ANALYSIS OF THE RELATIONSHIP BETWEEN TRADE OPENNESS, FOREIGN AID, EXTERNAL DEBT AND ECONOMIC GROWTH IN KENYA

BY

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DECLARATION

Declaration by Candidate

I declare that this thesis is my original work and has not been submitted for the award of a degree in any other university. This work has acknowledged all information sources by referencing.

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This Thesis about Analysis of the Relationship between Trade Openness, foreign aid, external debt and Economic Growth in Kenya has been done under our supervision as Maseno University Supervisors and submitted for examination with our approval.

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DEDICATION

To my late father Elisha Kiganda Kadambi. Though he did not live to celebrate my success, I am still inspired to live by emulating his determination.

ABSTRACT

Since 1950, trade openness and aid has led to the expansion of world output by fivefold. Trade accounted for 20% of Gross domestic Product (GDP) in 2002 and according to the Vision 2030 blue print, trade is a promising sector to raise GDP to 10% per annum in Kenya. The share of aid to developing countries declined from 1.49 percent in the 1980s to 1.22 percent in the 1990s. The same pattern is observed for Africa, with Kenya's share declining from 4.16 percent to 3.24 percent. Kenya undertook several trade reforms under the Structural Adjustment Programs that resulted in trade openness and a dramatic build-up in aid flows. Studies conducted in various countries indicate divergent views on the relationship between trade openness, foreign aid, external debt and economic growth. It is therefore not clear whether trade openness, foreign aid and external debt does or does not promote growth in the case of Kenya. The purpose of this study was therefore to analyze relationship between trade openness, foreign aid, external debt and economic growth in Kenya with specific objectives of determining relationship between trade openness and economic growth, establishing relationship between foreign aid and economic growth and examining relationship between external debt and economic growth in Kenya. This study was modeled on Adam Smith's absolute advantage theory. The study used correlation research design based on annual time series data spanning 30 years from 1980 – 2009. Data was obtained from the World Development Indicators. The study used Vector Error Correction Mechanism to integrate long run and short run dynamics and Granger causality for directional causality. The results indicated significant positive relationship having t-statistics > 2.056 and unidirectional causality between trade openness, foreign aid, external debt and economic growth in Kenya, with coefficients of 0.98, 0.36 and 0.39 implying that 1 % increase in trade openness, foreign aid and external debt increases economic growth by 0.98%, 0.36% and 0.39% respectively. Economic growth is significantly error correcting at 34.7% annually. The study concluded that in the long run trade openness, foreign aid and external debt promote growth in Kenya. In view of this, the study adds to literature by proving Adam Smith's theory and recommends that the government of Kenya to continue pursuing trade openness policies and do proper appraisals for government financed projects through borrowings and foreign aid to increase trade volumes and ensure that resources are used prudently to enhance economic growth.

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ABBREVIATIONS AND ACRONYMS

ADF Augmented Dickey Fuller

AIC Akaike Information Criterion

BPO Business Process Outsourcing

COMESA Common Market for Eastern and Southern Africa

COWAS Economic Community of West African States

DAC Development Assistance Committee

DW Durbin – Watson

EAC East African Community

ECM Error Correction Model

ECT Error Correction Term

FDI Foreign Direct Investment

GATT General Agreement on Tariffs and Trade

GDP Gross Domestic Product

GOV- ST Government Stability

IIDN Independently and Identically Distributed as a Normal Distribution

IMF International Monetary Fund

JB Jarque- Bera

LM Lagrange Multiplier

MENA Middle East and Northern Africa

ODA Official Development Assistance

OECD Organization for Economic Co-operation and Development

OLS Ordinary Least Squares

RGDP Real Gross Domestic Product

RTAs Regional Trade Agreements

SAPs Structural Adjustment Programs

SSA Sub – Saharan Africa

USD United States Dollar

VAR Vector Autoregressive

VECM Vector Error Correction Model

VIF Variance Inflation Factor

WTO World Trade Organization

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

While theory would indicate that trade and growth are positively correlated, it is not clear from empirical perspectives whether or not trade is a proximate determinant of economic growth (Capolupo & Celi, 2008). In the world economy since 1950 there has been a massive liberalization of world trade, first under the auspices of the General Agreement on Tariffs and Trade (GATT), established in 1947, and now under the auspices of the World Trade Organization (WTO) which replaced the GATT in 1993 (Thirlwall, 2000). Regional Trade Agreements (RTAs) have also become very fashionable in the form of Free Trade Areas and Customs Unions (Emeka, 2010). Trade openness has led to a massive expansion in the growth of world trade relative to world output, while world output (or GDP) has expanded fivefold, the volume of world trade has grown 16 times at an average compound rate of just over 7 percent per annum (Emeka, 2010). It is difficult, if not impossible, to understand the growth and development process of countries without reference to their trading performance (Thirlwall, 2000).

Between the early 1960's and the early 1980's, many African countries operated highly interventionist trade regimes on both import and export sides. On the import side, trade was characterized by restrictive import licensing systems, and tight foreign exchange controls. From the export side, substantial implicit and explicit taxes, as well as the prohibition of certain export items and other non-tariff barriers were common features of the trade regimes (Yahya *et al.*, 2013). Trade as a share of Gross Domestic Product (GDP) for Sub-Saharan Africa (SSA) averaged 45.0 % in 1980/1981 as compared to 50.4

% in 2000 /2001, Africa's share in world exports averaged about 6 per cent in 1980 and its share of world imports averaged about 4.6 per cent in 1980 (United Nations, 2003). Omolo (2011) argues that Trade openness can take different forms; it can be preferential, such as regional trading agreements which are specific to countries or a region like the East African Community (EAC) customs union, or the Common Market for East and Southern Africa (COMESA). Trade openness can either be unilateral and in most cases it is non-discriminatory, since it is applied by the customs authority for all goods and services entering its territory and was undertaken under the Structural Adjustment Programs (SAPs) of the World Bank and the International Monetary Fund (IMF) (Omolo, 2011).

Omolo (2011) further asserted that from Independence in 1963 to 1979, Kenya's main economic objective was to protect small industries in order for them to be able to compete in the global market. However, the country suffered economic shocks due to the oil crisis and the break-up of the East African Community which led to macroeconomic instability. In the 1960s and 1970s, GDP growth fluctuated from 23 percent to minus 5 percent, the result of a variety of factors, including world oil crisis in the early 1970s and the collapse of the East African Community in 1977 (Omolo, 2011). The country approached the World Bank and IMF for support in order to restore macroeconomic stability and revive economic growth. Several trade reforms were undertaken under the SAPs of the World Bank and IMF that resulted in trade openness with these programmes being carried out in three phases: Phase I was 1980-84, Phase II 1985-91 and phase III 1992-95(Omolo, 2011). According to Kenyan experts, policy makers, stakeholders and

investors, trade is among the six priority sectors that make up 57% of Kenya's GDP and promise to raise GDP growth rate to the region of 10 per cent per annum (Kenya Vision 2030, 2007).

This study was modeled on the postulates of Adam Smith's absolute advantage theory. Emeka (2010) argued that the doctrine that trade enhances welfare and growth has a long and distinguished ancestry dating back to Adam Smith. In his famous book, and inquiry into nature and causes of the wealth of nations (1776), Smith stressed the importance of trade as a vent for surplus production and as a means of widening the market thereby improving the level of productivity (Emeka, 2010). Trade openness refers to the sum of exports and imports as a ratio of GDP (Liberati, 2007) and according to Bajwa and Siddiqi (2011), openness is proxied by the ratio of imports plus exports to GDP. According to Olopade and Olopade (2010), economic growth represents the expansion of a country's GDP or output. In this study, trade openness was captured as the ratio of imports plus exports to GDP and economic growth represented by expansion of a country's GDP.

International trade plays an important role in the development of any economy and assumed to be an engine of growth. International trade may affect the economy through different channels; creation of employment, generation of capital formation that leads to better living standards in terms of higher level of GDP and GDP per capita (Bajwa & Siddiqi, 2011). Further, Trade openness may influence economic growth in several ways

which Din *et al.* (2003) outlines as; first, trade openness may enhance efficiency through greater competition and improved resource allocation. Secondly, greater access to world markets may allow economies to overcome size limitations and benefit from economies of scale. Third, imports of capital and intermediate goods can contribute to the growth process by enlarging the productive capacity of the economy. Fourth, trade can lead to productivity gains through international diffusion and adoption of new technologies. Trade and industry accounted for 20 per cent of GDP and employed about 300,000 people in the formal sector and 3.7 million in the informal, in addition, the sector accounted for over 43 per cent of Kenya's total export earnings in 2002 (Ministry of Planning, 2003). The trade and industry sector is strategic to economic recovery because it is the sector likely to recover fastest (Ministry of Planning, 2003).

According to Economic Survey (2010), Africa's economic prospects for 2009 were reduced due to its integration in the global economy through trade. As a result, the continent recorded a slowed real GDP growth of 1.9 % in 2009 compared to 5.2 % in 2008. The continent was mostly affected due to its reliance on primary commodity exports in the face of contraction in global demand and declining prices. In Kenya, domestic exports grew marginally by 0.3% while re-exports declined by 4.1%. Total imports grew by 2.3% in 2009 compared to a 27.4% growth recorded in 2008. This resulted in the volume of trade growing by 1.6% in 2009 compared to a growth of 26.8% in 2008 with the economy recording a minimal GDP growth rate of 2.6% in 2009 (Economic Survey, 2010) . Although, according to Din *et al.* (2003), the relationship between trade openness and economic growth has been examined extensively in

theoretical and empirical literature, the scenario above strongly indicates that there is correlation between trade and growth in Africa and as Emeka (2010) puts, no economy can isolate itself from trading with the rest of the world because trade acts as a catalyst of growth.

There are various arguments raised by researchers regarding the relationship between trade openness and economic growth; Whereas, Ahmadi *et al*. (2012) found a negative relationship in Pakistan, Atif *et al*. (2010), Muhammed (2012), among others found a positive relationship in Pakistan and Cote d'Ivoire, Arif and Ahmed (2012) found a bi-directional causality and Atif *et al*.(2010) unidirectional causality in Pakistan. Omolo (2011) asserted that to policy makers trade openness is good for Kenya as there are development opportunities that accompany free trade, such as transfer of technology which improves productivity and hence results in economic growth while the civil society as argued by Omolo (2011), on the other hand, holds the position that trade openness does not result in gains for segments of the population such as farmers, who tend to be the greatest casualties when openness takes place. Based on the civil society arguments Omolo (2011) asserted that, it is, therefore, not easy to provide policy prescriptions on how trade openness can be a tool for development and poverty reduction making it difficult for policy makers to negotiate confidently at the World Trade Organization (WTO) given that they do not have evidence on the true impact of trade openness on poverty. In addition, most empirical reviews on the relationship between trade openness and economic growth are based on panel data set and do not give a clear indication of the relationship between trade openness and economic growth with various researchers

establishing varied results. This lack of consensus on the contribution of trade openness to economic growth and the use of panel data set methodology make it difficult to clearly point out to whether trade openness enhances economic growth or has the opposite effect in Kenya, hence this study determines the relationship between trade openness and economic growth in Kenya. This study therefore provided evidence on whether or not trade openness enhances growth in Kenya and can therefore be used by policy makers, academia, civil society and other stakeholders in making informed decisions geared towards achieving economic growth through trade openness.

Official development assistance (ODA), more commonly known as foreign aid consists of resource transfers from the public sector, in the form of grants and loans at concessional financial terms, to developing countries (Moreira, 2005). Many studies in the empirical literature on the effectiveness of foreign aid have tried to assess if aid reaches its main objective, defined as the promotion of economic development and welfare of developing countries (Moreira, 2005). When focusing on the traditional purpose of foreign aid - promotion of the economic growth of developing countries -, one notes that the results obtained differ according to the approach used. Moreira (2005) argued that studies at the micro-level, mainly using cost-benefit analyses, support the view of those in favour of the effectiveness of foreign aid, in contrast, the results presented in studies at the macro-level, namely cross-country regression studies, are, to say the least.

Since the 1980s, Kenya as a country has experienced relatively unpredictable flows of international aid (Mwega, 2009). According to Organization for Economic Co-operation

and Development- Development Assistance Committee (OECD-DAC) statistics as captured by Mwega (2009), while Kenya experienced a dramatic build-up in nominal aid flows in the 1980s, there was a slackening of donor support in the 1990s. Nominal aid flows increased from US$ 393.4 million in 1980 to an average peak of US$ 1120.5 million in 1989-90, before declining to a low of US$ 308.85 million in 1999, with some recovery thereafter in response to a new government in December 2002 (Morrissey & Amanja, 2005). According to UNDP (2006) report as Mwega (2009) captured, increased aid flows since 2002 were as a result of increased government borrowing to finance development projects on infrastructure as well as increased inflows of grants to support government efforts in social sectors and humanitarian responses to droughts following successful Consultative Group (CG) meetings in 2003 and 2005. The increase in foreign aid therefore reflected renewed donor confidence in the government's resolve for proper management of the economy and situating adequate government measures against graft and corruption (Morrissey & Amanja, 2005). However, since 1993 Mule *et al.* (2002) as captured by Mwega (2009) asserts that net ODA to Kenya started to decline dramatically, with two major episodes of "aid freeze" and donor withdrawals as the government reneged on its commitments to donors.

Further McCormick *et al*. (2007) as captured by Mwega (2009) argues that three stabilization programmes, for example, collapsed in rapid succession in the early 1980s. While the period 1983-90 saw a series of programmes concluded relatively successfully, the fourth programme collapsed in 1991, precipitating the aid freeze imposed by the donor consultative group in November that year. The fifth collapsed in the run-up to the

1997 general elections and the sixth in 2000 (Mwega, 2009). It is only after 2003 that the aid situation in Kenya started to improve, with a gradual increase in net ODA. Hence, the drop in aid in the 1990s reflected Kenya's own falling out with donors over the implementation of Structural Adjustment Programmes (SAPs) and the general decline in aid to SSA following the end of the Cold War (Morrissey & Amanja, 2005).

The share of aid to developing countries declined from an average of 1.49 percent in the 1980s to 1.22 percent in the 1990s and was only 0.77 percent in the 2000-06 period (Mwega, 2009). The same pattern is observed for Africa, with Kenya's share declining from 4.16 percent in the 1980s to 3.24 percent in the 1990s and was only 2.18 percent over the period 2000-06. Kenya is therefore not considered to be a high aid-dependent economy (Mwega, 2009). Empirical studies of Asteriou (2009) and Sakyi (2010) among others have found positive relationship between foreign aid and economic growth while Jayid and Qayyum (2011) found a negative relationship between foreign aid and economic growth. Given these divergent views on the foreign aid-growth relationship, it remains unknown of what is the relationship between foreign aid and economic growth in Kenya? this study therefore establishes relationship between foreign aid and economic growth in Kenya.

According to World Bank development indicators (2013) external debt is debt owed to non residents repayable in foreign currency, goods, or services. In the 1980s and the years preceding, Kenya was among the major aid recipients in Africa, largely to put up infrastructure so as to integrate the large rural economy into the then emerging import

substitution Kenyan economy (Kasidi & Said, 2013). The 1990s witnessed a steady decline in development assistance to Kenya occasioned by a perception of poor governance and mismanagement of public resources and development assistance; other factors include the end of the cold war and the collapse of the Soviet Union (Mutuku & Putunoi, 2013). These led to a debt crisis in the country in the early 1990s which turned Kenya into a highly indebted nation. The debt problem was exacerbated by macroeconomic mismanagement in the 1990s such as the Goldenberg scandal which fleeced Kenyans billions of shillings leading to a reduction of donor inflows (Mwega, 2009). The government thus resorted to occasional debt rescheduling and expensive short-term domestic borrowing to finance its expenditures (Mutuku & Putunoi, 2013).

