484				
All	19.64552	6	0.0032				

Source: Own computation

Granger causality test helps us identify the causal linkages between the variables. It specifies the null hypothesis that the independent variables granger cause the dependent variable against the alternative they do not granger cause. The decision is on whether or not to reject the null hypothesis based on the t statistics or the p- values. In this study we reject the null hypothesis that the independent variables granger cause the dependent variable if the p-value is smaller than 5 percent ($p< 0.05$).

From Table 4, the null hypothesis that exports granger cause GDP will be accepted while GDP does not granger cause exports. The causality is unidirectional running from exports to GDP. Imports do not granger cause GDP while GDP granger causes imports. In this case there is unidirectional causality running from GDP to imports. However there is a bi-directional causality between household consumption and GDP. Further from the results, there is unidirectional causality running from government consumption and FDI to GDP. Investment does not granger cause GDP but GDP granger causes investment. This means there is unidirectional causality running from GDP to investment.

In addition, there is unidirectional causality running from: exports to imports, exports to household consumption, exports to government consumption and exports to investment. However there is a bi-directional causality between exports and FDI.

4.4 Testing for Cointegration and Vector Error Correction Model (VECM)

A Vector Auto Regression (VAR) model is a multi-equation time series model that considers a number of inter-related variables. The key feature of VAR is that there is no a priori distinction between endogenous and exogenous variables. The advantage of using VAR is the fact that we need to understand the causal linkages between our variables in the model. If all the variables in our model are stationary I (0), we estimate the standard VAR and interpret the results through the impulse response and the variance decomposition. If however, non-

stationarity I (1) exists as is the case with most economic variables, we build a Vector Error Correction Mechanism (Johansen Procedure).

However the structural VAR is not identified and an analyst must place additional restrictions on the system in order to obtain results. In addition, obtaining the correct lag-length that yields white noise residuals and does not result into too much loss of degrees of freedom is important. As shown from the VAR Lag Length results in Appendix 3, the Likelihood Ratio test statistic, Final Prediction Error, Schwarz Information Criterion and Hannan-Quinn information Criterion identify lag order of 1 while the Akaike Information Criterion identifies lag order of 2 as appropriate for the VAR. Therefore, lag order of 1 is adopted for the VAR.

Johansen and Juselius (1990) developed a Maximum Likelihood procedure that estimates and tests for the presence of multiple cointegrating vectors. All the variables in this model were found to be I (1) hence we build a Vector Error Correction Model (VECM). To undertake this, we test for cointegration using the Johansen procedure as follows:

Table 5: Test for Cointegration

Date: 09/08/12 Time: 14:18
Sample: 1976 2011
Included observations: 34
Series: LGDP LEXP LIMP LHC LGC LINV LFDI
Lags interval: 1 to 1

Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Trace	3	2	2	3	3
Max-Eig	2	2	2	2	2

*Critical values based on MacKinnon-Haug-Michelis (1999)

Source: Own computation

If the rank (r) is equal r<n there are r linearly independent combinations of the cointegrating vectors (Enders, 1995). The test for the number of characteristic roots that are insignificantly different from unit can be ascertained using either the trace or the maximum eigenvalue from the table above. The trace statistic tested the null hypothesis that the number of distinct cointegrating vectors is less than or equal to r against the general alternative of more than r cointegrating vectors. The maximum eigenvalue statistic tests the null hypothesis that the number of cointegrating vectors is r against the alternative r+1. From the table above, both the trace and the maximum eignvalues have identified 2-3 co integrating vectors. However, for simplicity we assume 1 cointegrating vector by imposing restrictions in the number of cointegrating vectors. This yielded the VECM.

