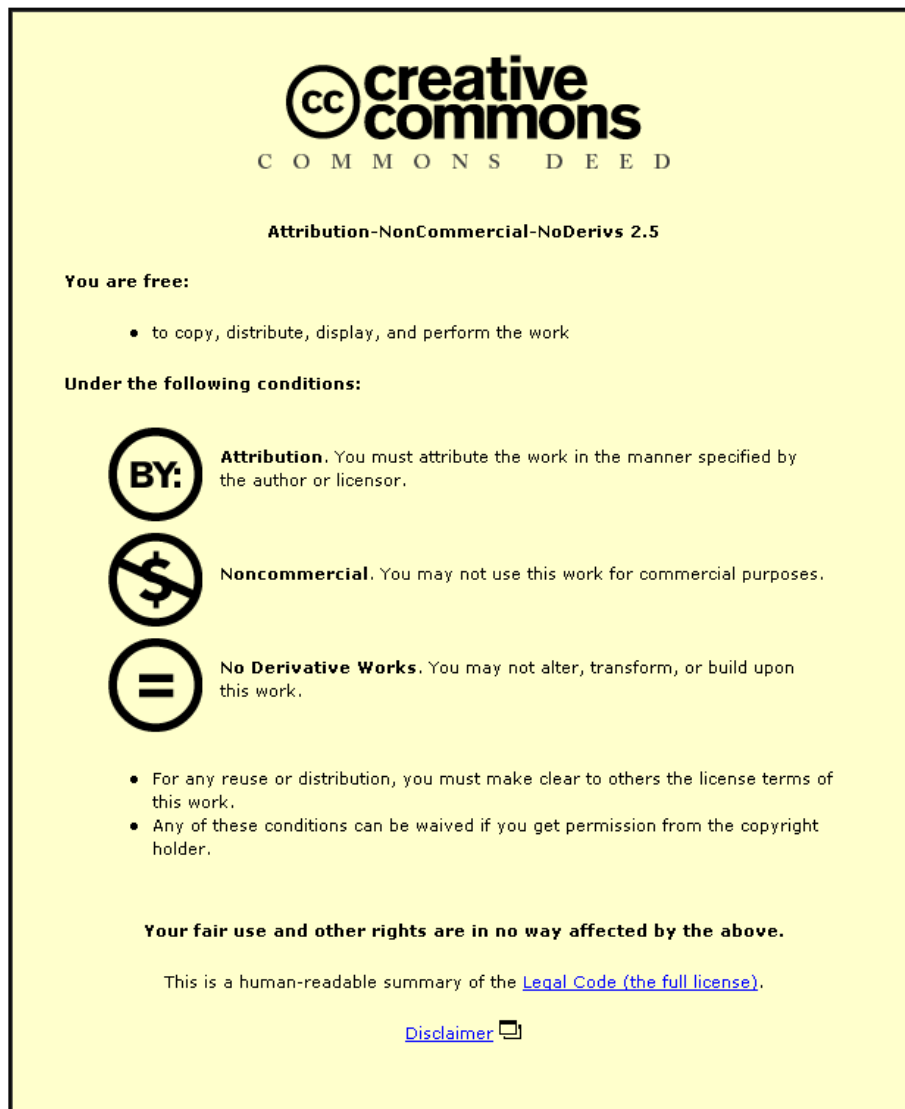


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AN EMPIRICAL INVESTIGATION OF MEASURES TAKEN TO ENHANCE INTRA-AFRICA TRADE

By

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DEDICATION

Dad, for teaching me that learning never ends.

Although I was away, you were always with me, urging me on, encouraging me and challenging me. Now, that you are the one gone, I cannot explain how much I long for you to be here. I miss you. Terribly. Forever, you'll remain in my heart.

(Dr. Ngatiah, J. W., 21.May.1952 - 5.Dec.2011)

ABSTRACT

Trade is largely considered a driving force of economic growth and development of nations. To this end, there is vast and far-reaching research on the subject, especially on matters international. However, research on intra-African trade is lacking in comparison to research on trade amongst the rest of the world, not just developed, but also developing countries alike. That aside there are numerous efforts put in place to enhance and encourage trade within and without the continent.

The research presented in this thesis aims to investigate and address three key issues specific to intra-Africa trade. The questions asked are: are the measures currently in place successful in the promotion of intra-Africa trade; is the continent ready for measures about to be implemented and after all that, is trade really the key driving force for economic growth and development within Africa?

To answer these questions, the research presented here in this thesis employs the gravity modelling approach, the G-PPP test and develops a macro-economic model which is applied to the Kenyan economy. The results indicate that; yes, trade is significant and important in determining economic growth, and while measures taken thus far such as the creation of Economic Integrations have not been as successful as was envisioned, trade openness continues to be among the most important ways in which trade is encouraged and enhanced, to this end, although the continent is yet to fulfil all the requirements for the formation of a full-blown Economic Union, it is ready for drastic measures such as the formation of a currency union. Literature reveals that this could form the basis of hastening complete integration and harmonization of all systems of the participating economies, thereby benefiting not just trade but also all other sectors of the economies.

Key words: Intra-Africa trade, economic integrations, monetary unions, trade, gravity model, G-PPP, macro-economic modelling.

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ABBREVIATIONS

AEC	African Economic Community	MEPM	Macro-Economic Policy Model
AU	African Union	MERCOSUR	Mercado Común del Sur -Common Market of the South
c.i.f	Cost Insurance and Freight	MFN	Most-Favoured Nation
CEMAC	Monetary Community of Central Africa	ML	Maximum Likelihood
CFA	Communauté Financière Africaine	MPI	Relative Import Prices
CGE	Computable General Equilibrium Modelling	MUB	Manufacturing Under Bond
CMA	Common Monetary Area	MUs	Monetary Union
COMESA	Common Market for Eastern and Southern Africa	NTAX	Net Tax
CUs	Customs Union	OAU	Organization of African Unity
DINV	Domestic Investments	OCA	Optimum Currency Area
DSGE	Dynamic Stochastic General Equilibrium	OECD	Organisation for Economic Co-operation and Development
DTAX	Direct Tax	OLS	Ordinary Least Squares
EAC	East African Community	POLS	Pooled Ordinary least Squares
EACB	East African Currency Board	PTAs	Preferential Trade Agreements
EACJ	East African Court of Justice	RBER	Real Bilateral Exchange Rates
EALA	East African Legislative Assembly	REER	Real Effective Exchange Rates
EAMU	East African Monetary Union	REM	Random Effects Model
ECA	Economic Commission for Africa	RER	Real Exchange Rates
ECM	Error Correction Model	RMSM	Revised Minimum Standard Model
ECOWAS	Economic Community of West African States	ROW	Rest of the World
EIs	Economic Integrations	SACU	South African Customs Union
EIs	Economic Integrations	SACU	South African Customs Union
EMU	European Monetary Union	SADC	The Southern African Development Community
EPZ	Export Promotion Zones	SRCB	Southern Rhodesia Currency Board
EU	European Union	SSA	Sub-Saharan Africa
FDI	Foreign Direct Investments	UEMOA	West African Economic and Monetary Union
FEM	Fixed Effects Model	VAR	Vector Autoregressive Models
ForEx	Foreign Exchange	VECM	Vector Error Correction Model
FTA	Free Trade Area	WACB	West African Central Bank
FTAs	Free Trade Areas	WAEMU	West African Economic and Monetary Union
GCC	Gulf Cooperation Council	WAMI	West African Monetary Institute
GDP	Gross Domestic Product	WAMZ	West African Monetary Zone
GLS	Generalized Least Square Estimators	WTO	World Trade Organization
GoK	Government of Kenya	XA	Agriculture Exports
G-PPP	Generalized Purchasing Power Parity	XAF	Central African CFA
HT	Hausman Test	XG	Goods Exports
IMF	International Monetary Fund	XMANU	Manufacturing Exports
INDAX	Indirect Tax	XMERCH	Merchandise Exports
Ksh	Kenya Shillings	XOF	West African CFA
LDCs	Less Developed Countries	XPI	Relative Export Prices
LM	Lagrange Multiplier	XS	Service Exports
MEM	Macro-Econometric Models	Y	Real Domestic Income