The details of Kenya‘s debt burden continue to be disheartening, as of August 2008 the public debt stood at Kshs 867 billion in a country with a population of 36 million people with numerous challenges (Mutuku & Putunoi, 2013). The share of multilateral aid increased moderately in the 1980s and early 90s, primarily due to the disbursement of the World Bank adjustment lending under SAPs, but the bilateral share rose again since then with the decline in new adjustment lending after 1991(Mwega, 2009). According to Mwega (2009) bilateral aid has been mainly in the form of grants (72 percent of the total), with the share of grants increasing in recent years, whereas multilateral aid has mainly been in the form of loans (86 percent). The principal source of multilateral loans has been the World Bank group, accounting for almost 80 percent of total loans in the study period (Mutuku & Putunoi, 2013). O’Brien & Ryan (2001) as noted by Mwega (2009) argued that, there are obvious reasons why Kenya received such large inflows in

the 1970s and 1980s, before their subsequent decline. Mwega (2009) asserted that, the primary motivations for providing aid are developmental (to promote economic growth and poverty alleviation in poor countries); commercial (to cement commercial and financial relations with the aid recipient, open markets, and ensure opportunities for investors, contractors, and suppliers from the aid-giving countries); and political (to maintain the allegiance of governments that are politically aligned with the donor, an especially prominent feature of aid during the Cold War) and Kenya was a logical candidate to receive aid for all the above reasons.

Empirical analysis on the relationship between external debt and economic growth has been extensively examined and points to varied views with Suleiman and Azeez (2012) establishing a positive relationship in Nigeria, Were (2001) a negative relationship and Kasidi and Said (2013) finding no long run relationship in Tanzania. Further, Ezeabasili *et al*. (2011) established a unidirectional causality from external debt to economic growth in Nigeria while Hossain and Mitra (2013), found a unidirectional causality from growth to external debt in Africa. This lack of consensus on the relationship between external debt and economic growth among researchers makes it difficult to point out to what is the actual relationship between external debt and economic growth in Kenya. This study therefore examines the relationship between external debt and economic growth in Kenya.

1.2 Statement of the Research Problem

Policy makers argue that trade openness is good for Kenya as there are development opportunities that accompany free trade. Civil society, on the other hand, holds the position that trade openness does not result in gains. Empirical perspectives also lack consensus on the relationship between trade openness, foreign aid, external debt and economic growth. This arises from the divergent views of various researchers ranging from positive, negative, unidirectional and bi-directional relationship. The empirical question posed then is, what is the relationship between trade openness, foreign aid, external debt and economic growth in Kenya? More importantly, studies on the relationship between trade openness, foreign, external debt and economic growth are not exhaustive. They partially analyze the relationships by not conducting correlation, cointegration and causality analysis. In view of the gap created by; the lack of consensus on the contribution of trade openness to economic growth between policy makers and civil society, the divergent views by various researchers on the relationship between trade openness, foreign aid, external debt and economic growth and the failure to exhaustively analyze the relationships, the main purpose of this study was to analyze the relationship between trade openness, foreign aid, external debt and economic growth in Kenya. Annual time series data for the period 1980 – 2009 was used to establish correlation, cointegration and causality characteristics of the relationship between trade openness, foreign aid, external debt and economic growth in Kenya which therefore informs policy, academia and add to the existing literature review.

1.3 Objectives of the Study

1.3.1 Main Objective

The purpose of this study was to analyze the relationship between trade openness, foreign aid, external debt and economic growth in Kenya.

1.3.2 Specific Objectives

The specific objectives of the study were to;

i. Determine relationship between trade openness and economic growth in Kenya

ii. Establish relationship between foreign aid and economic growth in Kenya

iii. Examine relationship between external debt and economic growth in Kenya.

1.4 Research Hypothesis

This study focused on the following hypotheses such that for the;

i. Relationship between trade Openness and economic growth in Kenya,

H_0: There is no significant relationship between trade openness and economic Growth in Kenya

ii. Relationship between foreign aid and economic growth in Kenya

H_0 : There is no significant relationship between foreign aid and economic Growth in Kenya

iii. Relationship between external debt and economic growth in Kenya

H_0: There is no significant relationship between external debt and economic Growth in Kenya

The rejection of null hypothesis implies that the alternative hypothesis of existence of significant relationship for each case is accepted.

1.5 Scope of the Study

This study on the analysis of the relationship between trade openness and economic growth in Kenya was conducted between 1980 and 2009 based on annual time series data. It should be noted that in 1980, Kenya became one of the first countries to sign a Structural Adjustment Loan with the World Bank and in 2009 the world growth was

projected to fall to ½ percent in 2009, its lowest rate since World War II according to World Economic Outlook Update (2009).

1.6 Justification of the Study

To assess the existing opportunities and challenges for Kenya's economic growth, a diagnostic analysis was conducted by the vision 2030 research teams who settled on six priority sectors trade included that make up 57% of Kenya's GDP and promise to raise GDP growth rate to the region of 10 percent per annum (Kenya Vision 2030, 2007). According to (Economic Survey, 2010), Africa's economic prospects for 2009 were reduced due to its integration in the global economy through trade. As a result, the continent recorded a slowed real GDP growth of 1.9 % in 2009 compared to 5.2 % in 2008. The continent was mostly affected due to its reliance on primary commodity exports in the face of contraction in global demand and declining prices. In Kenya, domestic exports grew marginally by 0.3% while re-exports declined by 4.1%. Total imports grew by 2.3% in 2009 compared to a 27.4% growth recorded in 2008. This resulted in the volume of trade growing by 1.6% in 2009 compared to a growth of 26.8% in 2008 with the economy recording a minimal growth rate of 2.6% in 2009 (Economic Survey, 2010). Given the minimal growth in volume of trade by 1.6 % in 2009 and a minimal GDP growth rate of 2.6% in 2009 in Kenya, it was important to analyze the long run and causality relationship between trade openness and economic growth which was expected to produce valuable knowledge on the subject matter by analyzing the relationship between trade openness and economic growth in Kenya. This was to form useful material for reference to other researchers and policy makers in the area of formulating policy decisions. This study suggested significant policy measures through

its recommendations on the functional relationship between trade openness and economic growth in Kenya which not only add to literature but also important to policy makers and academia in trying to make decisions regarding what Kenya has to trade, and the terms on which trade should take place with other countries. This will enable the country by adopting the various policy recommendations to increase trade volumes which will in turn enhance growth.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter discusses literature related to relationship between trade openness, foreign aid, external debt and economic growth. The review particularly focused on theoretical framework and the empirical reviews in line with the objectives of the study mainly the relationship between; trade openness and economic growth, foreign aid and economic growth, external debt and economic growth. These are considered as the main pillars in this study.

2.2 Theoretical Framework

2.2.1 Absolute Advantage Theory

This study was modeled on Adam Smith's absolute advantage theory. Sen (2010) argued that to trace back the evolution of what today is recognized as the standard theory of international trade, one goes back the years between 1776 and 1826, which respectively mark the publications of Adam Smith's Wealth of Nations. Emeka (2010) asserted that the doctrine that trade enhances welfare and growth has a long and distinguished ancestry dating back to Adam Smith (1723-90). In his book, and inquiry into nature and causes of the wealth of nations (1776), Smith stressed the importance of trade as a vent for surplus production and as a means of widening the market thereby improving the level of productivity. He asserted that "between whatever places foreign trade is carried on, they all of them derive two distinct benefits from it. It carries the surplus part of the produce of their land for which there is no demand among them, and brings back in return something

else for which there is a demand. Emeka (2010) further summarized the absolute advantage theory of Adam Smith that countries should specialize in and export those commodities in which the trading partner has an absolute advantage. That is to say, each country should export those commodities it produced more efficiently.

However in adopting this classical trade theory, the researcher is not ignorant of its weaknesses. Thirlwall (2000) mentioned that the trade theory based on the classical ideas of Smith ignores the balance of payments consequences of trade. If a particular pattern of trade leads to balance of payments difficulties and the balance of payments is not self correcting through relative price (i.e. real exchange rate) movements, the gains from trade can easily be offset by the reductions in output and the increase in unemployment necessary to compress imports. This is an important consideration in thinking about the potential role of strategic protection and the speed of trade openness.

As applied to this study, the trade theory holds that trade openness would influence economic growth, thus there is a functional relationship between trade openness and economic growth hypothesized by use of Cobb –Douglas production function (3.3) to analyze the relationship between trade openness and economic growth in Kenya which as argued by Saleem *et al.* (2012) represents the relationship between outputs and inputs. In our relationship economic growth is the output and trade openness, foreign aid and external debt the inputs. Thirlwall (2000) argued that there can be little doubt about that, historically, trade has acted as an important engine of growth for countries at different stages of development, not only by contributing to a more efficient allocation of resources within countries, but also by transmitting growth from one part of the world to

another. Further, Thirlwall (2000) asserts that, given the predictions of trade theory and the facts, the important point to make is that the issue for developing countries in general, and Africa in particular, is not so much whether to trade but in what to trade, and the terms on which trade should take place with the developed countries of the world (or between themselves).

2.3 Empirical Literature

2.3.1 Relationship between Trade Openness and Economic Growth

Ahmadi and Mohebbi (2012) in their paper considered the effect of trade openness on economic growth in Iran for the period 1971-2008. Estimation results indicated that trade openness had a significantly positive effect on economic growth in Iran. However, there study was not exhaustive in the sense that they failed to incorporate correlation and causality analysis which forms an important part of the relationships analysis.

Ahmadi *et al*. (2012) analyzed the impact of trade openness and institutional variables on GDP growth of Pakistan using annual time series data for the period 1984 to 2010. The result indicated that there exists a negative long run equilibrium relationship between real GDP and trade openness. The error correction term (ECT) was statistically significant at the 5% level of significance. Although the authors tried to show trade openness-economic growth relationship, the gap that arose was that they failed to undertake correlation and causality relationship analysis to assess the association and direction of causality.

Arif and Ahmed (2012) analyzed the long run relationship between trade openness and output growth for Pakistan using annual time series data for 1972-2010. The study indicated a positive long run relation between the variables. The results of granger causality showed that there is a bi-directional significant relationship between trade openness and economic growth. However, Arif and Ahmed (2012) missed to undertake correlation analysis. This is an important part in relationships analysis and gives an overview of the association between variables.

Atif *et al. (*2010) investigated the impact of financial development and trade openness on GDP growth in Pakistan using annual data over the period 1980-2009. The empirical results confirmed the validity of trade led growth and financial led growth hypothesis in Pakistan. A co-integrated relationship between economic growth, trade openness and financial development was noticed in both the long-run and short-runs. Further analysis showed that trade openness and financial development Granger-cause economic growth in the period of study. Although, Atif *et al*. (2012) did cointegration and causality analysis, the gap of correlation analysis is evident in their study making relationship analysis not exhaustive.

Bajwa and Siddiqi (2011) investigated the causal link between trade openness and economic growth based on annual data for four South Asian countries that are Bangladesh, India, Pakistan and Srilanka for the sample period 1972 to 2007 with data divided into two spans that are from 1972 to 1985 and 1986 to 2007. In 1972-85 short run

unidirectional causality from GDP to openness is found whereas, in 1986-2007 there existed bi-directional causality between GDP and openness. However, the points of departure in relationships analysis included the failure to carry out correlation and cointegration analysis.

Domirhan and Akçay (2005) examined the causal relationship between openness and economic growth for the nine selected Middle East and North African (MENA) countries. This study used annual data on economic growth and openness for the following countries; Algeria (1960-1996), Egypt (1950- 2000), Iran (1955-2000), Israel (1950-2000), Jordan (1954-2000), Morocco (1950-2000), Syria (1960-2000), Tunisia (1961-2000) and Turkey (1950-2000). The results were indicative of unidirectional causality running from openness to economic growth in Egypt, Jordan and Syria. The test results also indicated that there is a bi-directional causality in Algeria. Even though, causality analysis was conducted, the gap of inconclusiveness was evident given the varied results and failure to incorporate correlation and cointegration analysis.

Hassan and Islam (2005) examined temporal causality among financial development, trade openness and economic growth in Bangladesh over the period from 1974 to 2003. The paper did not find any causal relationship between trade openness and growth. Also, Haq (2008) investigated empirically the direction and shape of causality among Trade openness, investment and economic growth using data for Bangladesh during the period 1980-2006. Granger causality test results confirmed that there exists unidirectional

causality between trade openness and growth. The results supported the conventional presumption about the relationships between trade openness and economic growth. Although, the researchers carried out their studies in the same country, it is evident that the results were varied hence a gap of lack of consensus on trade openness- economic growth relationship.

Hossain and Mitra (2013) examined the dynamic causal relationships between trade openness, foreign aid, domestic investment, long-term external debt, government spending and economic growth for a panel of 33 highly aid-dependent African countries Kenya included for the period 1974-2009. The long-run effects of trade openness, domestic investment and government spending on economic growth were significantly positive. Short-run bidirectional causality was found between economic growth and trade openness. Whereas these researchers tried to analyze trade openness- economic growth relationship, they failed to address the correlation analysis question.

Iqbal (2005) analyzed the impact of trade liberalization policy on GDP growth of Pakistan for the period ranging from 1972 to 2002. They found insignificant positive correlation between GDP and export and import. Both the models showed positive and significant correlation between GDP and investment. Also, Muhammed (2012) investigated effect of trade openness on economic growth in the long run by incorporating financial development as an additional determinant of economic growth in Pakistan using time series data for the period 1971 to 2011. The results confirmed

cointegration among the series. In long run, trade openness promotes economic growth. As much as the authors analyzed the relationship between trade openness and economic growth in Pakistan, they failed to incorporate at least one of the relationships analysis concepts; correlation, cointegration and causality.

Kahnamoui (2013) looked at the impact of trade barriers and trade openness on economic growth in the presence of export credits of 90 non-Organizations for Economic Co-operation and Development (OECD) countries. Even though the researcher did conduct correlation and causality analysis. The results showed no evidence of any change in the impact of trade restriction on economic growth but a positive and significant impact of trade openness on economic growth in the presence of export credits.

Karras (2003) investigated the effects of openness to international trade on economic growth by considering three variables; the investment-to-GDP ratio; the population growth rate; and government-purchases-to-GDP ratio using annual data for a sample of 56 economies Kenya included. The findings show that the effect of openness on economic growth is positive, permanent, and statistically significant. Also, Redlin and Gries (2012) examined the short-term and long-run dynamics between per capita GDP growth and openness for 158 countries Kenya included over the period 1970-2009. They explored the causal relationship between these two variables. The results suggested a long-run relationship between openness and economic growth and indicated a positive significant causality from openness to growth and vice versa. Whereas the researchers

established cointegration and causality, it is evident that, relationship analysis was not exhaustive since they failed to attempt correlation analysis.

Osabuohein (2007) examined the impact of trade openness, real government expenditure, labour force and real capital stock for both on economic performance of ECOWAS Members focusing on Ghana and Nigeria (1975-2004). A unique relationship between economic performance, trade openness, real government expenditure, labour force and real capital stock for both Ghana and Nigeria was established. Trade openness and real government expenditure impact positively the economies of Ghana and Nigeria. Further, Omisakan *et al*. (2009) examined the empirical econometric evidence of causal interrelationship among foreign direct investment, trade openness and economic growth in Nigeria. The study covered the periods from 1970- 2006. The results revealed unidirectional causality running from Foreign Direct investment to output and trade openness to output. However, the points of departure in relationships analysis included the failure to carry out correlation and cointegration analysis.

Razmi and Rafaei (2013) investigated how economic freedom impacts economic growth using 17(Middle East and East Asian) countries' data during 2000-2009 using five variables; openness, physical capital, employment, human capital and population. The results showed that overall index of economic freedom is positively and robustly correlated with growth, further, the results demonstrated that trade openness is positively associated and statistically significant determinant of growth. They found that economic

freedom has significant effect on economic growth. Although, the researchers' analysis focused on correlation and cointegration, the gap of relationship analysis exhaustiveness arose by failing to incorporate causality test.

Saleem *et al*.(2012) in their study estimated the impact of FDI, exchange rate, capital-labor ratio and trade openness on GDP growth rate for 38 African countries Kenya included from 1980 to 2008. The results found trade openness having a positive relationship with GDP. On the other hand, Ulaşan (2012) revisited the empirical evidence on the relationship between trade openness and long-run economic growth in Turkey over the sample period 1960-2000. Their findings indicate that many openness variables are positively and significantly correlated with long-run economic growth. However, Saleem *et al*. (2012) and Ulaşan (2012) in their trade openness- economic growth relationship analysis failed to conduct causality test, hence the gap of relationship analysis exhaustiveness.

Yaoxing (2010) examined the long-run impact of foreign direct investment and trade openness on economic growth in Cote d'Ivoire using data span for the period 1980-2007. Amongst the key results it was found: a long run relationship between the foreign direct investment, trade openness and output. Both foreign direct investment and trade openness were significant in explaining output growth in Cote d'Ivoire. The Granger causality revealed unidirectional causal relationship running from foreign direct investment, trade openness to output and from output, foreign direct investment to trade openness. Both

foreign direct investment and trade openness are significant in explaining output growth in Cote d'Ivoire. Although the researcher attempted to analyze trade openness- economic growth relationship, the gap clearly evident is that of exhaustiveness by failing to carry out correlation analysis.