Table 6: Vector Error Correction Estimates

Vector Error Correction Estimates Date: 09/24/12 Time: 16:02 Sample (adjusted): 1979 2011 Included observations: 33 after adjustments Standard errors in ( ) & t-statistics in [ ]			
Cointegration Restrictions: B(1,1)=1, A(2,1)=0 Convergence achieved after 165 iterations. Restrictions identify all cointegrating vectors LR test for binding restrictions (rank = 1): Chi-square(1) 0.067383 Probability 0.795186			
Cointegrating Eq:	CointEq1		
LGDP(-1)	1.000000		
LOPEN(-1)	-1.907032 (0.25707) [-7.41828]		
LINV(-1)	2.153753 (0.44158) [4.87740]		
C	-13.37300		
Error Correction:	D(LGDP)	D(LOPEN)	D(LINV)

CointEq1	-0.037873	0.000000	-0.317423
	(0.00773)	(0.00000)	(0.09237)
	[-4.90119]	[NA]	[-3.43639]
D(LGDP(-1))	-0.075014	1.955935	-8.819853
	(0.28770)	(0.82959)	(2.73434)
	[-0.26074]	[2.35770]	[-3.22559]
D(LGDP(-2))	-0.599086	-0.923854	-4.869521
	(0.32703)	(0.94302)	(3.10818)
	[-1.83189]	[-0.97968]	[-1.56668]
D(LOPEN(-1))	0.052174	-0.363552	1.720398
	(0.08066)	(0.23260)	(0.76664)
	[0.64681]	[-1.56301]	[2.24408]
D(LOPEN(-2))	0.082155	0.070739	-0.088759
	(0.08676)	(0.25018)	(0.82459)
	[0.94691]	[0.28275]	[-0.10764]
D(LINV(-1))	0.006140	-0.175856	0.901676
	(0.03265)	(0.09415)	(0.31033)
	[0.18805]	[-1.86777]	[2.90557]
D(LINV(-2))	0.034115	0.036908	0.337763
	(0.03505)	(0.10108)	(0.33315)
	[0.97325]	[0.36515]	[1.01385]
C	0.167934	0.051274	1.341310
	(0.03846)	(0.11090)	(0.36552)
	[4.36660]	[0.46235]	[3.66959]
R-squared	0.718978	0.326400	0.401028
Adj. R-squared	0.640291	0.137791	0.233316
Sum sq. resids	0.035039	0.291343	3.165036
S.E. equation	0.037437	0.107952	0.355811
F-statistic	9.137269	1.730570	2.391168
Log likelihood	66.16394	31.21608	-8.143311
Akaike AIC	-3.525087	-1.407035	0.978382
Schwarz SC	-3.162298	-1.044246	1.341172
Mean dependent	0.109743	0.112169	0.117970
S.D. dependent	0.062421	0.116259	0.406360
Determinant resid covariance (dof adj.)		7.49E-07	
Determinant resid covariance		3.26E-07	
Log likelihood		105.9611	
Akaike information criterion		-4.785522	
Schwarz criterion		-3.561107	

Source: Own computation

The Error Correction Term (CointEq1) is negative and statistically significant at 5% level. This term captures the long run relationship. This is important as it shows the corrective mechanism that is followed once the system deviates from the long run equilibrium path and its coefficient can be interpreted as the speed of adjustment or amount of disequilibrium transmitted each period to economic growth. Its magnitude is -0.037873 implying that about 37% of disequilibrium is corrected in the subsequent period. From the result above, an adjusted R-squared of 0.64 indicates that the model provides a good fit for our data since it explains 64% of the GDP variation. The Vector Error Correction Mechanism can be estimated as a single dynamic regression equation following an approach proposed by Wickens and Breusch (1988). This approach is the Autoregressive Distributed Lag.

4.5 Auto Regressive Distributed Lag Model (ARDL)

It involves simultaneous estimation of the long and short term parameters and is based on unrestricted error correction Auto Regressive Distributed Lag (ARDL) model. The ARDL is easier for interpretation compared to the VECM.

From the ARDL below, the adjusted R squared equivalent to 0.94 indicates that the data provides a very good fit for our data since it explains 94% of the GDP variation. Prior to interpretation of the model we conduct diagnostic tests to confirm the assumption that the residuals are normally distributed with a constant variance. The Jarcque Bera Test is used to test for the normality of the residuals. It utilises the mean based coefficient of skewness and kurtosis to check normality. If the p-value is less than JB chi-square at 5% level of significance the null hypothesis is rejected. In addition, tests for serial correlation, heteroskedasticity and misspecification are also done. The results that show that all the tests are passed are included in Appendix 4.