Chapter 1

INTRODUCTION

1.1 Research Problem Statement

Many economists agree that trade is vital to economic growth and development of nations. Trade's basic concept comprises the willing exchange of goods and services amongst bilateral or multilateral parties within market frameworks especially for profit. Profit generation is motivated and supported by among many factors, differences in costs of production due to; differing factors of production including quality and quantity of human capital, technology, natural resources, climates and in certain cases political stability. Trade is also necessitated by need for variety as seen via differentiated consumer preferences, achievable via taking advantage of comparative advantage and through increasing efficiency.

Trade theories (discussed in chapter 2) depict a continuous quest to understand and formulate policies that serve in the best interests of continued growth and development of nations. Among the most commonly stated benefit includes increased national incomes from export earnings. In the early 19th century, David Ricardo's work showed that the development of countries (developed or developing) and progressive economic growth was achievable and sustainable through international trade. By studying and empirically testing the relationship between economic growth and various trade variables like exports, using country specific target studies or cross-country studies, economists find that the general consensus is that trade facilitates growth and development by increasing interdependence amongst the trading partners, while allowing for possible economies of scale by encouraging economies to harness their comparative advantages and specialise production in areas where they have relative cost advantage over other economies. With time, this enables the entire economy to then employ their human, physical and capital resources in sectors that in turn give the highest returns within the international markets.

This kind of cyclic process goes on to ensure that incomes increase across the board, going on to then promote productivity and attract more investors as investor-confidence is boosted. In line with this, for less developed countries with little or no capacity to invent and develop new ideas, trade is especially vital as it makes it possible to borrow from more developed countries,

ideas that have already been developed and improved promoting more effective and more efficient production while also providing for continued technological progress. In sub-Saharan Africa especially, studies such as those by (Edwards, 1992), (Frankel, 1999), and (Dollar, 2002), confirm this positive relationship between trade and economic development.

Recognition of these factors that link trade to perceived (or theoretical) and as evidenced by the various empirical studies, referenced, actual economic growth has led to various strategies by various governments to ensure they reap maximum gains from trade. In Africa, this has involved the shift from intervention policies and strategies such as import substitution strategies, applied especially in the 1960's as most countries gained independence and were keen to develop their domestic industries, to export-promotion¹ strategies, with some economies combining both at various stages of their development process, (Bhagwati, 1988).

In a bid to improve intra-Africa trade², African economies have formed Economic Integrations (EIs) in a quest towards the formation of a fully integrated Economic Union (EU), thereby relaxing most barriers to trade and hence also providing for wider markets. This begun as early as 1910, when the South African Customs Union (SACU) was formed, followed shortly by the establishment of the East African Community - EAC, in 1919. Since then, the number of EIs has grown. According to theory, formation of an EU progresses through certain distinct channels. Currently, African countries, as will be shown later in text, are observed to be yet at the formation stages. In spite of this however, the continent endeavours to form a fully integrated single currency operating African Union by 2028.

Given this insight and obvious importance of trade, it is therefore worth investigating why only about 10 per cent of total African trade, is intra-African in nature, whilst about 90 per cent is with the Rest of the World (ROW) and Organisation for Economic Co-operation and

¹ Import substitution is the identification of policies that are directed towards the reduction of imports, for example: use of tariffs and quota restrictions and subsequent substitution by domestic production, while export promotion refers to the term applied to policies that are neutral towards trade. Due to the confusion that can arise from the definition of these terms, economists have preferred to use the terms inward-oriented for policies promoting domestic production and discouraging imports, and outward-oriented for those which do not discriminate against imports.

² Total intra-African trade accounts for about 10 per-cent of the region's total trade

Development (OECD) countries, with an observed major portion influenced by past colonial links (IMF, 2009).

1.2 Aims and Objectives

The research presented in this thesis aims to develop a coherent outlook on the success of measures taken by Africa to improve trade, with the main aim including, finding out how successful Economic Integrations have been in enhancing intra-Africa Trade.

Following this, the study investigates how ready the continent is for the formation of a fully integrated economic union, using one of the advanced Economic Integrations in the region, East African Community (EAC) as a representative agent.

Finally, the research investigates the significance of Trade to the individual nations, using Kenya as a case study, by investigating how variations in export earnings affect national incomes.

Objectives set out by the research towards the accomplishment of stated aims include:

The comprehensive review of existing trade literature with a keen interest on:

- Economic integrations and their contribution to Intra-African trade;
- Monetary Unions and the African Progression towards an African Union,
- A general review of how Trade, here we focus on exports, affects national incomes and other major macroeconomic variables of a country.

A careful review of empirical methods available to test the stated hypothesis

Application of various chosen suitable econometric analysis methods towards testing the research hypothesis

1.3 Methodology

The research in this thesis applies econometric techniques to both panel and time series data to answer the research questions, aided by econometric software – Eviews. In this section, we

give a brief and general overview of the three distinct econometric approaches employed in this thesis, however, in the following empirical chapters, we present a more detailed and comprehensive description of each of the methodologies mentioned below.

The first empirical chapter applies the Gravity model which aids in analysing the effectiveness of measures taken to encourage intra-Africa trade. The gravity model first applied by (Isard, 1975), is widely and extensively used in analysis of bilateral trade flows between any two or more trading partners and has been a particularly useful tool, especially as it takes into account additional factors evident in explaining the extent and incident of trade such as; common and or shared characteristics between the trading partners. That is, the gravity model explains bilateral trade flows amongst trading partners as being directly proportional to their economic mass, whose proxy is national income – measured as real Gross Domestic Product (GDP) and inversely related to geographical distances between them. Krugman (1991) explains that nearness of trading centres can influence trade between any two countries because of low transportation costs, implying there should be more trade within regional blocs and across borders, an observation that is consistent with many empirical studies.

Literature reveals that various scholars show the applicability and strength of gravity modelling approach in bilateral trade analysis as well as showing that the Gravity modelling approach has theoretical backing (Anderson, 2003). However, Deardorff (1998) argues that the gravity equation does not prove the validity of one theory or another, instead, it is an empirically tested and approved tool via which established theories of trade can be formally tested and reconciled with reality. For our study, we develop a gravity model using the major traditional variables of the gravity modelling approach as observed from literature, including distance and GDP in explaining the variations in trade amongst trading partners. However, to answer the research question, we add a dummy variable that captures membership to an economic integration (EI), and investigate how that affects trade amongst and between members (Deardorff, 1998).