Yusoff and Febrina (2012) examined the relationships among economic growth, domestic investment, real exchange rate, and trade openness in Indonesia. The results suggested that there exists a significant long-run relationship among the variables. All coefficients had the correct positive signs and significant at least at 5 percent level. Granger causality test results suggest that all the variables cause real GDP in the short-run. Both the trade openness and gross domestic investment cause growth uni-directionally in short-run. The gap of exhaustiveness in relationship analysis is evident in the works of Yusoff and Febrina (2012), where they failed to carry out correlation analysis.

Based on the review of respective studies, several studies on the relationship between trade openness and economic growth have been undertaken. However, it is evident that there is a gap created by lack of consensus on the relationship between trade openness and economic growth given the varied results. Further, it is noted that most of the researchers did not exhaustively examine the relationship by not undertaking correlation, cointegration or causality analysis. This study therefore determined the relationship between trade openness and economic growth in Kenya.

2.3.2 Relationship between Foreign Aid and Economic Growth

Whereas Asteriou (2008) found support of the theoretical hypothesis of a positive relationship between foreign aid and GDP growth by using a panel data set comprising of five South Asian economies, Jayid and Qayyum (2011) by examining the effectiveness of foreign aid in Pakistan using the data for the period 1960 to 2008 found that foreign aid and real GDP have a negative relationship. It should be noted that, the reviews created a gap in terms of consensus with regard to the actual relationship between foreign aid and economic growth. This is due to the varied positive and negative results.

Irandoust and Hatemi (2005) investigated the relationship between foreign aid and economic growth for a panel of developing countries (Botswana, Ethiopia, India, Kenya, Sri-Lanka, and Tanzania) over the period 1974-1996. The results revealed that the variables cointegrate. The long-run elasticities (close to one for most countries) showed that foreign aid has a positive and significant effect on economic activity for each country in the sample. Further, Tadesse (2011) showed that foreign aid is effective in enhancing growth. This was done by examining the impact of foreign aid on investment and economic growth in Ethiopia over the period 1970 to 2009 using multivariate cointegration analysis. Although the analysis revealed similar results, the researchers did not undertake correlation and causality test which form part of relationships analysis.

By assessing the foreign aid-led growth hypothesis in a panel of West African countries using panel cointegration techniques, Jones (2013) found a long run relationship between aid and growth in the whole panel and unidirectional causality from foreign aid to economic growth. Further, Sakyi (2010) investigated whether there is a long run equilibrium relationship between trade openness, foreign aid and economic growth in Ghana over the period 1984 to 2007. The paper found that the effect is positive and statistically significant in both the short-run and the long run. However, an exhaustiveness gap arose given that Jones (2013) and Sakyi (2013) in their studies failed to undertake correlation which is an important part of relationship analysis.

Kargbor (2012) examined the impact of foreign aid on economic growth in Sierra Leone using the Johansen maximum likelihood approach for the period 1970-2007; they found that foreign aid has a significant contribution in promoting economic growth in the country. Also, Njoupouognigni and Ndambendia (2010) found a strong evidence of positive impact of foreign aid and foreign direct investment on economic growth. They investigated the long-run relationship between foreign aid, foreign direct investment and economic growth in 36 Sub-Saharan Africa countries Kenya included over the period 1980-2007. However, their studies have a gap with regard to relationships analysis exhaustiveness where they failed to undertake correlation and causality tests.

Given the respective reviews, several studies on the relationship between foreign aid and economic growth have been undertaken. However, it is evident that there is a gap created

by lack of consensus on the relationship between foreign aid and economic growth given the varied results. Further, it is noted that the researchers did not exhaustively examine the foreign aid-growth relationship. They failed to undertake correlation, cointegration or causality analysis. This study therefore established the relationship between foreign aid and economic growth in Kenya.

2.3.3 Relationship between External Debt and Economic Growth

Abayie and Frimpong (2006) estimated empirically the impact of external debt on economic growth in Ghana for the period 1970 to 1999. They tested for stationarity and longrun relationship among variables and used a vector error correction to estimate the short run impacts. The results indicated that GDP growth is influenced positively by external debt inflows. Although the researchers tried to analyze external debt- economic growth relationship, the gap that arose was that they failed to undertake correlation and causality relationship analysis.

Ezeabasili *et al*. (2011) investigated the relationship between Nigeria's external debt and economic growth, between 1975 and 2006. The pairwise Granger Causality test revealed that uni-directional causality exists between external debt and economic growth at the 10 percent level of significance. However, Ezeabasili *et al*. (2011) did not exhaustively analyze the relationship between external debt and economic growth. This was as a result of not conducting correlation and causality tests.

Kasidi and Said (2013) investigated the impact of external debt on economic growth of Tanzania for the period of 1990-2010. Using time series data on external debt and economic performance, the study revealed that there is significant impact of the external debt and debt service on GDP growth. For the long run relationship, the co-integration test showed that there was no long run relationship of the external debt and GDP. The gap of exhaustiveness in external debt-growth relationship analysis is evident whereby the researchers failed to carry out correlation and causality analysis.

Given that Nawaz *et al*. (2012) in their analysis of long run and short run dynamics spanning 1980 to 2010 in Pakistan, established positive long run relationship between external debt and economic growth by use of Johansen cointegration test, Were (2001) using time series data for the period 1970-75 to examine the structure of Kenya's external debt and its implications on economic growth, found that external debt has a negative impact on economic growth. Although the researchers based their works on time series data, the gap of divergent views on the relationship between external debt and economic growth is clearly evident following the varied results.

Based on the respective reviews, several studies on the relationship between external debt and economic growth have been undertaken. However, it is evident that there is a gap created by lack of consensus on the relationship between external debt and economic growth given the varied results. Further, it has emerged that the researchers did not exhaustively examine the external debt-growth relationship. They failed to undertake

correlation, cointegration or causality analysis. This study therefore examined the relationship between external debt and economic growth in Kenya.

2.4 Summary of Missing Knowledge Gaps

In summary, there is strong indication that several research works have been conducted on the relationship between trade openness, foreign aid, external debt and economic growth. However, the short comings in these reviews is the failure to; establish a robust relationship between trade openness, foreign aid, external debt and economic growth following the divergent views of the various researchers and lack of relationship analysis exhaustiveness. The main purpose of this study was to address these critical issues by analyzing the relationship between trade openness, foreign aid, external debt and economic growth in Kenya using correlation analysis, cointegration and Granger causality test.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers the research design, model specification, measurement of variables, diagnostic test, study area, target population, sample size, sources of data and analysis.

3.2 Research Design

This study was conducted using correlation research design based on time series data. According to Oso and Onen (2011), correlation research design provides rigorous and replicable procedure for understanding relationships and determines whether, and to what degree, a relationship exists between quantifiable variables. The study analyzed the relationship between; trade openness and economic growth, foreign aid and economic growth, external debt and economic growth in Kenya by use of correlation coefficients, cointegration test, vector error correction mechanism and the Granger Causality test.

3.2.1 Model Specification

This study was conducted based on the Cobb- Douglas production function to analyze the relationship between trade openness, foreign aid, external debt and economic growth in Kenya. Saleem *et al. (*2012) argued that the Cobb- Douglas production function is widely used to represent the relationship between outputs and inputs. We applied Cobb-Douglas function, following Saleem as represented below;

$$Q = AL^{\alpha}K^{\beta} \qquad (3.1)$$

Where

Q = Output (monetary value of all commodities produced per annum)

L = Labour input (The total value in monetary terms of hours worked in a year)

K = Capital input (The monetary worth of all machinery, equipment, and buildings)

A = Total factor productivity

α and β are the output elasticities of labour and capital respectively.

Bao Hong (2008) explained as captured by Saleem *et al*., (2012) that the elasticities measure the responsiveness of the dependent variable to a change in the levels of the independent variables used in the production process. Further, Saleem *et al*., (2012) asserted that another feature of the Cobb- Douglas function is the concept of returns to scale; constant, increasing and decreasing returns to scale. Constant returns to scale means that the proportional change in inputs and outputs is equal represented as $\alpha + \beta = 1$. Increasing returns to scale means a proportional change in inputs is less than the proportional change in output represented as $\alpha + \beta > 1$. Decreasing returns to scale is when the proportional change in inputs is more than the proportional change in the outputs represented as $\alpha + \beta < 1$.

The model was adopted from the Cobb- Douglas production function for establishing relationship between trade openness, foreign aid, external debt and economic growth in Kenya. The Cobb- Douglas production function represented by equation (3.1) was modified to establish the functional relationship between trade openness, foreign aid, external debt and economic growth as shown in equation (3.3)

$$Y_t = f(T_t, F_t, E_t, \mu_t) \qquad (3.2)$$

Equation (3.2) can be rewritten in form of equation (3.1) as;

$$Y_t = AT_t^{\alpha} F_t^{\beta} E_t^{\delta} e^{\mu_t} \quad (3.3)$$

Where,

Y_t = Real GDP

A = Total factor Productivity

T_t = Trade openness

F_t = Foreign aid

E_t = External debt

μ_t = Error term

$\alpha, \beta \text{ and } \delta =$ elasticities

There was no restriction applied to the equation (3.3), that is $(\alpha + \beta + \delta) \neq 1$ for the return to scale to be determined from the model.

Transforming equation (3.3) into natural logs we obtain;

$$\ln Y_t = \ln A_t + \alpha \ln T_t + \beta \ln F_t + \delta \ln E_t + \mu_t \quad (3.4)$$

Equation (3.4) can be rewritten as;

$$\ln Y_t = \theta + \alpha \ln T_t + \beta \ln F_t + \delta \ln E_t + \mu_t \quad (3.5)$$

Where

t = 1980, 1981,..., 2009 denotes time period

$\mu_t \sim IID(0, \sigma^2)$ = the natural log of e^{μ_t}

$\theta = \ln A_t$ (Total factor productivity),

$\alpha, \beta, \delta =$ Elasticity coefficients,

$lnY_t =$ Dependent variable (economic growth),

$lnT_t, lnF_t, lnE_t =$ The independent variables representing trade openness, foreign aid and external debt respectively.

3.2.2 Measurement of Variables

The variables specified in the model (3.5) were measured as below;

Real GDP

Y_t – Represents Gross Domestic Product. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.

Trade Openness

T_t- Refers to Trade Openness. Implies the removal or reduction of restrictions or barriers on the free exchange of goods between nations (imports and exports).Trade openness is measured by the sum of exports and imports of goods and services measured as a share of gross domestic product. $TradeOpenness = \frac{(imports + exports)}{GDP}$

Foreign Aid

F_t - Represents foreign aid which is measured by net bilateral aid flows from Development Assistance Committee (DAC) donors.

External Debt

E_t - Total external debt was measured by the debt owed to non-residents repayable in foreign currency, goods, or services.

3.2.3 Correlation

Correlation is concerned with finding out whether there is an association between two or more variables, and if there is determines its strength and direction. This study used correlation coefficients obtained from the correlation matrix to determine if there exists correlation between trade openness, foreign aid, external debt and economic growth in Kenya. This was based on the hypothesis that;

$H_0 : r = 0$; There is no correlation

$H_1 : r \neq 0$; There is correlation

3.2.4 Stationarity Test

3.2.4.1 Introduction

A stochastic process is said to be stationary if its mean and variance are constant over time and the covariance between the two time periods depends only on the lag between the two time periods and not the actual time at which the covariance is computed

(Gujarati, 2004). The study employed unit root test. Unit root is a widely popular test of stationarity (or non-stationarity) over the past several years (Gujarati, 2004).

Practically, this study involved estimating equation (3.6) to ascertain the existence of unit root.

$$\Delta Y_t = \delta Y_{t-1} + \mu_t \quad (3.6)$$

Where equation (3.6) is the first difference operator.

The following hypothesis was tested;

$H_0 : \delta = 0$, that is, unit root exists (time series is non stationary)

$H_1 : \delta < 0$, time series is stationary

This study adopted the Augmented Dickey Fuller (ADF) test to test for unit root. The test is based on the assumption that the error term μ_t are correlated (autocorrelation).

3.2.4.2 Augmented Dickey – Fuller (ADF) Test

A random walk may have no drift, or it may have drift, or it may have both deterministic and stochastic trends (Gujarati, 2004). The ADF test involved testing the following three models to capture the various possibilities.

$$\Delta \ln Y_t = \delta \ln Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta \ln Y_{t-i} + \varepsilon_t \quad (3.7)$$

$$\Delta \ln Y_t = \beta_1 + \delta \ln Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta \ln Y_{t-i} + \varepsilon_t \quad (3.8)$$

$$\Delta \ln Y_t = \beta_1 + \beta_2 t + \delta \ln Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta \ln Y_{t-i} + \varepsilon_t \quad (3.9)$$

Where ε_t is a pure white noise error term ($\varepsilon_t \sim IIDN(0, \sigma^2)$),

m = lag length

In each case we test the hypothesis;

$H_0 : \delta = 0$, unit root exists (time series is non stationary)

$H_1 : \delta < 0$, time series is stationary

3.2.5 Cointegration Test

3.2.5.1 Johansen Cointegration Test

Emeka (2003) argued that individual time series in a model may be spurious but their linear combination may not and this is the purpose of cointegration test. Economically speaking, two (or more) variables will be cointegrated if they have a long-term, or equilibrium relationship between (or among) them (Gujaratti, 2004). The test followed in this study was that of Johansen Cointegration test.

Ssekuma (2011) argue that Johansen procedure builds cointegrated variables directly on the maximum likelihood estimation instead of relying on OLS estimators and is able to detect more than one cointegrating relationship if present. The number of cointegrating vectors in Johansen procedure was detected by the use of two likelihood ratio tests namely; the trace test and the maximum eigenvalue.

3.2.6 Vector Error Correction Model (VECM)

Emeka (2003) stressed that an important issue in econometrics is the need to integrate short run dynamics with long run equilibrium. Though there may be a long-term, or equilibrium relationship between variables, in the short run there may be disequilibrium. This study used the Error Correction Mechanism to validate the existence of long-term relationship and correction of the short run disequilibrium. Following Granger representation theorem which states that If two (or more) variables Y and X are cointegrated, then the relationship between (or among) them can be expressed as error correction mechanism, then the relationship in model (3.5) can be expressed as follows

$$\Delta \ln Y_t = \alpha_{10} + \sum_{i=1}^{p} \alpha_{11} \Delta \ln T_{t-i} + \sum_{i=1}^{p} \alpha_{12} \Delta \ln Y_{t-i} + \sum_{i=1}^{p} \alpha_{13} \Delta \ln F_{t-i} + \sum_{i=1}^{p} \alpha_{14} \Delta \ln E_{t-i} + \lambda_i \mu_{t-1} + \varepsilon_{1t} \quad (3.10)$$

$$\Delta \ln T_t = \alpha_{20} + \sum_{i=1}^{p} \alpha_{21} \Delta \ln T_{t-i} + \sum_{i=1}^{p} \alpha_{22} \Delta \ln Y_{t-i} + \sum_{i=1}^{p} \alpha_{23} \Delta \ln F_{t-i} + \sum_{i=1}^{p} \alpha_{24} \Delta \ln E_{t-i} + \lambda_i \mu_{t-1} + \varepsilon_{2t} \quad (3.11)$$

$$\Delta \ln F_t = \alpha_{30} + \sum_{i=1}^{p} \alpha_{31} \Delta \ln T_{t-i} + \sum_{i=1}^{p} \alpha_{32} \Delta \ln E_{t-i} + \sum_{i=1}^{p} \alpha_{33} \Delta \ln Y_{t-i} + \sum_{i=1}^{p} \alpha_{34} \Delta \ln F_{t-i} + \lambda_i \mu_{t-1} + \varepsilon_{3t} \quad (3.12)$$

$$\Delta \ln E_t = \alpha_{40} + \sum_{i=1}^{p} \alpha_{41} \Delta \ln T_{t-i} + \sum_{i=1}^{p} \alpha_{42} \Delta \ln E_{t-i} + \sum_{i=1}^{p} \alpha_{43} \Delta \ln F_{t-i} + \sum_{i=1}^{p} \alpha_{44} \Delta \ln Y_{t-i} + \lambda_i \mu_{t-1} + \varepsilon_{4t} \quad (3.13)$$

Where

ε_{1t}, ε_{2t}, ε_{3t}, ε_{4t} = white noise error terms,

p = lag length, μ_{t-1} = Error correction Term (ECT) that guides the variables Y_t, T_t, F_t, E_t to restore back to equilibrium.