Table 7: Auto Regressive Distributed Lag Model

Dependent Variable: D(LGDP)
Method: Least Squares
Date: 09/24/12 Time: 16:30
Sample (adjusted): 1980 2011
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.051940	0.011411	4.551791	0.0001
LGDP(-1)-1.91*LOPEN(-1)+2.154*LINV(-1)-13.37	-0.011482	0.002648	-4.336957	0.0002
D(LGC(-2))	-0.100547	0.056035	-1.794358	0.0844
D(LFDI(-3))	0.000207	0.001772	0.116776	0.9079
D(LEXP)	0.137120	0.023467	5.843159	0.0000
D(LHC)	0.464133	0.054047	8.587565	0.0000
R-squared	0.950416	Mean dependent var		0.110086
Adjusted R-squared	0.940881	S.D. dependent var		0.063388
S.E. of regression	0.015412	Akaike info criterion		-5.339929
Sum squared resid	0.006176	Schwarz criterion		-5.065104
Log likelihood	91.43887	Hannan-Quinn criter.		-5.248833
F-statistic	99.67268	Durbin-Watson stat		2.619767
Prob(F-statistic)	0.000000			

Source: Own computation

However on account of endogeneity problem of the variables involved, Two Stage Least Squares regression is carried out to solve the problem.

4.6 Two Stage Least Squares (2SLS)

Endogeneity occurs if the regressors are highly correlated with the error term either because of an omitted variable, measurement error, or simultaneity and reverse causality. In our model, endogeneity between output and exports as well as openness could exist and hence Two-Stage Least Squares regression was used to control for it and get better estimates. This meant that valid instrumental variables were needed. Statistically insignificant variables like Government Consumption and FDI are removed from the model. Therefore, 2-Stage Least Squares with the lagged independent variables of exports, openness, household consumption and investment as the instruments is performed to control for the endogeneity problem.

Table 8: Two Stage Least Squares

Dependent Variable: D(LGDP)
Method: Two-Stage Least Squares
Date: 10/31/12 Time: 08:10
Sample (adjusted): 1979 2011
Included observations: 33 after adjustments
Instrument specification: (LGDP(-1) - 1.90703200868*LOPEN(-1) + 2.15375287098*LINV(-1) - 13.3729987943) D(LGDP(-1)) D(LGDP(-2)) D(LOPEN(-1)) D(LOPEN(-2)) (LOPEN(-3)) D(LINV(-1)) D(LINV(-2)) D(LGC(-1)) D(LGC(-2)) (LGC(-3)) D(LEXP(-1)) D(LEXP(-2)) D(LHC(-1)) D(LHC(-2))
Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.036037	0.009707	3.712595	0.0009
LGDP(-1)-1.90703200868*LOPEN(-1)+2.15375287098*LINV(-1)-13.3729987943	-0.007588	0.002372	-3.199197	0.0034
D(LOPEN(-2))	-0.076860	0.022242	-3.455663	0.0018
D(LEXP)	0.170413	0.025086	6.793199	0.0000
D(LHC)	0.546816	0.071739	7.622262	0.0000

R-squared	0.956989	Mean dependent var	0.109743
Adjusted R-squared	0.950845	S.D. dependent var	0.062421
S.E. of regression	0.013839	Sum squared resid	0.005363
F-statistic	128.0752	Durbin-Watson stat	2.402778
Prob(F-statistic)	0.000000	Second-Stage SSR	0.026564
J-statistic	10.19877	Instrument rank	16
Prob(J-statistic)	0.512601		

Table 8 presents the results of the short run model obtained using the Two Stage Least Squares. This method was used to solve the problem of endogeneity between output, exports and openness. From the adjusted R-squared of 0.95 and standard error of regression of 0.013, the model is superior in terms of presenting a good fit for the data since most variables are statistically significant contributors to GDP and also explain a larger percentage of the variations in GDP. We find that all the explanatory variables in first difference are statistically significant for both in the lag and in levels. The estimated error term has a correct sign and is statistically significant at 1% level. However, the speed of adjustment to long-run changes is quite low (0.0076). In addition, the model passed all the diagnostic tests (See

Appendix 5) which means there is no evidence of serial correlation, heteroskedasticity, normality and specification problems.