Once we establish the effect and extent of joining an EI within Africa on intra-African trade, the research goes on to investigate whether or not the continent is ready for the successive plans towards the formation of a fully operational African Union sharing a common currency. To do this, in the second empirical chapter, our research analyses one of the regional blocs already established in the continent, the East African Community (EAC). For this purpose, we employ the Generalized Purchasing Power Parity (G-PPP) approach.

This approach was first extended by Enders and Hurn (1994), deriving from the theory of Purchasing Power Parity (PPP), which asserts that if a series of real bilateral exchange rates, is found to be stationary, this indicates that the two countries are well integrated. However, Enders and Hurn questioned the validity of the PPP hypothesis in standard bilateral tests, citing that influences of other countries should not be ignored. To correct for this, the GPPP theory was then formulated upon the notion that although the real bilateral exchange rates of the economies are non-stationary, as found of fundamental macroeconomic variables determining real exchange rates of a group of economies, such as GDP, prices and interest rates, it is still possible that the said fundamental variables can be sufficiently integrated, forming a co-integrating relationship such that the Real Bilateral Exchange Rates - *RBER* share common trends, (Enders, 1994).

Hence if it is established that there is even one stationary linear combination of otherwise non-stationary real bilateral exchange rates, then it is reasonable to conclude that there is sufficient economic interdependence to warrant the long-run equilibrating conditions amongst the fundamental macroeconomic variables of the economies in question. Thus simply, the GPPP test merely seeks to find if there are any co-integrating vectors between *RBER* of members within a CU or those intending to form a CU, which involves testing to see if there is an equilibrium relationship between the different *RBER*. To carry out this test, we run co-integration tests on the *RBER* of the five members of EAC: Kenya, Uganda, Tanzania, Rwanda and Burundi. Given this and according to Mundell's optimum currency area (OCA) theory, which posits that two economies constitute a currency area if they present similar real disturbances (Mundell, 1961), the economies in question can successfully form an OCA, as long as there is evidence of co-integration among the *RBER*.

After we investigate the possibility of successfully forming a currency union within Africa, our research follows on to answer a fundamental question that we found should not be left unanswered. That is; given how much effort has gone towards creating avenues and environments via which to encourage, boost and enhance African trade, is trade really a key determinant in driving economic growth and development of the mostly small and developing countries in the continent?

To do this, our research develops a macro-econometric model for Kenya, which facilitates the investigation of variations in trade on national income, which is captured by real GDP. We use

Kenya as a case study and representative of small open and developing economies within the continent. Macroeconomic models (MEMs) are basically a set of behavioural equations which represent the structure and operations of an economy, usually based on both observed and predicted behaviour of individual economic agents upon the introduction of shocks, such as experienced upon introduction of policy changes to the system and are therefore especially useful tools for policy analysis and forecasting.

In general, macro models are intended for purposes of analysing how an economy's key components vary with time, given different policy options and are usually developed depending primarily on both the use for which they are required as well as the economy for which they are required. Although we note from literature that macroeconomic models have been used since late 1930s³ with pioneering works including that by Tinbergen in assisting the implementation of economic policies by the Dutch Central Planning Bureau (Valadkhani, 2005)⁴, macro-economic modelling is not as extensive in Africa as it is in other developing countries.

For our study, informed by literature reviewed and after considering the economy's key characteristics; small, developing, primarily agricultural and open, we choose to develop a macro-econometric model based on the income-expenditure approach, adapting the traditional Keynesian demand side modelling approach, while borrowing from the frame work suggested specifically for a Kenyan macro-economic model by Karingi and Ndung'u (2000). For our purposes, the model is mainly interested in the external sector, more specifically, the effects of trade in varying national income, as such, we apply a set of equations that depict the behavioural, institutional and definitional relationships within a framework that provides the general structure and operations of the Kenyan economy and because this is a simultaneous equation system, any change in one variable will cause changes in all other variables ensuring

³ See (Diebold, 1998) and <http://cowles.econ.yale.edu> for more details on the evolution of macro modelling and Bodkin, Klein and (Bodkin, 1986a) (Bodkin, 1986b) and (Bodkin, 1991) for a comprehensive literature review of Macro Econometric Models

⁴ Available at: http://www.treasury.gov.au/documents/1087/HTML/docshell.asp?URL=04_Productivity_trends.asp

that joint relations are taken into account, thus avoiding any bias that a static equation might create.

1.4 Thesis Organization

The thesis is organized as follows:

Part one – here the thesis presents the informative chapter – chapter 1, giving basic information on the research problem, including fundamental information such as research aims and objectives, contributions, and thesis organization before moving on to three individual econometric chapters.

Part two – this section is further sub-divided into three chapters; 2, 3 and 4. Each of the three chapters offers a comprehensive discussion of fundamental background knowledge and literature review on the different topics of interest. First, has the formation of EIs enhanced intra-Africa trade? Is Africa ready for a common currency? And, is trade as important to overall economic growth as literature suggests for African countries?

Chapter 2: primarily discusses EIs, investigating the factors that contribute towards and hinder Intra-African Trade. To explore this, the gravity modelling approach is discussed and applied to a select few countries within Sub-Saharan Africa (SSA). The results of this analysis are given and discussed.

Chapter 3: discusses the readiness of Africa for a fully integrated economic union with a single currency in operation. The research carried out here applies the Generalized Purchasing Power Parity (G-PPP) approach to find out how ready the continent is to share a single currency, taking one regional trading bloc at a time. To this end, the most advanced trading bloc, EAC – which is effectively currently a common market (CM), is used as a representative of the regional trading blocs in the continent. Here the study proffers the idea that not only will the formation of a CU work towards enhancing continent wide integration as a result of policy measures that follow such a decision, but this will also by itself greatly enhance intra-regional trade.

Chapter 4: discusses the general effect of trade, in particular exports, on overall economic growth, which is represented by real GDP in the study, while also taking other macroeconomic variables into account. To understand this, the study develops and applies a small macro-econometric model for the Kenyan economy, following which the results of the analysis are discussed.

Part three – this section presents the last chapter, chapter 5 which gives a summary discussion of the research results, concludes the thesis providing a summary of main findings and their policy implications while including possible insights for future work.

Chapter 2

INTRA-AFRICA TRADE

Feenstra (2004) refers to trade as a cornerstone concept in economics, and a key contributor in the growth of Nations. Likewise, Chigora (2008) agrees saying that, ‘Trade drives the world economy and forms the basis upon which development can be realized,’ (Chigora, 2008). Dollar and Kraay (2001), wonder how participation in international trade affects overall economic growth rates of developing countries and how that in turn affects their income distribution and poverty incidence, concluding that events leading to globalization in the post war era of 1980s, such as advanced international trade show many great benefits including rising incomes, falling poverty levels, including spill over effects that enable the less developed countries to catch up with the more developed ones. The authors go on to say that countries that choose not to participate in this process are the end losers.