3.2.7 Diagnostic Tests

3.2.7.1 Introduction

The study involved carrying out various diagnostic tests to investigate whether the assumptions of the regression analysis are satisfied which refer to; distribution of random variable, relationship between error terms, the relationship between explanatory variables themselves and the constant variance of the residuals. The tests included; economic a priori criteria, normality test, autocorrelation test, multicollinearity test and heteroscedasticity test.

3.2.7.2 Economic a priori criteria

This was determined by the principle of economic theory and refers to the size and sign of the parameters of economic relationship. The aim was to confirm whether the parameter estimates conform to a priori expectation. Table 3.1 captures definition of variables and expected signs of coefficients.

Table 3.1

Expected Signs of the Coefficients of Independent Variables and Definitions

Variable	Definition	Expected sign

Y_t	Represents Gross Domestic Product. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products (World Development Indicators, 2013).	Dependent variable and considered to be stochastic (Emeka, 2010)
T_t	Refers to Trade Openness. The removal or reduction of restrictions or barriers on the free exchange of goods between nations (imports and exports) measured by the sum of exports and imports of goods and services measured as a share of gross domestic product (World Development Indicators, 2013).	Positive (α) Karras (2003), Ahmadi and Mohebbi (2012), Yusoff and Febrina (2012)
F_t	A measure of foreign aid. Measured by net bilateral aid flows from DAC donors, are the net disbursements of official development assistance (ODA) or official aid from the members of the Development Assistance Committee (DAC) (World Development Indicators, 2013).	Positive (β) Sakyi (2010), Asteriou (2008)
E_t	Total external debt is debt owed to non-residents repayable in foreign currency, goods, or services (World Development Indicators, 2013).	Positive (δ). Kasidi and Said (2013), Hossain and Mitra (2013)
μ_{t-1}	Error Correction Term	Negative (λ). Gujarati (2004)

Note. Author's Compilation from Books, Empirical Studies and World Development Indicators.

3.2.7.3 Normality Test

Normality test was carried out to verify if the error terms are normally distributed. The Jacque-Bera (JB) test was employed to ascertain this assumption. The JB test statistic is given by; $JB = \frac{n}{6}(S^2 + \frac{(k-3)^2}{4})$ and follows a chi^2 distribution with 2 degrees of freedom

$(\chi^2\ (2df))$. Where n= no. of observations, s= skewness and k = kurtosis. The test was based on the null hypothesis that the residuals are normally distributed.

3.2.7.4 Autocorrelation Test

Autocorrelation or serial correlation refers to the case in which the error term in one time period is correlated with the error term in any other time period. Classical linear regression assumes that such correlation does not exist. As a result of a crucial limitation of Durbin-Watson (DW) statistic, that it becomes invalid when applied to a regression equation which includes a lagged dependent variable among its regressors and cannot test for higher order autocorrelation, the Breusch-Godfrey (LM) test was employed.

3.2.7.5 Multicollinearity Test

Multicollinearity refers to a case in which two or more explanatory variables in the regression model are highly correlated making it difficult to isolate their individual effects on the dependent variable. Detection was by Variance Inflation Factor (VIF). Gujarati (2004) argues that the rule of thumb is that if Variance Inflation Factor (VIF) exceeds 10, that variable is said to be highly collinear.

3.2.7.6 Heteroscedasticity Test

Heteroscedasticity occurs when the variance of the error term is not constant. The study employed White's General heteroscedasticity Test. Gujarati (2004) asserts that the general test of heteroscedasticity proposed by White does not rely on the normality assumption and is easy to implement.

3.2.8 Causality Test

3.2.8.1 Introduction

Cointegration gives signal that there is possibility of causality but does not show direction of causality. This study adopted the Granger Causality test because according to Gujaratti (2004), the test is a useful descriptive tool for time series data**.**

3.2.8.2 Granger Causality Test

The following pair of regressions was estimated to establish pair wise Granger causality;

$$\Delta \ln Y_t = \alpha_{1j} + \sum_{i=1}^{p} \alpha_{11i} \Delta \ln Y_{t-i} + \sum_{i=1}^{p} \alpha_{12i} \Delta \ln T_{t-i} + \sum_{i=1}^{p} \alpha_{13i} \Delta \ln E_{t-i} + \sum_{i=1}^{p} \alpha_{14i} \Delta \ln F_{t-i} + \mu_{1t} \quad (3.14)$$

$$\Delta \ln T_t = \alpha_{2j} + \sum_{i=1}^{p} \alpha_{21i} \Delta \ln T_{t-i} + \sum_{i=1}^{p} \alpha_{22i} \Delta \ln Y_{t-i} + \sum_{i=1}^{p} \alpha_{23i} \Delta \ln E_{t-i} + \sum_{i=1}^{p} \alpha_{24i} \Delta \ln F_{t-i} + \mu_{2t} \quad (3.15)$$

$$\Delta \ln E_t = \alpha_{3j} + \sum_{i=1}^{p} \alpha_{31i} \Delta \ln T_{t-i} + \sum_{i=1}^{p} \alpha_{32i} \Delta \ln E_{t-i} + \sum_{i=1}^{p} \alpha_{33i} \Delta \ln Y_{t-i} + \sum_{i=1}^{p} \alpha_{34i} \Delta \ln F_{t-i} + \mu_{3t} \quad (3.16)$$

$$\Delta \ln F_t = \alpha_{4j} + \sum_{i=1}^{p} \alpha_{41i} \Delta \ln T_{t-i} + \sum_{i=1}^{p} \alpha_{42i} \Delta \ln E_{t-i} + \sum_{i=1}^{p} \alpha_{43i} \Delta \ln F_{t-i} + \sum_{i=1}^{p} \alpha_{44i} \Delta \ln Y_{t-i} + \mu_{4t} \quad (3.17)$$

Where it was assumed that the error terms μ_{1t}, μ_{2t}, μ_{3t} and μ_{4t} are uncorrelated. The study involved testing the following hypothesis;

H_0: No causality,

H_1: Causality exists

3.3 Study Area

Kenya is located on the eastern coast of Africa, bordering Somalia to the east; Ethiopia to the north; Sudan to the northwest; Uganda to the west and Tanzania to the south. The Indian Ocean lies to the southeast (Kituyi *et al*., 2005). Kenya is located approximately between latitudes 5ºN and 4º 40' and extends from longitude 33º 53' East of Greenwich Meridian to 41º 55.5' East. Kenya's geographical position makes it a major gateway for trade to the Eastern and Central Africa region (Kituyi *et al*., 2005).

3.4 Target Population

The target population consisted the macroeconomic variables of trade openness, real exports, real imports, official exchange rate, foreign aid and external debt that affect economic growth in Kenya.

3.5 Sample Design and Sample Size

The sample in this study consisted of annual time series data set for the period of 30 years spanning from 1980 – 2009 for the variables of economic growth, trade openness, real exports, real imports, official exchange rate, foreign aid and external debt in Kenya.

3.6 Data Collection

3.6.1 Sources of Data

Data used in the study was obtained from official published documents of the World Bank; World Development Indicators. The analysis was based on annual time series data

on real exports, real imports, trade (% of GDP), official exchange rate, foreign aid, total external debt and real GDP from the World development Indicators.

3.7 Data Analysis

The study used inferential data analysis to analyze this quantitative research data. Oso and Onen (2009) explained that, inferential analysis is used to draw conclusions concerning the relationships and differences found in research results. The techniques employed included; correlation and regression analysis inferential data analysis techniques. Oso and Onen (2009) asserted that correlation is used when a researcher wants to describe the association between two or more variables in terms of magnitude and direction while regression analysis is used when a study is about prediction of variables from other predictor variables. Further since according to Oso and Onen (2009), correlation and regression analysis cannot prove cause-effect relationships; the study employed cointegration and Granger causality tests. For the various techniques mentioned data analysis was conducted using Econometric estimation software Eviews.

3.8 Data Presentation

The study analyzed the relationship between trade openness and economic growth in Kenya. This was in light of the lack of consensus on the contribution of trade openness to economic growth between policy makers and civil society in Kenya and the divergent views on the relationship between trade openness and economic growth among various researchers. Data obtained from official published documents of the World Bank; World Development Indicators was presented using figures and tables. Oso and Onen (2009) describe tables and figures as useful in presenting findings because they can summarize a lot of information in a small space.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Introduction

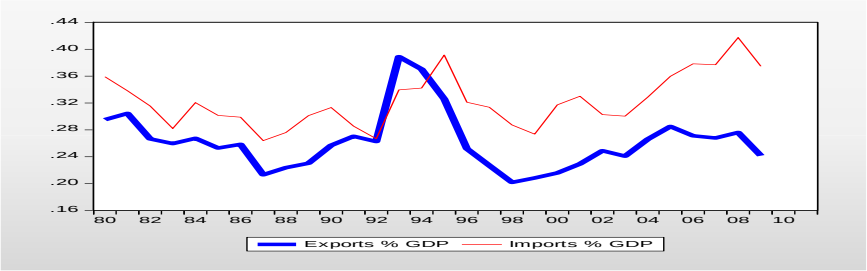
This study analyzed the relationship between trade openness and economic growth in Kenya that is, to establish country specific characteristics of the relationship. This was in light of the lack of consensus on the contribution of trade openness to economic growth between policy makers and civil society in Kenya and the divergent views from empirical studies on the relationship between trade openness, foreign aid, external debt and economic growth. Time series data obtained from World bank documents; world development indicators for the period of 30 years spanning from 1980 to 2009 was analyzed to; determine correlation, establish time series property of stationarity, establish cointegration and examine causality between trade openness, foreign aid, external debt and economic growth in Kenya . This chapter presents and discusses the growth trends of real GDP, imports, exports, external debt and foreign aid in Kenya for the period 1980 - 2009 and findings of analysis.

4.2 Trend Analysis

4.2.1 Trend of Exports and Imports as a percentage of real GDP in Kenya

Figure 4.1 below shows Kenya's exports and imports as a percentage of real GDP for the period 1980 –2009. Clearly as depicted there is a steady decline in imports and exports in the early 1980s, an increase in the late 1980s and a further fall in the early1990s. The upward trend in imports and exports picked up in the mid 1990s before slipping back in the late 1990s. Morrisey and Amanja (2005) assert that the pronounced swings in the trend of imports around 1983/84 and 1993/94 coincide with the advent of structural

adjustment programmes in the early 1980s as well as trade and financial sector liberalization of early and mid 1990s. Volatile upward trend is experienced from 2003 for imports to its highest in 2007. According to Roberts and Fageniäs (2004) after 1980, the structure of merchandise exports fluctuated but was trendless, with non-traditional exports failing to raise their share significantly. The drivers of growth in the 1980s were tourism and tea, which respectively accounted for nearly 70% and over 30% of the increase in the value of exports of goods and non-factor services over the decade. During the 1990s, tourism earnings in current dollars fell, with mounting traveler concern about security. The honours of raising exports were once again to tea (contributing 37% of the rise in dollar values), and to the horticulture and agricultural raw materials, which each contributed 25%. In the late 1990s horticultural and flower exports grew vigorously, raising the combined share to nearly 20%. Kenya has been experiencing worsening trade balance over years (Economic Survey, 2012) as depicted in the figure 4.1 except for years 1992-1995. According to the Ministry of trade (2008) while total exports and imports increased in 2007, trade balance widened further from a deficit of Kshs.270.5 billion in 2006 to Kshs.330.5 billion in 2007 reflecting an increase of 22.2%, reflecting that imports grew faster than the exports.

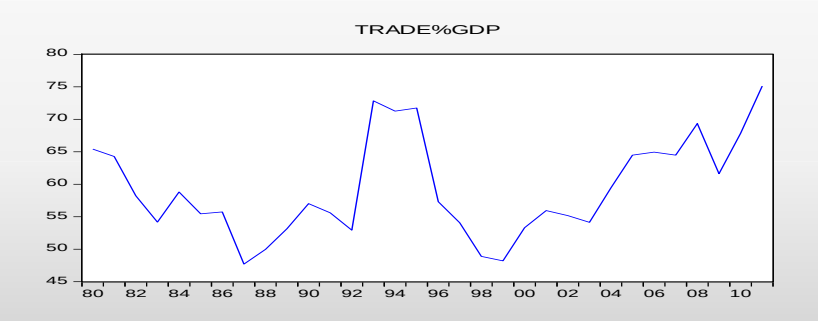


Source. Author's computation using EVIEWS 7.1

***Figure 4.1*. Trend of imports and exports as a percentage of real GDP in Kenya**

4.2.2 Trend of Trade Openness in Kenya

Figure 4.2 below shows Kenya's trade trend for the period 1980 –2009. Clearly as depicted there is a steady decline in trade in the early 1980s, an increase in the late 1980s and a volatile growth in the early1990s which is lost in the late 1990s. Roberto and Fagernäs (2004) assert that Kenya's economy experienced a declining trend in its trade/GDP ratio until the late 1980s. Kenya lost world market share for its coffee exports, but was able to increase its presence in the exports market for tea and horticultural products, in the 1990's there was rapid real export growth, notably through the expansion of exports of garments (Roberto and Fagernäs 2004). According to the (Ministry of Trade, 2008), the trade sector has shown growth trend from 2003 to 2007. This is partly due to increase in trade particularly within the East African Community (EAC) and the Common Markets of Eastern and Southern Africa (COMESA) regions. According to (Economic Survey, 2010), domestic exports grew marginally by 0.3% while re-exports declined by 4.1%. Total imports grew by 2.3% in 2009 compared to a 27.4% growth recorded in 2008. This resulted in the volume of trade growing by 1.6% in 2009 compared to a growth of 26.8% in 2008.



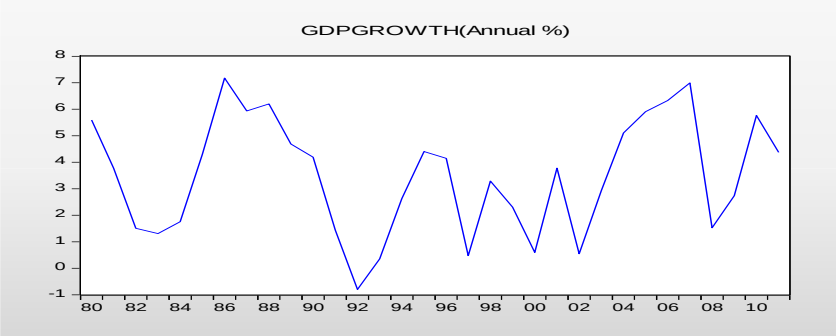
Source. Author's computation using EVIEWS 7.1

Figure 4.2. **Trend of trade openness in Kenya**

4.2.3 Trend of Real GDP Growth Rate in Kenya (Annual %)

Figure 4.3 shows Kenya's real GDP growth for the period 1980-2009. Economic growth of Kenya was on a downward trend in the 1980s (the early years of the era of trade liberalization and structural adjustment programs). The economy picked in the mid 1980s and averaged over 7% in 1986 before slipping to a negative in the 1990s. Kenya's growth momentum was lost in the 1990s as the result of a combination of factors which include; instability, mounting public debt, the bouched implementation of (extensive) economic liberalization and institutional reforms, the effects of physical insecurity on tourism, worsening corruption at all levels and extension of cronyism in the formal private sector (Roberts and Fagernäs, 2004). Rapid growth of the economy is experienced from 2003 with the economy averaging 7% in 2007 before slipping to as low as 1.6% in 2008. According to (Economic Survey, 2010), growth in Kenya recorded a major decline in 2008 of 1.6% the lowest since 2003. This real GDP growth trend can not only be attributed to trade but many other factors and Wanjala *et al*., (2009) argued that between 2004 and 2007, Kenya's economy showed signs of revitalization and average annual growth rate climbed above 5 per cent, however, the political turmoil of 2008 slowed

growth, and the global financial and economic crisis has made it difficult to return to high growth rates.