4.7 Discussion of the Results

The objective of the study was to test the Export Led Growth Hypothesis for Kenya. Using time series data for the period 1976 to 2011, a multiple regression of Real Exports, Real Imports, Real Household Consumption, Real Government Consumption, Real Investment and Real FDI on Real GDP was undertaken.

The 2SLS regression results show that all the variables have the expected signs. The study yields an adjusted R-squared of 0.95 which means that 95% of the variation in GDP can be explained by changes in exports, openness, household consumption and investment while the other factors not included in the model account for 5%.

Real Exports has a positive and statistically significant short run relationship with real GDP. This relationship is statistically significant at 1% level in explaining GDP growth. A 1% increase in real exports leads to 0.17% increase in real GDP. The results indicate that the causality is unidirectional running from exports to economic growth. This finding is similar to the finding by Ramesh and Boaz (2007) who found both short run and long run unidirectional relationship from exports to GDP growth. The results are also in line with theoretical literature in which exports are said to be a significant catalyst in boosting economic growth by increasing foreign exchange earnings, promoting expansion and development of industries and encouraging research and development in order to diversify products.

Openness measured as the average of real exports and real imports has a negative short run and long run relationship with real GDP and is statistically significant at 1% level in

explaining GDP growth. A 1% increase in openness leads to a decrease in real GDP by 0.076% in the short run and in the long run GDP decreases by 1.9%. This is because the share of imports in Kenya's trade data is large compared to exports (See *Table 2*). The results also indicate that imports do not granger cause economic growth but economic growth granger causes imports. Increased imports negate balance of payment and thus reduce growth. Imports have been used as one of the macroeconomic variables that may have an effect on the export-economic growth linkage. This is based on the argument of Riezman *et al* (1996) that imports are crucial in testing the Export-Led Growth hypothesis in order to avoid producing a spurious causality results.

Real Household Consumption has a positive and statistically significant short run relationship with real GDP. This relationship is statistically significant at 1% level in explaining GDP growth. A 1 % increase in household consumption leads to 0.55% increase in real GDP. The results also indicate that there is a bi-directional causality between household consumption and economic growth. The Keynesian macroeconomic model argues that domestic demand plays an important role in influencing economic growth by stimulating aggregate expenditure. Household consumption is a significant contributor to real GDP as it promotes productivity by firms to fill the household demand. It creates demand for goods and services, a contributory factor to industrial production and economic activities.

Real Investment has a positive and statistically significant long run relationship with real GDP. This is statistically significant at 1% level in explaining GDP growth. A 1% increase in real investment leads to a 2.2% increase in real GDP. Physical capital accumulation is a major source of economic growth in all countries. The results show that it is the most significant contributor to economic growth among the variables studied with 2.2%. In the Harrod-Domar economic growth theory, a country needs to replace worn-out capital goods

such as structures and buildings, equipment and machinery hence they must retain a proportion of their national income as well as increase new investments for the economy to grow. The neoclassical theory says that an increase in capital as an input in production leads to increases in output.

The results from the model also show that there is unidirectional causality running from exports to imports, exports to household consumption, exports to government consumption and exports to investment. This means increase in exports leads to an increase in consumption and investment which through the multiplier effect leads to higher growth.

The analysis encountered endogeneity between the variables exports, openness, household consumption and GDP. This was dealt with using 2SLS regression with lagged variables of independent variables as instruments to produce unbiased results.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Summary and Conclusion

The main objective of this paper was to investigate the Export Led Growth Hypothesis in Kenya while controlling for other potentially relevant variables such as imports, consumption, investment and FDI omitted in models of previous studies. Specifically the study assessed whether promoting exports enhances economic growth. This paper implemented the Vector Error Correction Model, Autoregressive Distributed Lag and 2-Stage Least Squares techniques in testing the ELGH for Kenya on the basis of time series data from 1976-2011.