2.1 Theory of Trade

Since the 17th century, the theory of Trade has gradually expanded in a step by step pattern akin to that of the Product Life Cycle. Among the founding fathers of the theory of Trade include Edward Misselden with articles such as ‘The Means to Make Trade Flourish’ (1622). Misselden was among a group later named Mercantilists by Adam Smith for their sole focus on trade. Mercantilists mostly consisted of early 17th century merchant writers who believed exports contributed to income while imports only accrued costs, while postulating that trade is a zero-sum game, benefiting one member at the expense of the other, concluding it was better for economies to export as much as possible while importing as little as possible (Lipsey, 1995).

The mercantilist’s theory however, precludes the fact that it is in some cases better and even cheaper to import than it is to produce locally for export. However, with time and the rise of Feudalism, the concept of barter trade came forthwith, gradually giving way to the acceptance of buying and selling. This growth of commerce compounded by the discoveries of the New World led to the rapid development of common mediums of exchange amongst trading partners, varying with region, sometimes cultures and resources at hand. For example, commodities such as cowry shells were used as a medium of exchange from as far back as 145-86 BC by the Chinese, while copper was used as a medium of exchange in Africa as recently

as pre-colonial times. This theme supported by Feudalism, helped shift the mind set of economists and economies in general from the previous system of minimum trade, onto accepting and embracing the benefits thereof. Following on, as exchange rates gained importance by way of their indications of the existing market conditions for money, some of the mercantilists themselves realized the importance of trade, as later depicted by Misselden in 'The Circle of Trade' (1623). To modify this trend of thought and foster more liberal trade, Adam Smith then proffered the theory of absolute advantage, and proposed that a country should go on to produce only items with which it has absolute advantage giving room for other countries that have a similar absolute advantage in other commodities to do the same, providing further incentives to trade across with each other (Smith, 1776).

In the real world however, it is not often that there are characteristics that provide for such complete absolute advantage, in many cases, different countries experience slight advantages over other countries in the production of certain commodities. In this regard, in 1817, David Ricardo modified Adam Smith's theory and introduced the idea of comparative advantage. Ricardo cited the possibility of efficiency gains from trade if countries chose to specialize in the products they could produce relatively more efficiently and at less cost than other products – even if other countries did produce the same goods too – and then imported those commodities they could not produce from the countries that held comparative advantage in their production. This theory does not suggest losses when there is absolute advantage; instead it says that there are gains to be made from trade either way.

With gradual adjustments to theory of trade, later, in a general equilibrium model of trade, the theory of Factor Endowments was put forth, first by Swedish Economist, Eli Heckscher and subsequently added on by Bertil Ohlin, earning the name Heckscher-Ohlin (H-O) theory. This theory says that countries should only trade in the products which they can produce from the production factors that these countries are naturally endowed with, especially focusing on capital and labour. The theory postulates that countries should produce the commodities that use the relatively abundant factor of production intensively, while importing those products that require intensive use of the relatively scarce resource. This theory was in its simplest form, based on the concept of two partner countries, differentiated by the different levels of two homogenous factors of production, i.e. labour and capital in each, and in the production of two commodities each, moving away from complete specialization. The theory holds several assumptions, such as constant returns to scale (CRS – implying that a proportionate increase in

all inputs increases the output by the same percentage). For example, if K = Capital, L = labour and $Z = f(K, L)$ is the production function for good Z , then a doubling of both K and L would result in a doubling of Z -production, i.e.

$$Z' = f(2K, 2L) = 2Z.$$

This theory, however, suggests that where there is relative capital abundance, the wage rates tend to be high. In such cases, the cost of production of goods that require more labour to capital tend to be relatively higher in comparison to those that require a higher capital to labour ratio. Also, the theory determines that trade patterns are reliant on the characteristics of the trading countries, such that countries with an abundance of capital will trade in goods requiring more capital in their production while countries with more labour will trade in goods that require relatively more labour in their production. Only one main difference is observed between developed and developing countries by this trade theory, factor endowments. That is, developed countries have more capital relative to developing countries (Salvatore, 1999).

However, some of the assumptions made were not very practical, such as, assuming technology is the same everywhere. Due to this, the theory's application was criticised and consequently, subjected to tests and extensively analysed. Among various results of this critique was the resultant Leontief Paradox. Wassily Leontief, a Russian-born US economist, did a study that observed that although the USA was relatively more endowed in capital than in labour, (and should thus have produced and exported the products requiring more capital per labour ratio), it was actually the opposite. Instead, USA imported commodities that were capital-intensive in production and exported labour-intensive commodities, an observation contrary to expectations of the H-O theory (Mankiw, 1997). The H-O theory explains trade under the assumptions that markets work under pre-existing perfect competition, however, as has often been realized, there are consistent imperfections within the markets. This led to the rise of the new trade theories.

New trade theories are mainly used to explain intra-industry trade, a component not extensively discussed by the H-O model. Established in the 1980s (Krugman, 1987) (Grossman, 1991), new trade theories mostly challenge the assumption of constant returns to scale and are largely regarded as the main critique to the idea of free trade. In general, these theories, (mainly modifications to already existing theories), assume that international trade is as a result of economies of scale, whilst trying to be more realistic with dealing with factors that affect trade. Among the innovations made include market imperfections, imperfect competition, industrial

growth and product differentiation and political economy arguments especially within classical economics. In addition, new trade theories base international trade on economies of scale, mostly associating trade with growth theories, which has invoked a favouritism towards trade liberalisation by means of fewer and indeed if possible, no barriers at all. However, models based on market imperfections argue for the need for interventionist policies, including protectionism. New trade theories allow for the idea that free-trade might come as a detriment to economic growth as market imperfections such as information asymmetry encumber the society⁵. Intra-industry trade is better explained by new trade theories, as more than half of the trade in manufactured goods among industrialized nations is based on product differentiation and economies of scale, not easily reconciled with the H-O factor endowment model.

As recently as 1985, yet another theory was suggested, this one to bridge the gap between economic principles and business practicalities. This theory, brought to light by Michael Porter and named *Competitive Advantage Theory*, implies that a nation's prosperity depends on its competitiveness, based on the productivity with which it produces goods and services. This is different from absolute advantage in that, for competitive advantage, the nation doesn't only focus on products for which it has absolute advantage in cost of production, but also products for which it can earn the most returns. According to Porter, competitive advantage is of two basic types: cost advantage and differentiation advantage, (Porter, 1990). In this theory, the postulated determinants of competitive advantage of a nation are based on four major attributes: Factor endowments (*basic* or *advanced*); Demand conditions; Related and supporting industries; Firm strategy, structure and rivalry.

Generally, these theories also advocate for free and open trade systems as its main foundation is built on the theory that all economies would perform better if there was optimal utilization of resources and complete and integrated globalization of manufacturing and services across the world. Porter's theory presumes to predict the patterns of international trade as currently observed by suggesting that countries should and often do, produce for exports commodities from the nations thriving industry, either as a result of planned effort or chance advantage, that

⁵ For detailed information on the differing innovations made by new trade theorists, see (Deraniyagala, 2001)

is where all four attributes required for success according to the theory are favourable and import those requiring use of attributes that are not favourably supported in the nation. It is also noted that this competitiveness is mainly in the nation's microeconomic statures, fuelled by entrepreneurship, where competitive advantage refers to the situation where a company is able to generate profits above those of the industry average. However, this theory also does not escape making crucial assumptions, among them, that there exists adequate employment opportunities for those engaging themselves to leverage competitive advantage over others to ensure they optimize their own potential. This theory however concentrates more on why nations succeed in particular industries and not others, and not a general overview of total trade (Morgan, 1996).