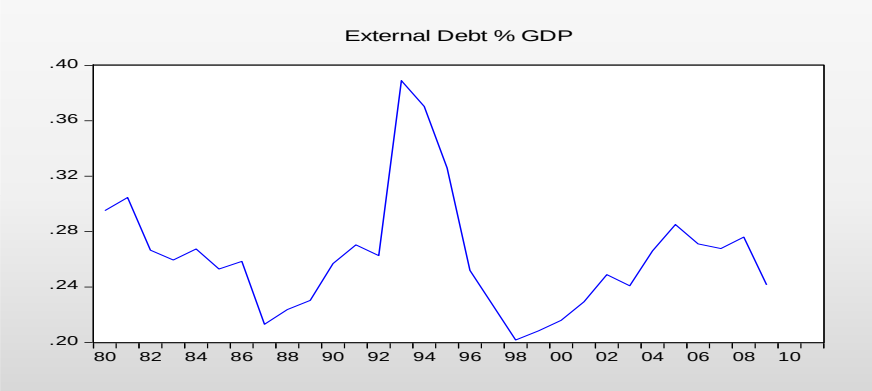
Source. Author's computation using EVIEWS 7.1

Figure 4.3. **Trend of real GDP growth rate in Kenya (annual %)**

4.2.4 Trend of External Debt as % of Real GDP in Kenya

Figure 4.4 shows Kenya's external debt trend as a percentage of real GDP for the period 1980-2009. External debt of Kenya was on a downward trend in the early to mid 1980s. In the 1980s and the years preceding, Kenya was among the major aid recipients in Africa, largely to put up infrastructure so as to integrate the large rural economy into the then emerging import substitution Kenyan economy (Mutuku and Putunoi, 2013). Mwega (2009) asserts that the multivariate aid (mainly in form of loans) increased moderately in the 1980s and early 1990s, primarily due to the disbursement of the World Bank adjustment lending under SAPs. The share of external debt increased sharply from the early 1990s to mid 1990s before declining sharply in the late 1990s. The 1990s witnessed a steady decline in development assistance to Kenya occasioned by a perception of poor governance and mismanagement of public resources and development assistance. Other factors include the end of the cold war and the collapse of the Soviet Union. These led to

a debt crisis in the country in the early 1990s which turned Kenya into a highly indebted nation. The debt problem was exacerbated by macroeconomic mismanagement in the 1990s such as the Goldenberg scandal which fleeced Kenyans billions of shillings leading to a reduction of donor inflows (Mutuku and Putunoi, 2013). An upward trend picked up from 2000 to 2007 and Mwega (2009) attributed this to increased government borrowing to finance development projects on infrastructure.



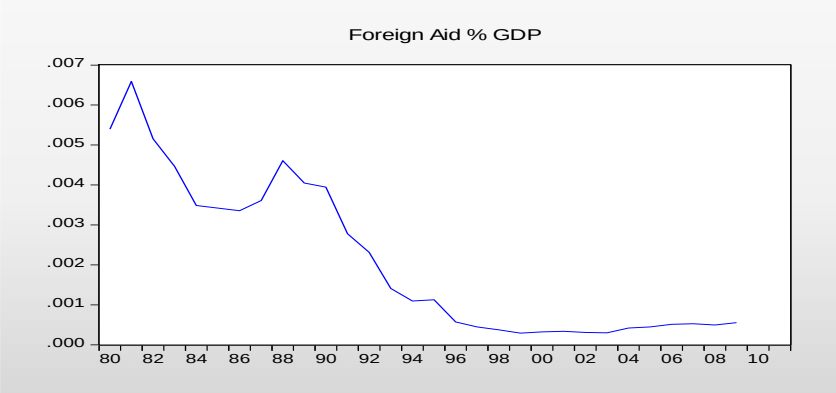
Source. Author's computation using EVIEWS 7.1

***Figure 4.4*. Trend of external debt as % of real GDP in Kenya**

4.2.5 Trend of Foreign Aid as % of Real GDP in Kenya

Figure 4.5 depicts Kenya's foreign aid as a percentage of real GDP trend for the period 1980-2009. In the early 1980s the country experienced an upward trend before starting to decline in the 1982. Mwega (2009) asserts that since 1980s, the country has experienced relatively unpredictable flows of international aid. While Kenya experienced a dramatic build- up in nominal aid flows in the 1980s, there was a slackening of donor support in the 1990s. According to Mule *et al*. (2002) as captured by Mwega (2009) since 1993, foreign aid started to decline dramatically, with two major episodes of aid freeze and donor withdrawals as the government reneged on its commitments to donors with some

recovery thereafter in response to a new government in December 2002. McCormick *et al*., 2007 as noted by Mwega (2009) argued that the drop in aid in the 1990s reflected Kenya's own falling out with donors over the implementation of Structural Adjustment Programs (SAPs) and the general decline in aid to Sub Saharan Africa following the end of the Cold War. Mwega (2009) further affirms that increased aid flows since 2002 were as a result of increased inflows of grants to support government efforts in social sectors and humanitarian responses to drought following successful Consultative Group (CG) meetings in 2003 and 2005. According to Mule *et al*. (2002) as captured by Mwega (2009), the increase in foreign aid therefore reflected renewed donor confidence in the government's resolve for proper management of the economy and situating adequate government measures against graft and corruption.



Source. Author's computation using EVIEWS 7.1

***Figure 4.5*. Trend of foreign aid as % of real GDP in Kenya**

4.3 Discussion of Findings

4.3.1 Descriptive Analysis of Variables

Descriptive statistics gives initial indication of variables that can be used in regression analysis giving several summarized statistics on a variable, e.g. mean, medium, standard deviation and also often the lowest and highest observation (Johansen, 2011). The statistics in Table 4.1 indicate that the means and medians are not much different from each other which imply that economic growth (proxied by GDP expansion), trade openness, foreign aid and external debt are normally distributed. Jarque-Bera test further confirms that the variables are normally distributed at 5% level of significance since the $JB - statistic < \chi^2\,(2df) = 5.99147$ for each of the variables. The maximum and minimum (obtained by getting the antilogs of the natural logs) for the variables are; Ksh. 2.365 trillion (2009) and Ksh.53.9 billion (1980) respectively for economic growth (proxied by GDP), 72.86% (1983) and 47.70% (1987) respectively for trade openness, 1.31 billion USD (2009) and 291 million USD (1980) respectively for foreign aid, 8.59 billion USD (2009) and 3.39 billion USD (1980) respectively for external debt.

According to University of Reading (2011), the standard deviation represents the amount of deviation from the mean, (the smaller the standard deviation the more accurate future predictions may be, because there is less variability). In table 4.1, the results indicate that economic growth (proxied by GDP expansion), trade openness, foreign aid and external debt do not deviate much from the mean (the variables have smaller standard deviation) thus the more accurate are the future predictions. Musau and Musau (2011) assert that

skewness measures the direction and degree of asymmetry; a value of zero indicates a symmetrical distribution, a positive value indicates skewness (longtailedness) to the right while a negative value indicates skewness to the left, value between -3 and +3 indicate typical values of samples from a normal distribution. While Kurtosis measures the heaviness of the tails of a distribution, negative kurtosis indicates too many cases in the tails of distribution, positive kurtosis indicates too few cases (Musau & Musau, 2011).

From Table 4.1, results indicate that all the variables have normal curves since the value of skewness lies between -3 and +3. The negative values of skewness for variables of economic growth, foreign aid and external debt indicate a tail to the left while a positive value for trade openness indicates a tail to the right with all the distributions having too few cases in the tails (lighter tails) since the kurtosis for all the variables are positive.

Table 4.1

Descriptive Statistics of Variables

Statistic	LnY_t	LnT_t	LnF_t	LnE_t
Mean	26.69298	-0.544596	23.86592	28.93497
Median	26.79111	-0.571260	24.04657	29.71721
Maximum	28.49199	-0.316651	25.64611	31.41956
Minimum	24.71058	-0.740181	21.79807	25.49458
Std. Dev	1.196705	0.116941	1.005521	1.945947
Skewness	-0.15892	0.342562	-0.436034	-0.347865
Kurtosis	1.623151	2.358371	2.297619	1.588792
Jarque – Bera	2.495928	1.101352	1.567301	3.094436
Probility	0.287089	0.576560	0.456736	0.212839
Observations	30	30	30	30

Source. Author's computation using EVIEWS 7.1

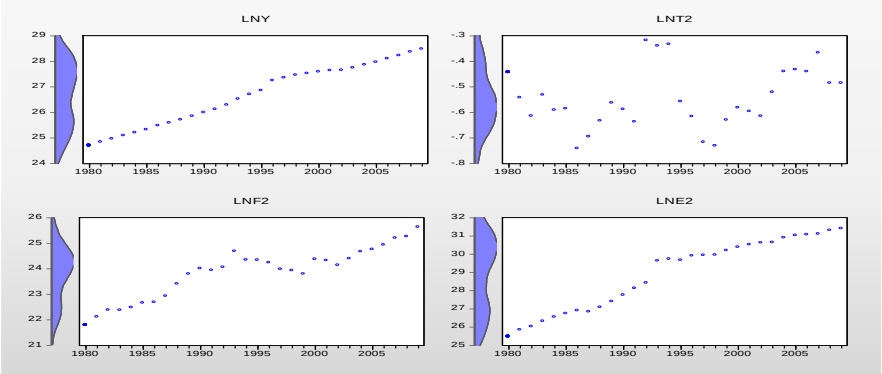


Figure 4.6. Graphs on the distribution of variables. Author's computation using EVIEWS 7.1.

4.3.2 Correlation Analysis

The study involved identifying the existence of correlation between; trade openness and economic growth, foreign aid and economic growth, external debt and economic growth using correlation coefficients obtained from the correlation matrix. Analysis of data with regard to correlation was based on the null hypothesis of no correlation in line with the objectives of study. The results summarized in Table 4.2 show that; based on the first objective, there is a weak positive correlation between trade openness and economic growth in Kenya ($r = 0.216952$). From these results the study therefore rejects the null hypothesis of no correlation between trade openness and economic growth at 5 % level of significance with the correlation between trade openness and economic growth being insignificant. However, though Ulasan (2012), Saleem *et al*. (2012), Osabuohein (2007), Karras (2003), Ahmadi and Mohebbi (2012) found a positive significant correlation between trade openness and growth our findings of insignificant positive correlation between trade openness and economic growth in Kenya is consistent with that of Iqbal (2005) who analyzed the impact of trade liberalization policy on GDP growth of Pakistan for the period 1972 – 2002. Although various researchers had varied views on the correlation between trade openness and economic growth, the analysis of results provides

evidence of a weak insignificant positive correlation between trade openness and economic growth in Kenya.

Based on the second objective, there is a strong positive correlation between foreign aid and economic growth in Kenya($r = 0.913989$). From the results in Table 4.2, the study therefore rejects the null hypothesis of no correlation between foreign aid and economic growth at 5 % level of significance with the correlation between foreign aid and economic growth being significant thus $r \neq 0$. Though Jayid and Qayyum (2011) found a negative association between foreign aid and economic growth, our finding of positive association between foreign aid and economic growth in Kenya is consistent with the findings of Tadesse (2011) who examined the impact of foreign aid on investment and economic growth in Ethiopia. Given that various researchers had varied results on the correlation between foreign aid and economic growth, our analysis establishes a strong significant positive correlation between foreign aid and economic growth in Kenya.

Given the third objective, there is a strong positive correlation between external debt and economic growth in Kenya($r = 0.988202$). From the results in Table 4.2, the study therefore rejects the null hypothesis of no correlation between external debt and economic growth at 5 % level of significance with the correlation between external debt and economic growth being significant thus $r \neq 0$. Although, Were (2001) found a negative correlation between external debt and economic growth, our finding of positive correlation between external debt and economic growth in Kenya is consistent with that

of Kasidi and Said (2013) who investigated the impact of external debt on economic growth of Tanzania. Although the various researchers had divergent views on the correlation between external debt and economic growth, our finding indicates that there is a strong significant positive correlation between external debt and economic growth in Kenya.

Table 4.2

Correlation Matrix

Correlation t-Statistic	LnY_t	LnT_t	LnF_t	LnE_t
LnY_t	1.000000 -----			
LnT_t	0.216952 (1.176011)	1.000000 -----		
LnF_t	0.913989* (11.91990)	0.384341* (2.202944)	1.000000 -----	
LnE_t	0.988202* (34.14175)	0.274582 (1.511028)	0.928601* (13.24161)	1.000000 -----

Note. t-statistics in Parentheses and * indicate statistical significance at 5% level of significance.

Author's computation using Eviews 7.1

4.3.2.1 Statistical Significance of Correlation Coefficients (r)

The statistical significance of the correlation coefficients was tested by the following test statistic $t_{cal} = \frac{r}{S_r}$ that follows the t- distribution with $\frac{\alpha}{2} = \frac{0.05}{2}$, $n-2$ degrees of freedom, $S_r = \sqrt{\frac{1-r^2}{n-2}}$ where $r =$ correlation coefficient, $n =$ no. of observations, $S_r =$ standard error of the statistic, t_{cal}= t- calculated.

The following hypothesis is tested with a decision rule of rejecting null hypothesis if $t_{cal} > t_{critical}$

$H_0: r = 0$, correlation coefficient insignificant

$H_1: r \neq 0$, correlation coefficient is significant

After computation, the statistics for correlation between trade openness and economic growth, foreign aid and economic growth and external debt and economic growth are 1.176, 11.920 and 34.142 respectively. This compared with $t_{0.025,28} = 2.048$, we conclude that at 5% level of significance the correlation between trade openness and economic growth is insignificant ($t_{cal} < t_{critical}$) while that of foreign aid and external debt with economic growth is significant ($t_{cal} > t_{critical}$).

4.3.3 Stationarity Test

To identify the time series property of stationarity for each of the variables, Augmented Dickey Fuller (ADF) test was performed on levels and first differences. The ADF test takes the form of equations (3.7), (3.8) and (3.9). This test examined the null hypothesis that the considered variable has a unit root (series non stationary) against the alternative hypothesis that the variable is stationary. The results of ADF tests presented in Table 4.3 reveals that the series of economic growth (proxied by GDP expansion), trade openness, foreign aid and external debt are each found to be integrated of order 1, I(1). Analyses by use of correlograms as depicted in Table 4.4 also show the same (the series are integrated of order 1) as the autocorrelations hover around zero (Gujarati, 2004). This implies that our data series of economic growth (proxied by GDP expansion), trade openness and foreign aid are non stationary in levels and become stationary after first differencing.

Before examining the results appropriate models from the three models (3.7), (3.8) and (3.9) were chosen. Model (3.7) without intercept and trend was ruled out because the coefficients of $lnY_{t-1}, lnT_{t-1}, lnF_{t-1}$ and lnE_{t-1} which equal δ were positive which contravenes the alternative hypothesis of $\delta < 0$. In the models (3.8) and (3.9), the coefficients of $lnY_{t-1}, lnT_{t-1}, lnF_{t-1}$ and lnE_{t-1} are negative conforming to a priori expectation.

The determination of lag length was by Akaike Information Criterion (AIC). This study estimated the stationarity of the variables lnY_t, lnT_t, lnF_t and lnE_t using autoregressive models (3.8) and (3.9). As depicted in Table 4.5 below, models for the unit root test though having the same AIC value; we conclude that models with lag 2 are among those with minimum AIC value i.e. the models having 2 lags are among those that have the lowest AIC value.