The empirical results have shown that the ELGH hypothesis can be verified in Kenya in the short run. The causality is unidirectional running from exports to GDP. Exports granger cause GDP indicating that they have a significant positive effect on GDP in Kenya for the period studied. Economic growth has also been influenced positively by household consumption, government consumption, investment and foreign direct investment.

In the short run, household consumption has a positive effect on GDP however the causality is bi-directional between the two variables. Investment does not granger cause GDP in the short run but in the long run it has a positive significant effect on GDP. Further, there is unidirectional causality running from government consumption and FDI to GDP. Conversely, imports do not granger cause GDP and have a negative effect on GDP in the long run.

These results are in line with other literature in this area such as Smith (2001) and Ramesh and Boaz (2007) among others, whose results supported ELGH.

5.2 Policy Recommendations

The study has established that growth in exports promotes economic growth. Kenya should therefore enhance macroeconomic and institutional environment conducive for export growth specifically the diversification of export commodities, tax rebates on imported inputs for production of exports and export-oriented industries. The country should have solid macroeconomic policies directed towards the export sector.

There are potential export markets that can be explored to Kenya's advantage in economic integration blocks particularly the East African Community and Common Market for Eastern and Southern Africa. Kenya needs to deepen its integration with regional economic blocks to increase its bargaining power and broaden its market.

Exchange rate stability is an important economic policy as it affects imports, exports and FDI. Exchange rates should be managed to avoid overvaluation of the domestic currency. The stability will make it possible to avoid imposing general import restrictions and facilitate a gradual reduction of trade restrictions. Both trade liberalization and realistic exchange rates are necessary for export sector success. In addition, provision of an adequate infrastructure and technology has a positive impact on exports and FDI and finally on economic growth.

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APPENDICES

Appendix 1: Annual Time Series Data over the Sample Period in Kenya

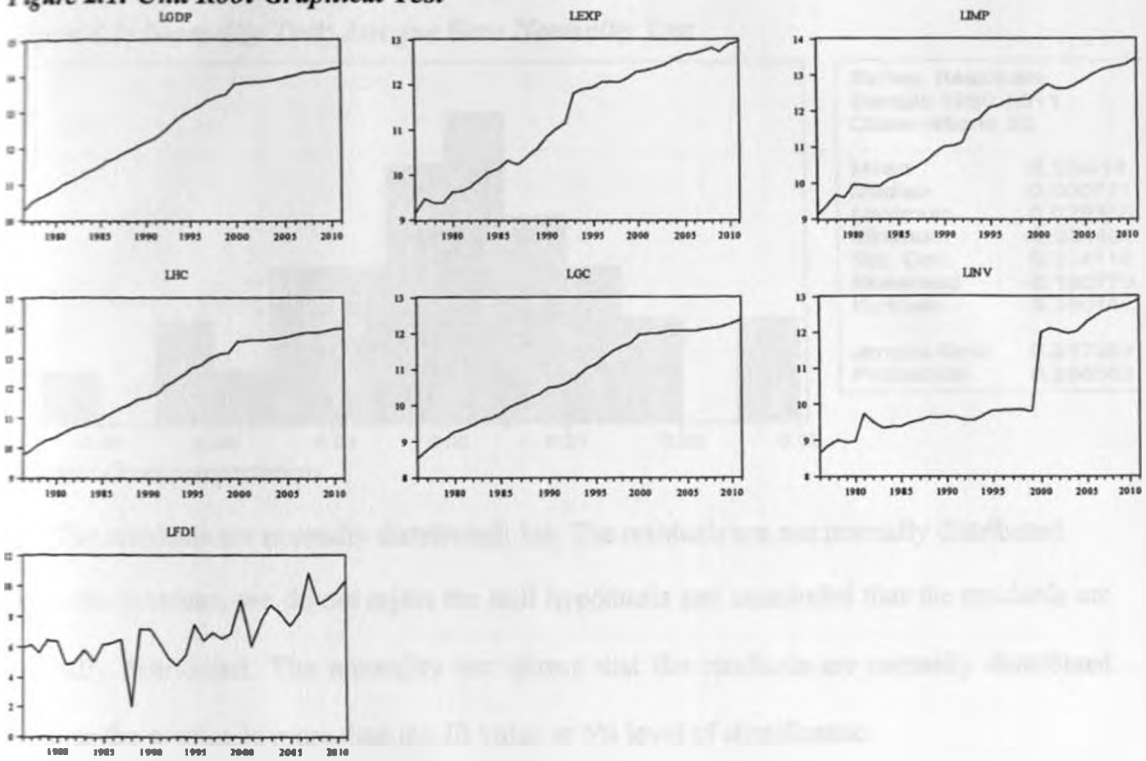
Table 1A: Annual data 1976-2011 in Kenya Shilling Million at Constant 2001 prices