2.2 Trade and Growth

The general and most common trade-led hypothesis emphasizes the positive and dynamic effects of increased national incomes from contributions earned from exports, which can also be channelled towards economic growth as these foreign exchange earnings from exports not only provide the foreign currency required for importing of necessary commodities not produced locally, (most of which include capital, intermediate and final products especially in Less Developed Countries – LDCs) but also help the governments to finance their external debt. In Africa especially, an existing debt of over \$200 billion is cited as the single biggest obstacle to the continent's development, hence revenues from exports would go towards servicing this debt⁶.

The same hypothesis also asserts that trade leads to the allocation of resources according to the comparative advantage of individual economies, with spill-over effects generated from trading, such as interactive exchanges of knowledge and technological progress. This is especially true for small economies that are more likely to benefit from economies of scale, going towards enhancing both the labour and capital productivity of trading economies. Consequently, the

⁶ A total of almost \$14 billion is spent on debt service every year in Africa, consuming funds that would otherwise be allocated to development enhancing programs and projects such as the management and prevention of HIV/AIDS – a rampant and malignant health issue in most of SSA (Sub-Saharan Africa), education, and infrastructural development among other important needs. See: (Spencer, 2011)

exposure increases competition. For producers, increased competition provides for an incentive to ensure they keep costs of production down and enhance quality of produce, thus ensuring efficiency which in-turn provides incentives for the development of new technologies (Romer, 1986).

As stated earlier, David Ricardo's work among others showed that the development of countries and progressive economic growth was achievable and sustainable through International trade. Extensive research has gone on to prove the same, as seen from the study by Edwards (1998), who correlates the same economic growth with several measures of trade openness and Dollar (2001), who correlates the same with a proxy for distortions to international trade as measured by high and unexplained domestic prices, with many economists now accepting the theory that, in the long-run, trade benefits both parties involved in the transaction, even given different and varying degrees of trade-openness across different countries. Within sub-Saharan Africa, studies including those by (Edwards, 1992), (Frankel, 1999) and (Dollar, 2002), confirm this positive relationship. However, other studies show otherwise, a study by Barro (1991), indicated an interesting finding indicating diminishing growth rate effects of trade-openness as GDP – capturing the wealth effect of a country - increased, thus implying that poorer regions would benefit most at the onset of opening up-to trade.

With time and in a bid to improve intra-Africa trade African countries have successfully and not-so-successfully formed Economic Integrations (EIs) and Regional Trading blocs (a trend that has been in line with the processes of progression of world economy via globalization), thereby relaxing the barriers to trade and also providing for wider markets. The history of EI initiatives within the continent has been long and eventful with some formed, as far back as 1910, with the South African Customs Union – SACU, followed shortly by the establishment of the East African Community - EAC, in 1919. In Africa however, other factors aside from trade also led to the creation, succession and in some cases, failure of EIs, as will be observed later in the chapter, including social and political reasons, especially in the late 20th century as most African Nations struggled for independence, particularly in the period after 1960s. The number has since then continued to increase, with almost 10 currently in active operation.

2.3 Economic Integrations

In their most basic form, Economic Integrations are Free Trade Areas (FTAs) best described by Evans and Newham (1990), as ‘forms of economic unions between states where members agree to abolish tariffs and other restrictions on selected goods between themselves vis-à-vis the rest of the system in which they continue to maintain their existing tariffs’ (Evans, 1990). An EI is not the same as a regional trading bloc, although an EI can exist within (or form from) a trading bloc. Regional trading blocs are groups of actors with common interests in better trade relations, aimed at leading to possibly closer cooperation and integration in the long term.

2.3.1. Supporting Theoretical Framework

The theory and rationale behind EIs dates as far back as trade itself, beginning when trade was embraced and theorized by Adam Smith, through to David Ricardo. It has undergone two distinct transformations with the first brought to light and made famous by Viner, (1950). Viner’s theory, modelled on the classical economic concepts of free trade is largely based on the Customs Union (CUs) Theory and examines the impact of the removal of trade barriers (tariffs and non-tariff restrictions), between trading partner countries on trade in general, going on to show that the formation of CUs is not always a gains-gains solution, that in-fact, CUs can be either trade creating or trade diverting. The second phase is the ‘Terms of Trade – Volume of Trade’ (TT) approach by (Jaroslav, 1965) later elaborated on by Kemp and Negishi (1969).

Viner’s approach is general and seeks to find out if CUs lead to improved welfare by comparing both of trade creation and trade diversion effects as a result of their formation, while the TT approach is more detailed and seeks to find out particularly, why CUs are formed, whether they lead to eventual free-trade, what happens to the individual member countries welfare after their formation, among other more intricate questions. The latter approach investigates this by looking at the resultant effects of CUs on prices and volume of trade. The two approaches also use different methods of analysis, with Viner⁷ applying partial equilibrium analysis while the

⁷ This study is informed by: (Balassa, 1964); (Tinbergen, 1962); and (Viner, 1950) among the principal economists of the Neo-classical model of EIs that model’s EIs in stages.

TT approach is more restrictive and applies general equilibrium analysis, (Bhagwati, 1971). According to Viner (1955), the rationale for formation and succession of EIs draws from the standard trade theory whose basic principle stipulates that: ‘...free trade is superior to all other trade policies.’

Following the neo-classical model, formation of EIs implies the removal of artificial barriers to optimal market operations and the deliberate introduction of strategies that liberalize economies by eliminating any barriers to mobility of resources and commodities, develop the economies via facilitating capital accumulation and economies of scale. This increases competition and productivity, and finally culminates in the harmonization and co-ordination of policies. All these aim towards achieving market equilibrium, where there are uniform prices and free movements of both commodities and factors. To achieve this however, certain common characteristics hold true of the willing participant economies; well developed and functioning infrastructure supporting efficient transport (hence negligible transport costs) and communication networks and that each economy specializes in the production of different commodities in line with prevalent comparative advantage.

This goes on to inform that free trade among two or more countries will improve the welfare of the member countries providing the arrangement leads to net trade creation and not trade diversion⁸.

2.3.2 Trade Diversion and Trade Creation

When a country begins to liberalize its trade, the welfare effects are uncertain and are largely determined by whether the EIs result in trade creation or trade diversion. By broad definition, trade creation defines itself in that it is the resulting occurrence of trade directly related to the formation of an EI, with consumption shifting from high cost, less efficient producers to low cost, more efficient producers, leading to increased consumer surplus and subsequent overall

⁸ For more details on the evolution of the theory of customs union, see: (Bhagwati, 1968) (Bhagwati, 1991) (Geda, 1999) (Lipsey, 1987) (Meade, 1955) (Kemp, 1976) including and (Viner, 1950)

improvements on national welfare. On the other hand, trade diversion describes the incidence where the formation of an EI diverts trade away from efficient producers who are non-members of the EI, to less efficient producers within the EI, which can lead to reduction of national welfare.