Table 4.3

Unit Root Results

ADF Model: $\Delta lnY_t = \delta lnY_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta lnY_{t-i} + \varepsilon_t$ (No Intercept and No Trend (None))

	Level				First Difference			
Variable	No. of Obs.	$H_0: \delta < 0$	Lag Length	Inference	No. of Obs.	$H_0: \delta < 0$	Lag Length	Inference
lnY_t	28	0.003196	2	-	27	-0.081843	2	-
		(0.9992)				(0.3344)		
lnT_t	29	-0.013194	2	I(1)	28	-1.032720**	2	I(0)
		(0.5309)				(0.0000)		
lnF_t	29	0.005483	2	-	28	-0.774600	2	-
		(0.9986)						

lnE_t	29	0.006900 (1.0000)	2	-	26	-0.289286 (0.1404)	2	-

ADF Model: $\Delta lnY_t = \beta_1 + \delta lnY_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_t$ (Intercept)

	Level				First Difference			
Variable	No. of Obs.	$H_0: \delta < 0$	Lag Length	Inference	No. of Obs.	$H_0: \delta < 0$	Lag Length	Inference
lnY_t	29	-0.009262 (0.7911)	2	I(1)	28	-0.687654** (0.0010)	2	I(0)
lnT_t	29	-0.362976 (0.1293)	2	I(1)	28	-1.032419** (0.0001)	2	I(0)
lnF_t	29	-0.052261 (0.6903)	2	I(1)	28	-0.998762** (0.0003)	2	I(0)
lnE_t	29	-0.035481 (0.4633)	2	I(1)	28	-0.909430** (0.0009)	2	I(0)

ADF Model: $\Delta lnY_t = \beta_1 + \beta_2 t + \delta lnY_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta lnY_{t-i} + \varepsilon_t$ (Trend and Intercept)

lnY_t	27	-0.166078 (0.6683)	2	I(1)	28	-0.709999** (0.0382)	2	I(0)
lnT_t	29	-0.409796 (0.2265)	2	I(1)	28	-1.037791** (0.0011)	2	I(0)
lnF_t	29	-0.215154 (0.6128)	2	I(1)	28	-1.003137** (0.0025)	2	I(0)
lnE_t	29	-0.107874 (0.9226)	2	I(1)	28	-0.963894** (0.0031)	2	I(0)

Note. The null hypothesis is that the series contains a unit root (series non stationary). The rejection of the null hypothesis is based on the Mackinnon (1996) one-sided p-values given in parentheses. ** implies rejection of null hypothesis of non stationarity at 5% significance level. Author's computation using EVIEWS 7.1

Table 4.4

Correlogram Test Results

Correlogram: lnY_t (2 lags)

Level		First difference	
Date: 08/16/13 Time: 18:11 Sample: 1980 2009 Included observations: 30		Date: 08/16/13 Time: 18:00 Sample: 1980 2009 Included observations: 29	
Autocorrelation	Partial Correlation	Autocorrelation	Partial Correlation
. |*******	. |*******	. |**. |	. |**. |
. |******|	. | . |	. |**. |	. |* . |

Correlogram: lnT_t (2 lags)

Autocorrelation	Partial Correlation	Autocorrelation	Partial Correlation
. |***** |	. |***** |	. | . |	. | . |
. |**. |	. *| . |	. | . |	. | . |

Correlogram: lnF_t (2 lags)

Autocorrelation	Partial Correlation	Autocorrelation	Partial Correlation
. |******|	. |******|	. | . |	. | . |
. |***** |	. | . |	. *| . |	. *| . |

Correlogram: lnE_t (2 lags)

Autocorrelation	Partial Correlation	Autocorrelation	Partial Correlation
. |*******	. |*******	. |* . |	. |* . |
. |******|	. | . |	. | . |	. | . |

Note. Author's computation using EVIEWS 7.1

Table 4.5

Unit Root AIC Values

Akaike Information Criterion (AIC) Value for Unit Roots				
Lag	LnY_t	LnT_t	LnF_t	LnE_t
0	-2.603219*	-1.668748*	0.079398*	0.013693*
1	-2.603219*	-1.668748*	0.079398*	0.013693*
2	-2.603219*	-1.668748*	0.079398*	0.013693*
3	-2.603219*	-1.668748*	0.079398*	0.013693*

Note. Optimal lag structure has the lowest AIC value, * shows the lowest AIC value. Author's computation using Eviews 7.1

4.3.4 Cointegration and Vector Error Correction Mechanism

4.3.4.1 Cointegration test results

Having determined that the variables of; economic growth (proxied by GDP expansion), trade openness, foreign aid and external debt are integrated of order 1, I(1), this study established cointegration between trade openness, foreign aid, external debt and economic growth in Kenya. To achieve this, the researcher performed the Johansen cointegration test to establish whether the variables in question are cointegrated using two likelihood ratio tests namely; the trace test and maximum eigenvalue test. Analysis of data was based on the null hypothesis of no cointegration in line with the objectives of this study. The results in Table 4.6 indicate that both the trace test and maximum eigenvalue test in the Johansen procedure each detected two cointegrating vectors, thus the study rejects the null hypothesis of no cointegration at 5% level of significance.

Basing on the first objective, rejection of the null hypothesis of no cointegration at 5% significance level among the variables implies that the variables of trade openness and economic growth in Kenya have a significant positive long run relationship that conforms

to a priori expectation. Given Ahmadi *et al*. (2012) who analyzed the impact of trade openness and institutional variables on GDP growth of Pakistan found a negative long run relationship between real GDP and trade openness, our findings of a significant positive long run relationship between trade openness and economic growth in Kenya is consistent with the findings of Sakyi (2010), Yusoff and Febrina (2012), Yaoxing (2010), Atif and Ahmed (2012) and Atif *et al*. (2010) who investigated the relationship in Ghana, Indonesia, Cote d'Ivoire and Pakistan respectively. Despite the varied results by various researchers, this finding of a significant positive long relationship between trade openness and economic growth in Kenya implies that trade openness promotes growth in the long run. Thus, a percentage increase in the level of trade openness increases economic growth in Kenya by 0.977006%

Based on the second objective, rejection of the null hypothesis of no cointegration at 5% significance level among the variables implies that the variables of foreign aid and economic growth in Kenya have a significant positive long run relationship that conforms to economic a priori. Significant foreign aid and economic growth cointegration finding in Kenya is consistent with the results of Jones (2013), Kargbor (2012) and Njouponognigni and Ndambendia (2010) who established the relationship in West African countries, Sierra Leone and 36 Sub- Saharan Africa countries respectively though inconsistent with the findings of Jayid and Qayyum (2011) who established negative relationship between foreign aid and real GDP by examining the effectiveness of foreign aid in Pakistan. Given the varied results by the various researchers, the significant positive long relationship finding between foreign aid and economic growth in Kenya

implies foreign aid enhances growth in the long run. Thus, a percentage increase in the level of foreign aid increases economic growth in Kenya by 0.357443%.

Based on the third objective, rejection of the null hypothesis of no cointegration at 5% significance level among the variables implies that the variables of external debt and economic growth in Kenya have a significant positive long run relationship that conforms to economic a priori. Given, Kasidi and Said (2013) found no long run relationship between external debt and GDP in Tanzania, Were (2001) established a negative relationship between external debt and economic growth in Kenya our results of significant positive long run relationship between external debt and economic growth in Kenya is consistent with the findings of Ezeabasili *et al*. (2011) and Sulaiman and Azeez (2012) who both investigated the effect of external debt on economic growth in Nigeria. Although the various researchers lacked consensus on the external debt-growth relationship, the positive significant relationship finding in Kenya implies that in the long run external debt promotes economic growth in Kenya. Thus, a percentage increase in the level of external debt increases economic growth in Kenya by 0.388983%.

From the Johansen procedure and Vector Error Correction Model (VECM) results in Tables 4.6 and 4.7, model (3.5) becomes the cointegrating equation hence expressed as;

$$\ln Y_t - 7.435328 - \underset{[-5.57712]}{0.977006}\ln T_t - \underset{[-7.89811]}{0.357443}\ln F_t - \underset{[-17.9009]}{0.388983}\ln E_t = 0 \qquad (4.1)$$

Making lnY_t the subject, equation (4.1) becomes equation (4.2) with t-statistics in parentheses.

$$\ln Y_t = 7.435328 + \underset{[5.57712]}{0.977006}\ln T_t + \underset{[7.89811]}{0.357443}\ln F_t + \underset{[17.9009]}{0.388983}\ln E_t \qquad (4.2)$$

4.3.4.1.1 Elasticity and Concept of Returns to Scale

The features of the Cobb-Douglas production function refer to; elasticities which measures the responsiveness of the dependent variable to a change in the levels of the independent variables used in the production process and the concept of returns to scale.

From the above equation (4.2), the responsiveness of economic growth to a change in the level of trade openness, foreign aid and external debt is determined by obtaining partial differentials as below;

$$\frac{\partial lnY_t}{\partial lnT_t} = 0.977006 \qquad (4.3)$$

$$\frac{\partial lnY_t}{\partial lnF_t} = 0.357443 \qquad (4.4)$$

$$\frac{\partial lnY_t}{\partial lnE_t} = 0.388983 \qquad (4.5)$$

This can be interpreted as; economic growth in Kenya exhibits a positive relationship with trade openness, foreign aid and external debt in the long run which conforms to economic a priori expectation. Thus, a percentage increase in level of trade openness, foreign aid and external debt increases economic growth in Kenya by 0.977006%,

0.357443% and 0.388983% respectively. These coefficients are statistically significant at 5 % level of significance.

Furthermore the country exhibits increasing returns to scale as clearly indicated by equation (4.7), i.e. the proportional change in inputs (trade openness, foreign aid and external debt) is more than the proportional change in output (economic growth).

$$\alpha + \beta + \delta = 0.977006 + 0.357443 + 0.388983 = 1.723432 \quad (4.6)$$

$$\alpha + \beta + \delta = 1.723432 > 1 \quad (4.7)$$

The relationship between trade openness, foreign aid and economic growth in Kenya in the form of a Cobb- Douglas production function (3.3) is given by model (4.8) where 1,694.81 is the antilog of 7.435328 representing total factor productivity. All elasticity coefficients in the model are rounded off to 2 decimal places.

$$\boldsymbol{Y_t = 1{,}694.81 T_t^{0.98} F_t^{0.36} E_t^{0.39}} \quad (4.8)$$

Table 4.6

Johansen Cointegration Test Results

The Trace Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.918196	102.5647	47.85613	0.0000
At most 1 *	0.615474	34.97201	29.79707	0.0116
At most 2	0.285083	9.166960	15.49471	0.3502
At most 3	0.003920	0.106051	3.841466	0.7447

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Maximum Eigenvalue

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.918196	67.59270	27.58434	0.0000
At most 1 *	0.615474	25.80505	21.13162	0.0102
At most 2	0.285083	9.060910	14.26460	0.2811
At most 3	0.003920	0.106051	3.841466	0.7447

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

* denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values

Normalized Cointegrating Coefficients

(Two Cointegrating Equations)

LNY	LNT	LNF	LNE
1.000000	-0.977006	-0.357443	-0.388983
	(0.17518)	(0.04526)	(0.02173)

Coint eqn 2

LNY	LNT	LNF	LNE	LNY

1.000000	0.000000	0.260501	-0.790969	1.000000
		(0.11330)	(0.05516)	
0.000000	1.000000	0.632487	-0.411447	0.000000
		(0.12599)	(0.06134)	

Note. Standard error in parentheses. Author's computation using EVIEWS 7.1

Table 4.7

Cointegration Equation from VECM

Vector Error Correction Estimates

Sample (adjusted): 1983 2009
Included observations: 27 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LNY(-1)	1.000000
LNT(-1)	-0.977006 (0.17518) [-5.57712]
LNF(-1)	-0.357443 (0.04526) [-7.89811]
LNE(-1)	-0.388983 (0.02173) [-17.9009]
C	-7.435328

Note. Author's computation using Eviews 7.1

4.3.4.2 Vector Error Correction Model (VECM)

Following Granger representation theorem which states that if two (or more) variables Y and X(s) are cointegrated, then the relationship between (or among) them can be expressed as error correction mechanism. Existence of cointegration among the variables of the model which we established necessitated the need for the VECM of the form (3.10), (3.11), (3.12) and (3.13) to capture the short run dynamics of the model. The

equilibrium error term μ_{t-1} corrects the disequilibrium and guides the variables Y_t, T_t, F_t and E_t to restore back to equilibrium.

The results summarized in table 4.8 by examining the F- statistics and the R^2 indicate that the variables in VECM significantly explained short – run changes in only Y_t (GDP) and E_t (external debt) at 5% level of significance and not those of $T_t(trade\ openness)\ and\ F_t$ (foreign aid) accounting for 92.4 % and 63.82% of the variations in the two series of economic growth (proxied by GDP expansion) and external debt respectively. From the results in table 4.8 models (3.10), (3.11), (3.12) and (3.13) are represented as models (4.9), (4.10), (4.11) and (4.12) respectively with 2 lags and t-statistics in parentheses. The lag length determination was by AIC as shown in table 4.9.

$$\begin{aligned}\Delta \ln Y_t = & \underset{[12.0518]}{0.237} - \underset{[3.09849]}{0.168}\Delta \ln T_{t-1} - \underset{[1.14812]}{0.098}\Delta \ln T_{t-2} - \underset{[2.32671]}{0.259}\Delta \ln Y_{t-1} + \underset{[1.65733]}{0.138}\Delta \ln Y_{t-2} \\ & - \underset{[1.29330]}{0.035}\Delta \ln F_{t-1} - \underset{[3.98762]}{0.087}\Delta \ln F_{t-2} - \underset{[4.97658]}{0.169}\Delta \ln E_{t-1} - \underset{[5.79005]}{0.196}\Delta \ln E_{t-2} - \underset{[11.6104]}{0.347}\mu_{t-1}\end{aligned} \tag{4.9}$$

$$\begin{aligned}\Delta \ln T_t = & \underset{[1.26034]}{0.107} - \underset{[1.19242]}{0.279}\Delta \ln T_{t-1} - \underset{[1.34593]}{0.499}\Delta \ln T_{t-2} - \underset{[1.78231]}{0.859}\Delta \ln Y_{t-1} - \underset{[0.71886]}{0.260}\Delta \ln Y_{t-2} \\ & + \underset{[0.20066]}{0.024}\Delta \ln F_{t-1} - \underset{[0.69558]}{0.065}\Delta \ln F_{t-2} + \underset{[1.98167]}{0.291}\Delta \ln E_{t-1} - \underset{[0.24664]}{0.036}\Delta \ln E_{t-2} + \underset{[0.23767]}{0.036}\mu_{t-1}\end{aligned} \tag{4.10}$$

$$\begin{aligned}\Delta \ln F_t = & \underset{[1.81478]}{0.361} - \underset{2.17337}{0.168}\Delta \ln T_{t-1} - \underset{[0.04367]}{0.098}\Delta \ln T_{t-2} - \underset{[0.82637]}{0.259}\Delta \ln E_{t-1} + \underset{[0.75644]}{0.138}\Delta \ln E_{t-2} \\ & - \underset{[0.55928]}{0.154}\Delta \ln F_{t-1} - \underset{[0..10008]}{0.022}\Delta \ln F_{t-2} - \underset{[0.76859]}{0.867}\Delta \ln Y_{t-1} - \underset{[0.03053]}{0.026}\Delta \ln Y_{t-2} - \underset{[0.42673]}{0.129}\mu_{t-1}\end{aligned} \tag{4.11}$$

$$\begin{aligned}\Delta \ln E_t = & \underset{[2.76655]}{0.418} + \underset{[2.85840]}{1.190}\Delta \ln T_{t-1} - \underset{[1.56627]}{1.033}\Delta \ln T_{t-2} - \underset{[0.10049]}{0.026}\ln E_{t-1} - \underset{[1.51100]}{0.394}\Delta \ln E_{t-2} \\ & + \underset{[0.23098]}{0.048}\Delta \ln F_{t-1} - \underset{[0.95020]}{0.159}\Delta \ln F_{t-2} - \underset{[1.44272]}{1.237}\Delta \ln Y_{t-1} + \underset{[0.52956]}{0.341}\ln Y_{t-2} - \underset{[2.61253]}{0.602}\mu_{t-1}\end{aligned} \tag{4.12}$$

The coefficients of the error correction term μ_{t-1} for the VECM1 (4.9) with economic growth (ΔlnY_t) as the dependent variable has the correct sign which conform to economic

a priori expectation i.e. negative and statistically significant at 5 % level of significance (validating the existence of long run relationship among trade openness, foreign aid, external debt and economic growth in Kenya. This implies that the vector of economic growth (Y_t) is error correcting i.e. 34.7%, of equilibrium error for economic growth will be corrected in the next period (annually). This explains that economic growth (proxied by GDP expansion) in Kenya adjusts significantly to short run disequilibrium (shocks) caused by changes in trade openness, foreign aid and its past values.

Results of Table 4.8 clearly indicate that while trade openness, foreign aid and external debt have a significant positive influence on Kenya's economic growth in the long run, in the short run as depicted by VECM1 trade openness and past values of economic growth has a significant negative effect on economic growth (proxied by GDP expansion) in Kenya at lag 1 whereas foreign aid has a delayed significant negative effect evident at lag 2 on economic growth (proxied by GDP expansion) and external debt has a significant negative effect on economic growth at both lag 1 and 2. The $-0.168, -0.087, -0.259, -0.169, -0.196$ coefficients of $lnT(-1), lnF(-2), lnY(-1), lnE(-1)\ and\ lnE(-2)$ respectively imply that in the short run, a unit increase in the degree of trade openness, foreign aid and external debt leads to a decline in economic growth (proxied by GDP expansion) in the short run by 0.168 , 0.087, 0.259, 0.169 and 0.196 units respectively in Kenya. The constant (0.236641) which represents the short run total factor productivity is positive and statistically significant.