Year	GDP	Exports	Imports	H/Consumption	G/Consumption	Investment	FDI
1976	29,072	9,434	9,232	17,909	5,076	5,809	388
1977	37,198	13,004	11,752	20,680	6,441	7,039	468
1978	41,164	11,862	15,860	24,977	7,972	8,224	266
1979	45,437	12,002	14,732	28,896	8,946	7,695	628
1980	52,649	15,066	21,054	32,178	10,675	7,903	586
1981	60,468	15,474	20,914	37,203	11,528	16,879	128
1982	68,215	16,940	20,105	43,141	12,949	13,367	142
1983	76,404	19,927	20,284	45,943	14,662	11,519	316
1984	87,781	23,410	24,639	52,947	15,512	11,871	155
1985	100,747	25,497	26,568	58,405	17,602	11,943	474
1986	117,483	30,334	30,129	70,396	21,518	13,362	531
1987	131,169	27,992	34,682	81,655	24,354	14,159	648
1988	151,194	33,297	41,086	93,914	27,293	15,334	7
1989	171,589	39,554	52,247	111,149	30,769	15,199	1,279
1990	195,536	51,186	61,391	121,655	36,620	15,702	1,308
1991	221,250	60,512	63,327	139,437	37,606	15,247	518
1992	264,475	69,287	69,041	178,571	41,475	14,361	205
1993	333,613	134,918	118,958	210,596	48,307	14,066	116
1994	400,679	148,225	135,641	250,076	60,719	16,002	224
1995	465,272	152,596	180,139	322,241	69,057	18,468	1,697
1996	528,740	172,459	195,155	359,442	84,523	18,701	602
1997	623,235	174,846	220,769	453,173	100,712	19,080	1,030
1998	694,029	171,895	224,772	513,249	113,568	19,051	689
1999	743,479	189,265	232,232	540,400	125,943	18,203	972
2000	982,855	217,332	289,529	779,463	158,569	164,783	8,448
2001	1,020,022	225,172	345,899	811,793	162,959	185,186	417
2002	1,025,584	241,193	306,861	818,639	165,634	173,851	2,175
2003	1,055,658	258,588	306,672	836,671	175,588	160,026	6,207
2004	1,109,541	291,157	344,380	856,918	176,610	171,764	3,647
2005	1,175,133	318,451	395,842	912,330	175,227	219,512	1,603
2006	1,249,459	328,226	466,347	984,207	179,143	260,211	3,654
2007	1,336,846	350,046	517,912	1,055,988	185,679	295,557	49,078
2008	1,357,263	375,245	552,301	1,041,750	190,254	323,762	6,612
2009	1,394,387	340,310	567,756	1,094,202	197,528	332,776	8,893
2010	1,474,763	400,415	602,122	1,173,374	215,604	358,471	14,109
2011	1,539,306	427,123	695,931	1,206,210	238,447	403,457	29,774