Viner's (1950) work pioneered the analysis on the trade creating and trade diverting effects of CUs. His work examines the after-effects of forming EIs in the embodiment of CUs on the change in the direction of trade, for the individual (and combined) member countries, for non-members and for the world in its entirety. Classical economic thought stipulates that free trade allows for gains by facilitating the maximization of utility and profits as both of individuals and firms – respectively, seek to maximize consumption by sourcing commodities from the cheapest producers, who in-turn seek to maximize profits by ensuring that production fully utilizes comparative advantage. Given this, it is normal to expect that forming EIs, which are generally trade liberalizing and advocate for free trade, would lead to general and overall gains.

According to Viner's work, however, the 'gains from trade argument,' only applies when all barriers are removed and there is complete trade liberalization the world over and is not the automatic result of forming EIs / CUs, as this does not result in complete elimination of pre-existing discrimination between suppliers / producers (who might be trading partners and not necessarily co-members of the new EI), as is often the case of many African EIs. Instead, Viner says that discrimination in the form of trade barriers are only shifted not eliminated.

Hence, EIs will only result in trade creation, in the event that the members of the EI happen to be the lower cost, more efficient option, than the non-members now facing slight disadvantage in having restrictions still imposed on them. In this case, where trade-creation dominates, then at least one member of the EI will benefit and in the long-run there will be general welfare gains in the world. It is however possible those member countries are not the more efficient cost effective producers, thus resulting in the diverting of trade away from such producers who are non-members. In this case, at least one (sometimes all) of the EI members will lose. This is potentially welfare reducing. This study notes 'potentially' welfare reducing, as various studies have gone on to show that trade diversion does not necessarily imply reduced welfare, with some citing that it can instead be welfare improving, (an argument deriving from New Trade theories), where it is argued that trade diversion may increase welfare for the diverting

country and the rest of the world as an EI resulting in increased competition and specialization, may lead to exploitation of economies of scale by firms, now with bigger markets, which might even lead to the member countries then transitioning to the least cost supplier (Wonnacott, 1989).

Viner's work is not without criticism all the same. Meade (1955) – in Kowalczyk (2001), criticizes Viner's analysis, which determines the resultant outcomes of EIs depending on the volume of trade resulting, citing that the analysis does not provide for a means to weigh the economic gains (losses) due to their formation. To solve this, Meade went on to show that for EIs to be classified as either trade creating or trade diverting, then it is important to consider not just the volume of trade, but also the extent of trade on per unit basis and the changes in these costs. Meade then stipulates that in the event that the trade barriers applied to non-members are in the form of fixed quantitative restrictions like quotas, then, EIs generally would result in welfare gains of the member countries, seeing as there would not be a case of displacing the imports from the non-members, (Kowalczyk, 2001). Lipsey (1957), agrees that it is possible to deflect any trade diversion effects of EIs, if countries joining are already main trading partners, as this implies that the trading partners are already identified as the most efficient – low cost producers.

This argument is further expounded by Summers (1991) in the theorems of 'natural trading blocs,' where Venables (2000), later cited that EIs by member countries with different than world (or non-member countries) average comparative advantages, were those significantly affected by either trade diversion or trade creation, as consumers, now shifted to member countries have to forego sourcing from the non-members who might generally have comparative advantage, making their products more efficient and cost effective (Venables, 2000). In addition, trade creation (trade diversion) constitutes a change in patterns and flows of trade, depending on the size of EI member economies. These changes could possibly affect world prices, which in turn could improve (reduce) welfare gains overall for member countries,

albeit at the possible cost of non-members⁹. Also, by their mere nature, EIs imply the reduction of trade barriers, if these trade barriers are in the forms of tariffs then; their reduction spells the consequent reduction of government revenues for the member countries as well as for non-member countries in the event of trade diversion.

This is especially possible if the countries from which trade is diverted were reliant on revenues earned from trade. Trade creation (diversion) is empirically investigated via econometric studies¹⁰ and computable general equilibrium modelling. The former try to relate any changes to trade flows; also identifying them as either trade creating or diverting as a result of joining EIs, using different econometric models with the most common one being the gravity modelling approach that uses dummy variables to capture membership to an EI. These gravity models generally estimate bilateral trade flows as functions of the members' GDP, population and any restrictive trade costs that are often captured by transport costs, (Frankel, 1999). Approaching the same problem from a different angle, computable general equilibrium modelling applies a complete computer model to simulate any resultant effects of policy changes resulting from formation of EIs on the economy in question. Such modelling is detailed in the micro-structures of an economy and is especially useful in informing policy as possible effects of instituting any policy changes can be more accurately and individually predicted for the various sectors of an economy (Yu, 1975).

2.3.3 Formation of EIs

EI are observed to progress through certain distinct phases with varying levels of liberalization and co-ordination of policies amongst the participating economies, by gradually decreasing the levels of all forms of economic discrimination among countries.

⁹ A study on Brazil's membership in Mercosur established that if EIs result in trade diversion then this leads to reduced imports from non-EI members and any subsequent reductions in import prices would be a terms of trade gain, but only for EI-members (Winters, 2000).

¹⁰ Econometric studies are more relevant for this study

2.3.3.1 Preferential Trade Agreements (PTAs)

PTAs are considered the weakest form of EIs and are characterized by preferential access and treatment of certain products from member countries in the form of reduced tariffs and elimination of non-tariff restrictions such as quotas, while still maintaining individual trade-restrictions to non-members. PTAs are not allowed among WTO members, as they are obligated to grant Most-Favoured Nation (MFN)¹¹ status to all other WTO members. Most PTA negotiations are bilaterally agreed upon through a trade pact. PTAs are considered the first step towards EI with the intention towards formation of a Free Trade Area – FTA.

2.3.3.2 Free Trade Area (FTA)

Here, a group of countries form trade blocs in which member countries agree to eliminate trade barriers (tariff and non-tariff) amongst themselves on most and sometimes all trade between them, but continue to hold their own individual national restrictions against non-member countries. This difference in external tariff structures requires the development of elaborate *rules of origin*¹². Rules of origin are designed to explicitly prevent goods from being imported from an FTA member country with the lowest tariff and then exported to countries with higher tariffs. The process also incorporates the carrying out of detailed customs inspections. Normally, only members with complementary economic structures will form FTAs, in the event that they are similar and hence competitive, it is more likely that they will form a Customs Union – CU. Examples of FTAs include most EIs in Africa including SADC which became a full FTA in 2008.

2.3.3.3 Customs Union (CU)

A CU involves the complete eradication of all barriers to trade amongst member countries and the equalization of common external tariffs or trade restrictions to all other non-members. There however, still exist restrictions to mobility of factors within a CU. In the case of a CU, the economic outcome is dependent on levels of common tariffs adopted and although CUs do

¹¹ Under MFN rules, countries agree not to discriminate against other WTO member countries.

¹² ... 'Rules of origin' are the criteria used to define where a product was made. And are an essential part of trade rules as a number of policies discriminate between exporting countries: quotas, preferential tariffs, anti-dumping actions including countervailing duty (charged to counter export subsidies) (WTO, n.d.)

not require the harmonization of individual economic policies, the adopted common tariffs might go on to determine the individual domestic policies of member countries depending on possible impacts on public revenues, which might then require policy co-ordination. An example of these includes the SACU – Southern African Customs Union, the oldest CU, ratified as a CU in 1889 and revised as recently as 2002.