In the trade openness equation (VECM2), the results in table 4.8 indicate that in the short run changes in economic growth, foreign aid, external debt, past values of trade openness and the constant has an insignificant effect on the level of trade openness.

Reviewing the foreign aid equation (VECM3), results in table 4.8 show that trade openness has a positive significant effect on foreign aid in the short run with a unit increase in trade openness increasing foreign aid by 1.191 units while economic growth (proxied by GDP expansion), external debt, past values of foreign aid and the constant has an insignificant effect on foreign aid in Kenya.

Turning to the external debt equation (VECM4), results in table 4.8 imply that economic growth (at lag 2), trade openness and foreign aid influences external debt positively, though only significant for trade openness with a unit increase in the degree of trade openness increasing external debt by 1.19 units in the short run. Further economic growth (proxied by GDP expansion) at lag 1, foreign aid at lag 2 and past values of external debt have an insignificant negative effect on external debt in Kenya. The constant also significantly influences external debt in the short run.

Table 4.8

Vector Error Correction Model

Error Correction:	D(LNY)	D(LNT)	D(LNF)	D(LNE)
CointEq1	-0.347152*	0.030758	-0.129385	-0.601775*
	(0.02990)	(0.12942)	(0.30320)	(0.23034)
	[-11.6104]	[0.23767]	[-0.42673]	[-2.61253]
D(LNY(-1))	-0.258959*	-0.858588	-0.867445	-1.236990

	(0.11130)	(0.48173)	(1.12861)	(0.85741)
	[-2.32671]	[-1.78231]	[-0.76859]	[-1.44271]
D(LNY(-2))	0.138435	-0.259890	-0.025862	0.340763
	(0.08353)	(0.36153)	(0.84701)	(0.64348)
	[1.65733]	[-0.71886]	[-0.03053]	[0.52956]
D(LNT(-1))	-0.167507*	-0.279013	1.191443*	1.190435*
	(0.05406)	(0.23399)	(0.54820)	(0.41647)
	[-3.09849]	[-1.19242]	[2.17337]	[2.85840]
D(LNT(-2))	-0.098320	-0.498869	0.037921	-1.033280
	(0.08564)	(0.37065)	(0.86838)	(0.65971)
	[-1.14812]	[-1.34593]	[0.04367]	[-1.56627]
D(LNF(-1))	-0.035020	0.023518	-0.153569	0.048182
	(0.02708)	(0.11720)	(0.27458)	(0.20860)
	[-1.29330]	[0.20066]	[-0.55928]	[0.23098]
D(LNF(-2))	-0.086647*	-0.065418	0.022051	-0.159058
	(0.02173)	(0.09405)	(0.22034)	(0.16739)
	[-3.98762]	[-0.69558]	[0.10008]	[-0.95020]
D(LNE(-1))	-0.168659*	0.290685	-0.283995	-0.026236
	(0.03389)	(0.14669)	(0.34366)	(0.26108)
	[-4.97658]	[1.98167]	[-0.82637]	[-0.10049]
D(LNE(-2))	-0.195801*	-0.036100	-0.259396	-0.393638
	(0.03382)	(0.14637)	(0.34292)	(0.26052)
	[-5.79005]	[-0.24664]	[-0.75644]	[-1.51100]

C	0.236641*	0.107112	0.361342	0.418483
	(0.01964)	(0.08499)	(0.19911)	(0.15127)
	[12.0518]	[1.26034]	[1.81478]	[2.76655]
R-squared	0.924032	0.368018	0.400290	0.638236
Log likelihood	69.99600	30.43658	7.449712	14.87005
F-statistic	22.97554	1.099944	1.260781	3.332438

Note. Values in ( ) are std errors while values in [ ] are t-statistics, * implies statistical significance at 5% level of significance. Author's computation using Eviews 7.1

4.3.4.3 Lag Length Determination

The study involved the Akaike Information criterion in the determination of the lag length for the autoregressive models (AR). In the Vector Error Correction Model (VECM) with ΔlnY_t as dependent variable the lag 2 has the lowest AIC value, thus the study settled for 2 as the lag length for the various autoregressive models as depicted in Table 4.9.

Table 4.9

Vecm Akaike Information Criterion Values

Vector Error Correction Model (VECM) ΔlnY_t As Dependent Variable	
Lag	AIC Value
1	-2.825802
2	-4.444148*
3	-3.881673

Note. Optimal lag structure has the lowest AIC value, * shows the lowest AIC value. Author's computation using Eviews 7.1

4.3.4.4 Statistical Test of Elasticity Coefficients

This is a first order test for the determination of the statistical significance of the parameters to evaluate the statistical reliability. The statistical criteria included the following tests; t-test and F- test to test for the statistical significance of individual

parameters and joint significance with the aid of relevant distribution tables at given levels of significance.

4.3.4.4.1 t-test

This test involved the use of t-test by testing the below stated hypothesis with the test results presented in Table 4.10.

$H_0: \hat{\beta} = 0$, estimated parameter significantly not different from zero

$H_1 : \hat{\beta} \neq 0$, significant

The calculated test statistic is obtained by;

$$t_{cal} = \frac{\hat{\beta}}{Se(\hat{\beta})}$$

Where t_{cal} = t- calculated, $\hat{\beta}$ = estimated parameter and $Se(\hat{\beta})$ = standard error for the estimated parameter.

The test involved comparing the t- calculated and t- critical obtained from the t-distribution table at $(n-k)$ degrees of freedom and $\frac{\alpha}{2}$ level of significance where n= no. of observations, k= no. of parameters and $\alpha = 0.05$

The rule of thumb is that we reject the null hypothesis if $t_{calculated} > t_{critical}$, otherwise do not reject.

TABLE 4.10: T- TEST RESULTS AND DECISION RULE

Cointegrating Model n=30, df=26				
Variable	t-calculated	t-critical	Decision	Conclusion
lnT_t	5.57712	2.056	$t_{cal} > t_{critical}$	Reject H_0 , statistically significant
lnF_t	7.89811	2.056	$t_{cal} > t_{critical}$	Reject H_0 , statistically significant
lnE_t	17.9009	2.056	$t_{cal} > t_{critical}$	Reject H_0 , statistically significant
Vector Error Correction Model: ΔlnY_t as dependent variable n=30, df=20				
μ_{t-1}	11.6104	2.086	$t_{cal} > t_{critical}$	Reject H_0 , statistically significant
ΔlnT_{t-1}	3.09849	2.086	$t_{cal} > t_{critical}$	Reject H_0 , statistically significant
ΔlnT_{t-2}	1.14812	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , statistically insignificant
ΔlnF_{t-1}	1.29330	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , statistically insignificant
ΔlnF_{t-2}	3.98762	2.086	$t_{cal} > t_{critical}$	Reject H_0 , statistically significant
ΔlnE_{t-1}	4.97658	2.086	$t_{cal} > t_{critical}$	Reject H_0 , statistically significant
ΔlnE_{t-2}	5.79005	2.086	$t_{cal} > t_{critical}$	Reject H_0 , statistically significant
ΔlnY_{t-1}	2.32671	2.086	$t_{cal} > t_{critical}$	Reject H_0 , statistically significant
ΔlnY_{t-2}	1.65733	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , statistically insignificant
Vector Error Correction Model: $\Delta \boldsymbol{lnT_t}$ as dependent variable n=30, df=20				
μ_{t-1}	0.23767	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnT_{t-1}	1.19242	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnT_{t-2}	1.34593	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant

ΔlnF_{t-1}	0.20066	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnF_{t-2}	0.69558	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnE_{t-1}	1.98167	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnE_{t-2}	0.24664	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnY_{t-1}	1.78231	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnY_{t-2}	0.71886	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant

Vector Error Correction Model: $\Delta \boldsymbol{lnF_t}$ as dependent variable n=30, df=20

μ_{t-1}	0.42673	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnT_{t-1}	2.17337	2.086	$t_{cal} > t_{critical}$	Reject H_0 , statistically significant
ΔlnT_{t-2}	0.04367	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnF_{t-1}	0.55928	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0, insignificant
ΔlnF_{t-2}	0.10008	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnE_{t-1}	0.82637	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnE_{t-2}	0.75644	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnY_{t-1}	0.76859	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnY_{t-2}	0.03053	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant

Vector Error Correction Model: $\Delta \boldsymbol{lnE_t}$ as dependent variable n=30, df=20

μ_{t-1}	2.61253	2.086	$t_{cal} > t_{critical}$	Reject H_0 , statistically significant
ΔlnT_{t-1}	2.85840	2.086	$t_{cal} > t_{critical}$	Reject H_0 , statistically significant
ΔlnT_{t-2}	1.56627	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnF_{t-1}	0.23098	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnF_{t-2}	0.95020	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnE_{t-1}	0.10049	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant

ΔlnE_{t-2}	1.51100	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnY_{t-1}	1.44271	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant
ΔlnY_{t-2}	0.52956	2.086	$t_{cal} < t_{critical}$	Do not Reject H_0 , insignificant

4.3.4.4.2 F-test

This measures the overall significance of the regression model (Emeka, 2010). This test involved testing the hypothesis that the estimated coefficients are simultaneously equal to zero as follows;

$H_0: \beta_1 = \beta_2 = \beta_3 = 0$,model is insignificant(coefficients simultaneously equal to zero)

$H_0: \beta_1 \neq \beta_2 \neq \beta_3 \neq 0$, model significant

This test involved comparing the F- calculated and F- critical obtained from the F-distribution table at $(k-1, n-k)$ degrees of freedom and $\alpha = 0.05$ level of significance where n= no. of observations, k= no. of parameters.

The rule of thumb is that we reject the null hypothesis if $F_{calculated} > F_{critical}$, otherwise do not reject. The results of the regression show that, F-statistics 22.97554 , 1.099944, 1.260781 and 3.332438 are the computed F-values for the VECM1, VECM2, VECM3 and VECM4 respectively.

$F_{0.05}(9,20) = 2.39$ as obtained from the F-distribution table represents the critical F-statistic. Since $F_{calculated} > F_{critical}$ for VECM1 and VECM4 we reject the null hypothesis that the models are not statistically significant (parameters are simultaneously different from zero), while $F_{critical} > F_{calculated}$ in VECM2 and VECM3, we do not

reject the null hypothesis, thus models not statistically significant (coefficients simultaneously equal to zero).

4.3.4.5 Residual Diagnostic Tests

Regression is based on certain assumptions some of which refer to the; normal distribution of the residuals, correlation between the error terms, constant variance of the residuals and correlation between explanatory variables. The study employed second order tests or econometric tests which include normality, serial correlation, multicollinearity and heteroscedasticity tests to ascertain that the assumptions of regression analysis with regard to residuals and the correlation between explanatory variables are satisfied.

4.3.4.5.1 Normality Test

Normality test is carried out to verify if the error term is normally distributed. The study employed Jacque –Bera (JB) test to test for normality. The results in Figure 4.7 below show that the null hypothesis that residuals are normal distributed is not rejected. The $JB - statistic = 5.349674$ and from the chi-square distribution table at 5% level of significance, the critical $\chi^2\ (2df) = 5.99147$. This implies that $JB - statistic < \chi^2\ (2df)$, thus we do not reject the null hypothesis that residuals are normally distributed at 5 % level of significance.

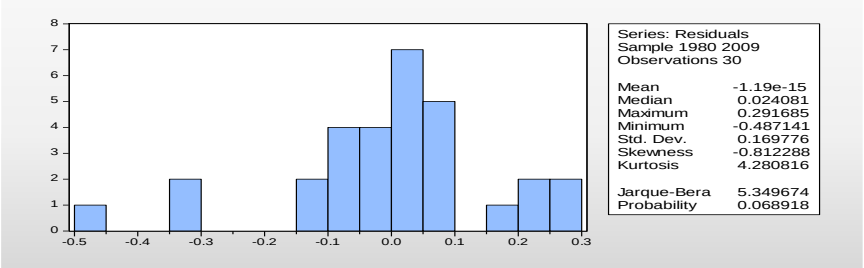


Figure 4.7. Normality test results. Author's computation using EVIEWS 7.1

4.3.4.5.2 Autocorrelation Test

Serial correlation refers to the case in which the error term in one period is correlated with the error term in any other time period. Classical regression assumes that such correlation does not exist. The Breusch- Godfrey serial correlation LM test was employed to test for serial correlation. Table 4.11 results indicate that the null hypothesis of no serial correlation is not rejected at 5% level of significance thus, the residuals are not correlated.

Table 4.11

Residual Serial Correlation LM Test

VEC Residual Serial Correlation LM Tests
Null Hypothesis: no serial correlation at lag order h
Date: 08/27/13 Time: 20:49
Sample: 1980 2009
Included observations: 27

Lags	LM-Stat	Prob
1	8.516557	0.9320
2	13.68509	0.6222

Note. Author's computation using Eviews 7.1

4.3.4.5.3 Multicollinearity

Multicollinearity refers to the case in which two or more explanatory variables in the regression model are highly correlated which makes it difficult to isolate their individual effects on the dependent variable. This study involved the use of Variance Inflation Factor (VIF) to test for multicollinearity. The results in Table 4.12 clearly indicate all the VIF are less than 10, i.e. 1.2, 8.3 and 7.7. This implies that none of the variables is highly collinear.

Table 4.12

Variance Inflation Factors

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C(1)	1.490155	1390.508	NA
C(2)	0.100947	29.18255	1.245217
C(3)	0.009168	4880.991	8.361153
C(4)	0.002256	1770.498	7.707144

Note. The Rule of Thumb is that if VIF Exceeds 10, the Variable is said to be Bighly Collinear. Author's Computation Using Eviews 7.1

4.3.4.5.4 Heteroscedasticity Test

Heteroscedasticity occurs when the variance of the error term is not constant. The study employed White's General heteroscedasticity Test to test for heteroscedasticity. Results depicted in Table 4.13 show that there is no heteroscedasticity. This implies that we do not reject the null hypothesis of no heteroscedasticity (homoscedasticity) at 5 % level of significance thus a constant variance for the residuals.

TABLE 4.13: RESIDUAL HETEROSCEDASTICITY TEST RESULT

VEC Residual Heteroskedasticity Tests:
Date: 08/27/13 Time: 20:50
Sample: 1980 2009
Included observations: 27

Joint test		
Chi-sq	Df	Prob.
173.5423	180	0.6214

Note. Author's computation using Eviews 7.1

4.3.4.6 Coefficient of Determination (R^2)

The coefficient of determination measures the goodness of fit of the model. For the models VECM1, VECM2, VECM3 and VECM4, R^2(coefficient of determination) are 0.924032, 0.368018, 0.400290 and 0.638336 respectively. This implies that 92.4% , 36.8% , 40% and 63.8% of the variations in economic growth, trade openness, foreign aid and external debt are explained by the models VECM1, VECM2, VECM3 and VECM4 respectively. The statistical significance of the coefficient of determination is tested by the following test statistic that follows the F- distribution with $\alpha = 0.05$ and $(k-1, n-k)$ degrees of freedom;

$$F_{cal} = \frac{(R^2)(n-k)}{(1-R^2)(k-1)}$$

Where R^2= coefficient of determination, n- no. of observations, k= no. of parameters, F_{cal} = F- calculated.

The F-statistic at 5% level of significance for the four vector error correction models confirms that the coefficients of determination (R^2) are statistically significant since the $F_{calculated} > F_{critical}$ i.e. $F_{Cal} = 22.77554$, $F_{Cal} = 1.099944$, $F_{Cal} = 1.260781$ and $F_{Cal} = 3.332438$ for R^2 in VECM1, VECM2, VECM3 and VECM4 respectively is greater than $F_{0.05}(9,20) = 2.39$.

4.3.5 Granger Causality Test Results

Cointegration gives signal that there is possibility of causality but does not show direction of causality. This study examined causality linkage between trade openness,

foreign aid, external debt and economic growth in Kenya by estimating four VAR models (3.17), (3.18), (3.19) and (3.20) to test for pair wise Granger causality among economic growth, trade openness, foreign aid and external debt in Kenya. Data analysis was based on the null hypothesis of no causality and in line with the objectives of the study.