Source: Kenya National Bureau of Statistics

Appendix 2: Unit Root Test

Figure 2.1: Unit Root Graphical Test



Source: Own computation

Appendix 3: Vector Auto Regression Model (VAR)

Table 3A: VAR Lag Length

VAR Lag Order Selection Criteria
Endogenous variables: LGDP LEXP LIMP LHC LGC LINV LFDI
Exogenous variables: C
Date: 09/08/12 Time: 13:50
Sample: 1976 2011
Included observations: 34

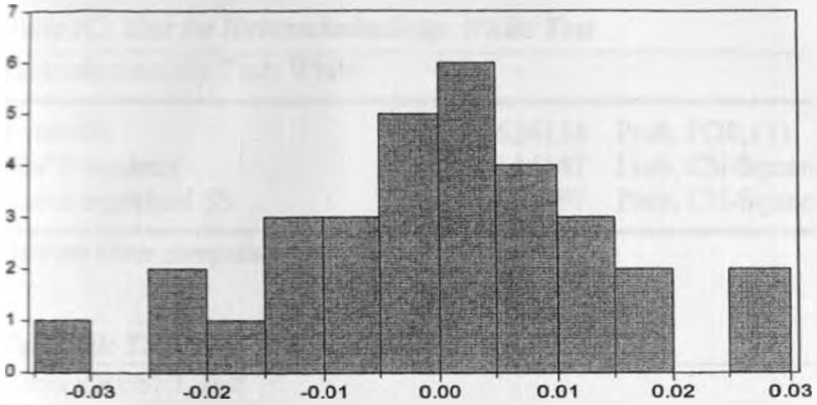
Lag	LogL	LR	FPE	AIC	SC	HQ
0	39.76989	NA	3.43e-10	-1.927641	-1.613390	-1.820472
1	246.1510	315.6417*	3.49e-14*	-11.18535	8.671347*	-10.32800*
2	300.7452	61.01709	3.71e-14	-11.51443*	-6.800665	-9.906898

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Source: Own computation

Appendix 4: Diagnostic Tests for the ARDL Model

Figure 4.1: Normality Test: Jarcque Bera Normality Test



Source: Own computation

Ho: The residuals are normally distributed; Ha: The residuals are not normally distributed.

From the p values, we do not reject the null hypothesis and concluded that the residuals are normally distributed. The normality test shows that the residuals are normally distributed because the p-value is more than the JB value at 5% level of significance.

Table 4A: Test for Serial Correlation: Breusch-Godfrey LM Test

Serial Correlation Test: Breusch-Godfrey LM Test			
F-statistic	1.910526	Prob. F(2,24)	0.1698
Obs*R-squared	4.395006	Prob. Chi-Square(2)	0.1111

Source: Own computation

H_o: The residuals are not serially correlated; H_A: The residuals are serially correlated.

From the p values, we do not reject the null hypothesis and concluded that the residuals are not serially correlated.

Table 4B: Test for Heteroskedasticity: Breusch-Pagan-Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.868758	Prob. F(5,26)	0.1345
Obs*R-squared	8.459798	Prob. Chi-Square(5)	0.1326
Scaled explained SS	6.087812	Prob. Chi-Square(5)	0.2978

Source: Own computation

H_o: The residuals are homoskedastic; H_A: The residuals are heteroskedastic.

From the p values, we do not reject the null hypothesis and concluded that the residuals are homoskedastic. The white test shows the same results of the residuals being homoskedastic.

Table 4C: Test for Heteroskedasticity: White Test

Heteroskedasticity Test: White			
F-statistic	0.636134	Prob. F(20,11)	0.8173
Obs*R-squared	17.16187	Prob. Chi-Square(20)	0.6424
Scaled explained SS	12.34997	Prob. Chi-Square(20)	0.9035

Source: Own computation

Table 4D: Test for Misspecification: Ramsey Reset Test

Ramsey RESET Test
Equation: EQFINAL
Specification: D(LGDP) C (LGDP(-1) - 1.90703200868*LOPEN(-1) + 2.15375287098*LINV(-1) - 13.3729987943) D(LGC(-2)) D(LFDI(-3)) D(LEXP()) D(LHC())
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.635068	25	0.5312
F-statistic	0.403311	(1, 25)	0.5312
Likelihood ratio	0.512119	1	0.4742