2.3.3.4 Common Markets (CM)

This is the fourth stage towards complete economic integration and encompasses all elements of a CU, with the additional characteristic of elimination of restrictions on mobility of factors of production, and just like with trading of goods and services, members of a CM also adopt common restrictions and policies on the regulation of mobility of factors of production for all non-members. With these similar policies, it is recommended but not forced that members harmonize domestic policies as well, which is then critical in the implementation of the final stage of integration by formation of an Economic Union – EU. An example is the European Union, which was originally established as a CM by the Treaty of Rome in 1957 as well as the EAC, which became a CM in 2010.

2.3.3.5 Economic Unions (EUs)

An EU comprises of all elements of a CM, and requires complete harmonization of all domestic policies, that is monetary, fiscal and welfare along with the adoption of common foreign relations policies. An example is the European Union, and although it took a long time for the full transition, today the European Union exhibits all aspects of an EU, including common labour laws that allow all the citizens to hold a common passport and are allowed to work or invest anywhere within the union without restriction. An EU will also regulate some fiscal spending responsibilities to a supra-national agency. The European Union's Common Agriculture Policy – CAP, is an example of fiscal coordination within an economic union.

2.4 Abstracting from the CU Theory to Accommodate African Economies

Despite commendable effort and a long history of experimenting with EIs, in most developing countries, sub-Saharan Africa among them, EIs are still very noticeably at the formation stages, with a general consensus that so far, they have had an overall less-than-satisfactory outcome towards achieving their intended objectives (Lyakurwa, 1997). Crippling these efforts and hindering the progress of economic integration in Africa, is the absence of macroeconomic stability in addition to which there is lack of a strong and sustained political commitment.

Among many symptoms of this are: the unwillingness of governments to surrender sovereignty over macroeconomic policy making; facing potential initial consumption costs that may arise by importing from a high cost member country especially in the transition periods; accepting unequal distribution of gains and losses that may follow on after joining an EI; and the discontinuation of existing economic ties with non-members, especially as African countries are observed to be struggling to disconnect and reverse a trade legacy that is dominated by trade with their former colonial rulers rather than with each other. For example, Senegal's biggest trading partner is France and although Senegal surrounds Gambia, Gambia trades extensively with the UK, while more than 60 per cent of Kenyan trade is with the UK, the remaining 40 per cent being split between China and the USA, (Johnson, 1995).

Viner's CU approach therefore, although used largely to inform this study is not appropriate for most developing countries and in particular, those within Sub-Saharan Africa due to the unique nature of their economic and political structures. For example, while the CU theory assumes specialization and builds on the effects from applicability of comparative advantage, this can be problematic in Africa, as most economies are heavily dependent on production and exportation of similar primary commodities (such as cotton, live animals, maize, fresh fish, vegetables, tea and sugar), resulting in pleas of diversification by experts both within and without the continent. In addition, there are poor and unreliable transport networks which create increased inefficiencies, directly eliminating the assumed negligible costs of transport. For example, flying from one African country to another might often require rerouting via Europe, while often most of the continent's railways and roads lead towards the ports rather than linking countries across regions. Still on inefficiencies, communication networks¹³ are equally challenged, with options such as Fibre-optic communication just now being introduced, more than thirty years after their invention. Another factor that might hinder the applicability of this model to African economies is the fact that it requires the homogeneity of the participant economies structures, institution-wise especially, while African economies vary over a wide spectrum and are far from homogenous.

¹³ For every 100 people in Africa there are 1.2 telephone lines -- lowest rate in the world, (World Bank report, 2002).

From another rather theoretical view point, considering the newer trade theories, Baldwin (1997), notes that there are possible resultant effects from formation of EIs on member's economic geography that might serve to increase hesitation or full participation in the implementation and progression of EIs. This is following derivations from the more recent trade theories, such as Krugman's (1991) New Trade theory approach that applies economic-geography modelling, explaining that formation of economic hubs, (where there is regional concentration of economic activities) is rather determined by trade costs. This indicates that it is still possible that African economies would shy away from forming EIs as they might fear that regional blocs could enhance economies of scale by locating a production activity in one location rather than each activity in each country, which might lead to the migration of industries, risking the development of some economies more than others (Lyakurwa, 1997).

Previously, in a study to analyse the developments of the CU theory, Krauss (1972) noted that the most significant rational argument for formation of EIs was that informed by the motivation behind their formation. Krauss noted that it was important for non-economic motivators to be considered in analysing potential EI effects, observing that most economies formed EIs for varied reasons, while embracing other sources of specialization that did not necessarily adhere to the existence of comparative-advantage (Krugman, 1993). This is the case especially for some African economies. In the development of the theory behind EIs, Fine and Yeo (1997) support this view point and suggest a reorientation in the traditional focus on EIs, stating that especially in the context of Africa, for EIs to work towards enhancing growth via enabling trade and trade related benefits, it is perhaps necessary to focus on the non-traditional concepts envisaged to result from formation of EIs. They suggest instead that EIs be considered as a means of achieving stable and sound national macro-economic policies and rapid accumulation of human and physical capital whilst focusing on infrastructural and natural resource development (Robinson, 1996).

In theoretical terms, this has shifted the focus away from the traditional classical motivations of forming EIs, fuelled by dynamic-effects interests like the chance of exploring possible economies of scale. In this regard, Krauss (1972) proposed two approaches to customizing the theory of CU, dependent on particular political settings. The first assumes that governments are irrational actors, mostly focusing on non-economic paradigms, while the second modification assumes governments to be rational and conscience of certain economic factors

like the welfare of the community. Krauss however considers the irrational approach, as the closest to ‘real-on-the-grounds’ situation, citing that governments do not choose to participate in EIs on neutral basis, but will do so in pursuit of their own interests, (Krauss, 1972)¹⁴.

Given the limitations of full application of pre-existing theories to African economies, it is worth mentioning that there have been several more developments in the theory of EIs. As it so happens, research on issues pertinent to formation of EIs has been growing and developing in as dynamic a pattern as the evolution of the different EIs themselves and the advent of newer trade theories, causing scholars such as Gunter (1989) to resign to the conclusion that, ‘...it is difficult to really determine how a CU works as all the studies dedicated to their analysis are simply too specific and different, aspiring to incorporate as realistic assumptions as possible, relevant to the individual areas where the CUs are,’ (Gunter, 1989).

2.5 Alternative Progression of EIs

Due to the discovery that conventional theoretical progression of EIs (as previously described in step wise progression), might not quite apply in circumstances such as those mentioned above, various studies have identified two approaches that are possible avenues of progression towards complete integration, in developing and least developed economies. These two approaches include: functional and development integration. Functional integration was inspired by Monnet’s vision that technical functional integration could lead to political transformation, laying foundations for gradual EI formation, noting the importance of cooperation in mutually beneficial areas of economic and social aspects, such as infrastructural development. This approach, as discussed by Haas (1964), suggests that cooperation should begin in the technical sectors, assuming that once this sector achieves positive results, other sectors will promptly follow suit, eventually leading to cooperation in all sectors of an

¹⁴ More developments and modifications of the CU theory are discussed in great detail by among others: (Harrison, 1993) and (Feenstra, 1990), including the incorporation of new-trade theories perspective (Krugman, 1991).

economy, including its political sectors (Haas, 1964). SADC is an African trading bloc that has successfully applied this approach in its pursuit of EI formation, starting by designing mutually beneficial development projects that member countries co-operated in implementation, such as improving transport networks, eventually expanding to ensuring sustainable and continued food security, energy provision and gradual liberalization of trade as they opened up their markets.