The results summarized in Table 4.14 based on the first objective, indicate that unidirectional causality exists between trade openness and economic growth ($T_t \rightarrow Y_t$). This implies that the null hypothesis of no causality is rejected for the relationship between trade openness and economic growth in Kenya. The unidirectional causality running from trade openness to economic growth in Kenya conforms to a priori expectation and is significant at 10% level of significance. The findings of unidirectional causality running from trade openness to economic growth in Kenya is consistent with the findings of Yaoxing (2010), Yusoff and Febrina (2010), Omisakan *et al*.,(2009),Domirhan and Akcay (2005) in Egypt, Jordan and Syria, Atif *et al.*,(2010) and Redlin and Gries (2012). However, this contradicts the findings of bi-directional causality by Arif and Ahmed (2012), Bajwa and Siddiqi (2011), Domirhan and Akcay (2005) in Algeria and Unidirectional causality from economic growth to trade openness by Domirhan and Akcay (2005) in Turkey and Israel. Given that the various researchers established varied results, the finding of causality from trade openness to economic growth in Kenya implies that trade openness promotes economic growth in Kenya.

Based on the second objective, results in Table 4.14 indicate that unidirectional causality exists between foreign aid and economic growth ($F_t \rightarrow Y_t$).This implies that the null hypothesis of no causality is rejected for the relationship between foreign aid and economic growth in Kenya. The unidirectional causality running from foreign aid to economic growth in Kenya is significant at 5% level of significance and consistent with the findings of Jones (2013) who assessed the foreign aid- led growth hypothesis in a panel of West African countries. The finding of causality from foreign aid to economic growth implies that foreign aid enhances economic growth in Kenya.

Given the third objective, results in Table 4.14 indicate that unidirectional causality exists between external debt and economic growth ($E_t \rightarrow Y_t$). This implies that the null hypothesis of no causality is rejected for the relationship between external debt and economic growth in Kenya. Unidirectional causality from external debt to economic growth finding in Kenya is significant at 10% level of significance and though consistent with the findings Ezeabasili *et al*. (2011) who analyze the relationship in Nigeria, it is inconsistent with Hossain and Mitra (2013) findings of unidirectional causality from economic growth to external debt who established the relationship for a panel of 33 highly aid-dependent African countries. Although the various researchers established varied results, the finding of causality from external debt to economic growth in Kenya implies that external debt promotes economic growth in Kenya.

The test involved 2 lags based on the Akaike Information Criterion to ensure consistency with the criterion used in the determination of lag length right from unit root test through cointegration and vector error correction tests.

Table 4.14

Granger Causality Test Results

Pairwise Granger Causality Tests
Date: 08/24/13 Time: 16:36
Sample: 1980 2009
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LNT does not Granger Cause LNY	28	3.23764	0.0577*
LNY does not Granger Cause LNT		0.80635	0.4587
LNF does not Granger Cause LNY	28	4.37727	0.0245**
LNY does not Granger Cause LNF		1.53207	0.2373
LNE does not Granger Cause LNY	28	3.25150	0.0571*
LNY does not Granger Cause LNE		0.17230	0.8428
LNF does not Granger Cause LNT	28	1.17086	0.3279
LNT does not Granger Cause LNF		3.80921	0.0372**
LNE does not Granger Cause LNT	28	1.35325	0.2782
LNT does not Granger Cause LNE		10.3823	0.0006**
LNE does not Granger Cause LNF	28	1.12780	0.3410
LNF does not Granger Cause LNE		2.28272	0.1246

Note. The lag length $\rho = 2$, ** and * implies rejection of the null hypothesis of no causality at 5% and 10% level of significance respectively. Author's Computation Using Eviews 7.1

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings on the analysis of the relationship between trade openness, foreign aid, external debt and economic growth in Kenya, conclusions, relevant policy recommendations and areas for further research.

5.2 Summary of Findings

This study investigated the relationship between trade openness, foreign aid, external debt and economic growth in Kenya. In view of the lack of consensus on the contribution of trade openness to economic growth between policy makers and civil society in Kenya and the gap created by the divergent findings from the empirical reviews on the relationship between trade openness and economic growth, foreign aid and economic growth and external debt and economic growth the study was to analyze the relationship between trade openness, foreign aid, external debt and economic growth in Kenya to establish country specific characteristics of the relationship between trade openness, foreign aid, external debt and economic growth. The study specifically sought to; determine the relationship between trade openness and economic growth, establish relationship between foreign aid and economic growth and examine relationship between external debt and economic growth in Kenya using annual time series data for the period of 30 years spanning from 1980 to 2009. This study involved testing for stationarity of the variables (economic growth, trade openness, foreign aid and external debt) using Augmented Dickey Fuller (ADF) test. The relationship between economic growth, trade

openness, foreign aid and external debt in Kenya was examined using correlation coefficients, Johansen Cointegration test, Vector Error Correction Model (VECM) and pairwise Granger causality test. This made it possible for the study to establish the, association, long run relationship, integrate long run and short run dynamics and examine casual relationship between trade openness, foreign aid, external debt and economic growth in Kenya.

The first objective of this study was to determine the relationship between trade openness and economic growth in Kenya. Analysis of data on this objective was based on the null hypothesis of no relationship between trade openness and economic growth in Kenya. First, the correlation coefficients show that there is a weak positive insignificant correlation($r = 0.216952$) at 5% significance level between trade openness and economic growth in Kenya. Secondly, the trace test and maximum eigenvalue test in the Johansen procedure each detected two cointegrating vectors at 5% level of significance implying that the variables of trade openness and economic growth in Kenya have a significant positive long run relationship that conforms to economic a priori. Thirdly, the Vector Error Correction Model results indicate that in the short- run trade openness has a significant negative relationship with economic growth at 5% level of significance in Kenya. Fourthly, the pairwise Granger Causality test results indicated unidirectional causality running from trade openness to economic ($T_t \rightarrow Y_t$) at 10% level of significance. From these results the study therefore rejects the null hypothesis of no relationship between trade openness and economic growth at 5 % level of significance in Kenya. The findings of a significant positive long run relationship between trade

openness and economic growth in Kenya though inconsistent with the findings of Ahmadi *et al.* (2012) who established a negative relationship in Pakistan, conforms to a priori expectation and are consistent with the findings of Saleem *et al*. (2012), Osabuohein (2007), Karras (2003), Ahmadi and Mohebbi (2012) who found a positive significant relationship between trade openness and economic growth in 38 African countries, Ghana and Nigeria (ECOWAS members), 56 economies Kenya included and Iran respectively.

The second objective of this study was to establish relationship between foreign aid and economic growth in Kenya. Analysis of data on this objective was based on the null hypothesis of no relationship between foreign aid and economic growth in Kenya. First, the correlation coefficients show that there is a strong positive significant correlation $(r = 0.913989)$ at 5% significance level between foreign aid and economic growth in Kenya. Secondly, the trace test and maximum eigenvalue test in the Johansen procedure each detected two cointegrating vectors at 5% level of significance implying that the variables of foreign aid and economic growth in Kenya have a significant positive long run relationship at 5% level of significance that conforms to economic a priori. Thirdly, the Vector Error Correction Model results indicate that in the short- run foreign aid has a significant negative relationship with economic growth at 5% level of significance in Kenya. Fourthly, the pairwise Granger Causality test results indicated unidirectional causality running from foreign aid to economic growth ($F_t \rightarrow Y_t$) at 5% level of significance. From these results the study therefore rejects the null hypothesis of no relationship between foreign aid and economic growth in Kenya at 5 % level of

significance. The findings of a significant positive long run relationship between foreign aid and economic growth in Kenya conform to a priori expectation. However, though Jayid and Qayyum (2011) found a negative relationship between foreign aid and economic growth in Pakistan our findings are consistent with that of Tadesse (2011), Jones (2013), Njoupougnigni and Ndambendia (2010), Kargbor (2012), Asteriou (2008) and Sakyi (2010) who established a positive significant relationship between foreign aid and economic growth in Ethiopia, 36 Sub-Saharan Africa countries, Sierra Leone, five south Asian economies and Ghana respectively.

The third objective of this study was to examine relationship between external debt and economic growth in Kenya. Analysis of data on this objective was based on the null hypothesis of no relationship between external debt and economic growth in Kenya. First, the correlation coefficients show that there is a strong positive significant correlation $(r = 0.988202)$ at 5% significance level between external debt and economic growth in Kenya. Secondly, from the Johansen procedure the variables of external debt and economic growth in Kenya have a significant positive long run relationship at 5% level of significance that conforms to economic a priori. Thirdly, the Vector Error Correction Model results show that in the short- run external debt has a significant negative relationship with economic growth at 5% level of significance in Kenya. Fourthly, the pairwise Granger Causality test results indicated unidirectional causality running from external debt to economic ($E_t \rightarrow Y_t$) at 10% level of significance in Kenya. From these results the study therefore rejects the null hypothesis of no relationship between external debt and economic growth in Kenya at 5 % level of significance. The findings for the

positive relationship between external debt and economic growth conform to a priori expectation. However, though Kasidi and Said (2013) established no long run relationship between external debt and GDP in Tanzania, our findings are consistent with those of Abayie and Frimpong (2006), Ezeabasili *et al.* (2011), Nawaz *et al.* (2012), Sulaiman and Azeez (2012) who investigated the relationship in Ghana, Nigeria, Pakistan and Nigeria respectively and established a significant long run relationship.

In addition, the VECM results revealed that the vector of Y_t (economic growth) is significantly error correcting at 5 % level of significance i.e. 34.7% of equilibrium error is corrected in the next period (annually) respectively.

5.3 Conclusions

In general, the findings of this study clearly indicate that all the time series variables (trade openness, foreign aid, external debt and economic growth) have a positive correlation, integrated of order one, i.e. become stationary at the first difference level (both intercept and trend and intercept), long run equilibrium relationship exists among the variables, economic growth is error correcting at 34.7%. Also unidirectional Granger causality is established running from trade openness to economic growth, foreign aid to economic growth and external debt to economic growth.

In conclusion, there is a significant positive long run relationship between; trade openness and economic growth, foreign aid and economic growth and external debt and economic growth in Kenya. The Johansen procedure by use of two likelihood ratio tests

and pair wise Granger causality test results in the Kenyan case validates Adam Smith's absolute advantage theory that finds trade as a vent for surplus production and as a means of widening the market thereby improving the level of productivity (trade causes productivity).

5.4 Recommendations

This study argues that there is a long run equilibrium relationship among the variables of trade openness, foreign aid and economic growth in Kenya. The results of the study indicate that although in the short run trade openness, foreign aid and external debt negatively affect economic growth in Kenya in the long run 1% increase in trade openness, foreign aid and external debt promote economic growth by 0.98%, 0.36% and 0.39% respectively . It is against these empirical findings that the study makes the following recommendations. First, a proper legal framework should be instituted by the government of Kenya that will hasten trade licensing, review import authorization procedure, harmonize the operations of trade facilitation institutions with the empowerment of this institutions through financing to enhance their services of monitoring, surveillance, cross border clearance and controlling cross border trade to check illegal activities of smuggling, tax evasion and dumping of substandard products in the country. This will enable the country to protect local industries by ensuring that no commodities are getting into the country through unorthodox means, reduce clearance delays at the borders and measure effectively the contribution of any cross border trade to the economy.

Secondly, Kenya as a country should continue pursuing its trade openness policies by; blossoming regional integration through trade blocs such as EAC and COMESA and negotiating new trade agreements with other countries (both at the regional level and world over). This will enable the country to not only foster relationship with other countries but explore new markets and sustain current markets which will see Kenya increase the volume of its trade by exporting its products to many other countries world over. Thirdly, the country should consider diversification of its export products from primary traditional products through value addition by investing in the manufacturing sector which will see Kenya exploit the potential in the international markets and in turn fetch more in terms of foreign exchange that will not only increase trade volume but also reduce on the worsening trade balance.

Fourthly, Kenya should come up with a standard project appraisal procedure for all government financed projects through borrowings and foreign aid with appraisals conducted by well trained government professionals (project managers) or privately contracted consultants and project managers. This will enable the government to channel revenues received from external debt and foreign aid to properly appraised productive projects in the economy which will ensure that resources are used prudently without embezzlement to enhance economic growth. Further, to ensure sustainability of the external debt and reduce over reliance on foreign aid, the government of Kenya needs to look into other sources of financing budget deficits by sealing the loop holes of income leakages such as tax evasion, cutting down on the huge public expenditure especially the

huge wage bill and establish a disaster management fund to tackle various calamities such as droughts and floods.

5.5 Limitations of the Study

This study had various limitations which need to be considered by other researchers when carrying out further research. The study only considered the effect of trade openness, foreign aid and external debt on economic growth in Kenya.

5.6 Suggestions for Further Research

From the results, areas for further research are evident. Given that trade openness, foreign aid and external debt explained 92.4% of the variations in economic growth, there are other factors that affect economic growth in Kenya. The study therefore recommends that future studies should analyze the determinants of economic growth in Kenya.

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APPENDICES

Appendix A: Data Presentation

YEAR	GDP	AID	EXPORTS	IMPORTS	EXRATE	EX DEBT	Trade (% of GDP)
1980	53910002000	2.91E+08	1.59E+10	1.94E+10	7.420187	3.39E+09	65.4168
1981	62016000000	4.09E+08	1.89E+10	2.1E+10	9.047498	3.23E+09	64.28019
1982	70247800000	3.62E+08	1.87E+10	2.22E+10	10.92232	3.37E+09	58.21574
1983	79592200000	3.55E+08	2.07E+10	2.25E+10	13.31152	3.63E+09	54.16271
1984	89242600000	3.11E+08	2.39E+10	2.86E+10	14.41387	3.51E+09	58.8039
1985	1.00812E+11	3.45E+08	2.55E+10	3.04E+10	16.43212	4.18E+09	55.44543
1986	1.1746E+11	3.94E+08	3.04E+10	3.51E+10	16.22574	4.6E+09	55.74139
1987	1.31156E+11	4.73E+08	2.79E+10	3.46E+10	16.45449	5.78E+09	47.70277
1988	1.48284E+11	6.83E+08	3.32E+10	4.09E+10	17.7471	5.81E+09	49.97498
1989	1.70404E+11	6.9E+08	3.92E+10	5.13E+10	20.57247	5.89E+09	53.15638
1990	1.96434E+11	7.75E+08	5.05E+10	6.15E+10	22.91477	7.06E+09	57.02091
1991	2.2423E+11	6.23E+08	6.06E+10	6.4E+10	27.50787	7.45E+09	55.5977
1992	2.64472E+11	6.12E+08	6.95E+10	7.05E+10	32.21683	6.9E+09	52.93087
1993	3.33611E+11	4.7E+08	1.3E+11	1.13E+11	58.00133	7.11E+09	72.85848
1994	4.00658E+11	4.39E+08	1.48E+11	1.37E+11	56.05058	7.12E+09	71.26613
1995	4.65251E+11	5.24E+08	1.52E+11	1.82E+11	51.42983	7.31E+09	71.74574
1996	6.87998E+11	3.93E+08	1.73E+11	2.21E+11	57.11487	6.81E+09	57.31211
1997	7.70313E+11	3.45E+08	1.75E+11	2.42E+11	58.73184	6.47E+09	54.05712

1998	8.50808E+11	3.19E+08	1.72E+11	2.44E+11	60.3667	6.82E+09	48.89724
1999	9.06928E+11	2.65E+08	1.89E+11	2.48E+11	70.32622	6.53E+09	48.19227
2000	9.67837E+11	3.11E+08	2.09E+11	3.07E+11	76.17554	6.19E+09	53.30904
2001	1.02022E+12	3.43E+08	2.34E+11	3.37E+11	78.5632	5.57E+09	55.94684
2002	1.03537E+12	3.21E+08	2.58E+11	3.13E+11	78.74914	6.18E+09	55.17267
2003	1.13178E+12	3.36E+08	2.73E+11	3.4E+11	75.93557	6.92E+09	54.13227
2004	1.27433E+12	5.33E+08	3.39E+11	4.19E+11	79.17388	6.98E+09	59.477
2005	1.41573E+12	6.34E+08	4.04E+11	5.09E+11	75.55411	6.48E+09	64.47887
2006	1.62257E+12	8.33E+08	4.4E+11	6.14E+11	72.10084	6.68E+09	64.94416
2007	1.83351E+12	9.65E+08	4.91E+11	6.91E+11	67.31764	7.52E+09	64.47774
2008	2.10746E+12	1.05E+09	5.82E+11	8.8E+11	69.17532	7.61E+09	69.35491
2009	2.36545E+12	1.31E+09	5.71E+11	8.86E+11	77.35201	8.59E+09	61.62815

Source: World Bank, World Development Indicators

Appendix B: Map of Kenya

Source: Japan International Cooperation Agency, (2007)