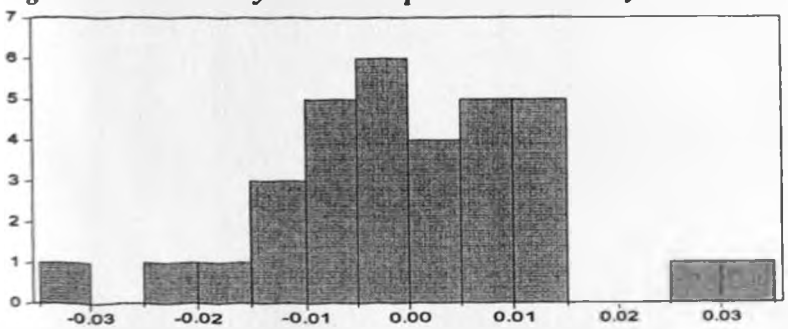
Source: Own computation

H_o: The model is correctly specified; H_A: The model is misspecified.

From the p values, we do not reject the null hypothesis and concluded that the model is correctly specified.

Appendix 5: Diagnostic Tests for the 2SLS

Figure 5.1: Normality Test: Jarcque Bera Normality Test



Series: Residuals
Sample 1979 2011
Observations 33

Mean	8.02e-18
Median	-0.000538
Maximum	0.032091
Minimum	-0.033973
Std. Dev.	0.012945
Skewness	0.024982
Kurtosis	3.845229
Jarque-Bera	0.985750
Probability	0.610868

Source: Own computation

H_o: The residuals are normally distributed; H_A: The residuals are not normally distributed.

From the p values, we do not reject the null hypothesis and concluded that the residuals are normally distributed. The normality test shows that the residuals are normally distributed because the p-value is more than the JB value at 5% level of significance.

Table 5A: Test for Serial Correlation: Breusch-Godfrey LM Test

Breusch-Godfrey Serial Correlation LM Test:			
Obs*R-squared	2.196674	Prob. Chi-Square(2)	0.3334

Source: Own computation

H_o: The residuals are not serially correlated; H_A: The residuals are serially correlated.

From the p values, we do not reject the null hypothesis and concluded that the residuals are not serially correlated.

Table 5B: Test for Heteroskedasticity: Breusch-Pagan-Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.512858	Prob. F(4,28)	0.7268
Obs*R-squared	2.252714	Prob. Chi-Square(4)	0.6894
Scaled explained SS	2.307181	Prob. Chi-Square(4)	0.6795

Source: Own computation

H_o: The residuals are homoskedastic; H_A: The residuals are heteroskedastic.

From the p values, we do not reject the null hypothesis and concluded that the residuals are homoskedastic.

Table 5C: Test for Misspecification: Ramsey Reset Test

Ramsey RESET Test
Equation: UNTITLED
Specification: D(LGDP) C (LGDP(-1) - 1.90703200868*LOPEN(-1) + 2.15375287098*LINV(-1) - 13.3729987943) D(LOPEN(-2)) D(LX) D(LHC)
Instrument specification: (LGDP(-1) - 1.90703200868*LOPEN(-1) + 2.15375287098*LINV(-1) - 13.3729987943) D(LGDP(-1)) D(LGDP(-2)) D(LOPEN(-1)) D(LOPEN(-2)) (LOPEN(-3)) D(LINV(-1)) D(LINV(-2)) D(LGC(-1)) D(LGC(-2)) (LGC(-3)) D(LX(-1)) D(LX(-2)) D(LHC(-1)) D(LHC(-2))
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.526768	27	0.6027
F-statistic	0.277485	(1, 27)	0.6027
Difference in J-stats	1.110351	0	NA

Source: Own computation

H_0: The model is correctly specified; H_A: The model is misspecified.

From the p values, we do not reject the null hypothesis and concluded that the model is correctly specified.