On the other hand, development integration, seen as the next step after functional integration has been successfully instituted and streamlined, encompasses policy co-ordination and harmonization of economic and political and financial institutions. This approach also takes care to include the smaller economies within the agreement, stating the importance of paying attention to their interests too. The key requirement of successful implementation of this stage of integration includes determined willingness to co-operate by members of the EI, especially by their political actors. Development integration also advocates for even distribution of resultant benefits from the formation of the EI, applying compensatory measures to ensure this at the low levels and measures such as regional industrial development at the national level, for the less developed members, by allocating priority to their development needs. The most successful example of this is the European Union (Blomqvist, 1992).

This route seems fairly mild and less intimidating in respect that it poses no direct threats to the sovereignty of individual economies, a simmering problem especially within Africa, and offers participating economies a chance to familiarize themselves with institutional set-up. However, this approach is merely the facilitator of forming EIs and does not in itself serve as a full EI. Irrespective of the progression of formation, it is the general agreement that there are overall gains to trade for countries involved in regional cooperation as observed in a study by Longo and Sekkat (2004) citing; currency in-convertibility, political instability and poor infrastructure as being among the major obstacles to intra-Africa trade (Longo, 2004). This observation is supported by McCulloch et. al. (2002), who asserts that even if it is selective, trade liberalization eventually leads to larger markets and associated dynamic effects, continuing on to point out that it is possible to experience even greater welfare gains with imperfectly competitive markets (Winters, 2002).

This being the case, for empirical purposes, the study embraces Balassa's (1987) definition of EIs as both or either of: *a process* - designed to gradually eliminate discrimination between

economic units that belong to different national economies; and *a state of affairs* – representing the absence of various forms of discrimination between national economies, in considering EII formation in Africa and their potential impact on intra-Africa trade flows.

2.6 Particularly in Africa

Africa shares a common problem of slow and stunted economic growth and development irrespective of its wealth in variation of resources. In the period between mid-1980s and late 1990s, the continent showed continued and consistent growth rates, averaging at 5 per cent, and although there was a distinct variation in the growth rates of individual EIs, there was nonetheless a noted significant improvement continent wide, with only a few particular countries recording negative growth. Growth rate trends are depicted below by regional and economic groupings for the period between 1980 to 2007, Economic Community of West African States –also known as UEMOA group is seen to be the most consistently progressive in terms of real GDP growth, followed by East African Community – EAC. Meanwhile, from mid 1980s, Common Market for Eastern and Southern Africa – COMESA and Southern African Development Community – SADC are seen to have the higher GDP ratios albeit also depicting a somewhat slow and cyclical growth pattern. The Economic Community of West African States – ECOWAS started off among the strongest, but showed a marked decline between 1985 and 1986 that is observed to continue on into 2000s, which could be subject to political conflict and unrest in the Niger delta, affecting the small economies consisting of WAEMU – West African Economic and Monetary Union – WAEMU (a sub group of ECOWAS) more significantly than the bigger economies that make up the rest of ECOWAS.

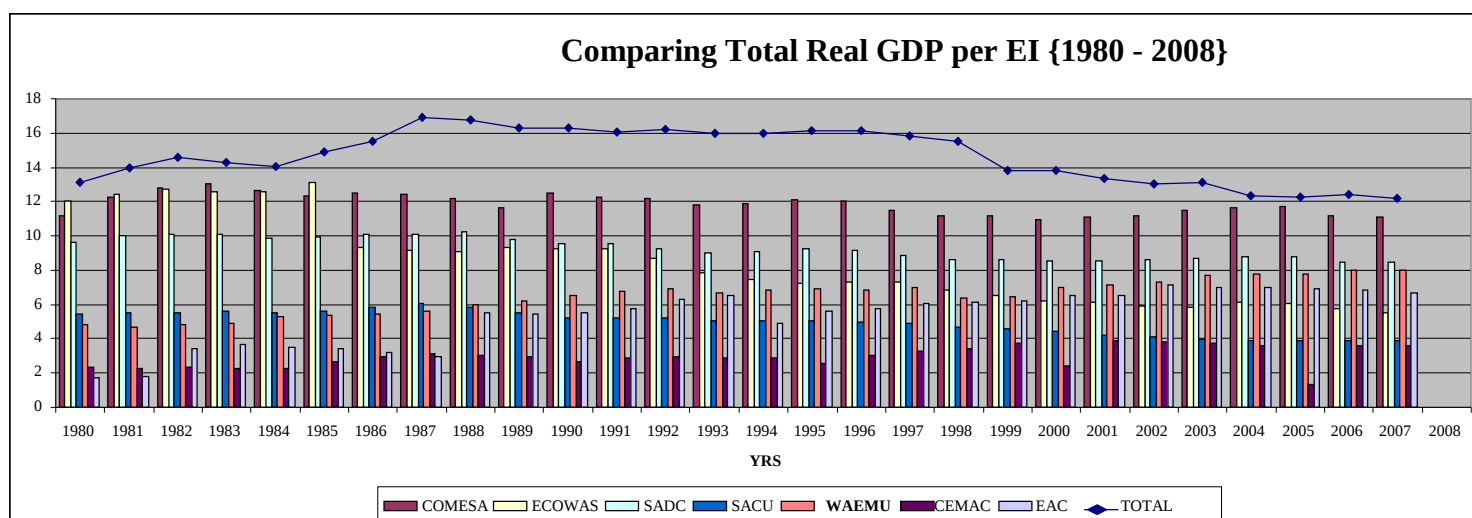


Figure 1: Real GDP Growth rates by Regional Groupings

It is also noted however that despite certain country specific difficulties, certain SSA countries were still able to record significant growth rates such as Nigeria, maintaining a positive 6.3 per cent growth rate despite continued unrest in the Niger Delta, which led to a decline in oil output, the major export product for the country. On the other hand, some countries did not fare as well, causing a significantly damaging decline in their growth. This was noted of Kenya, where after political instability in the form of post-election-violence (PEV), growth declined from 7.1 per cent in 2007 to 3.3 per cent in 2008, while fresh conflicts in the Democratic Republic of Congo (DRC) caused a growth decline from 3.6 per cent previously to 2.4 per cent in 2008, with the IMF continuing to predict even further declines.

In addition to country specific problems, the continent also currently faces deteriorating predictions on its growth patterns for the coming immediate future as the on-going financial crisis no doubt spills over to it. According to the World Economic Outlook, (IMF, 2009), the world economy decelerated in 2008 with global growth slowing at the onset of the global financial and economic crisis, leading to developing countries growth to slow down to 6.3 per cent from a growth of 7.9 per cent in the previous year. Several factors that led to the slowdown of growth within developing countries included a sharp rise in inflation¹⁵ due to an increase in commodity prices, leading to large decreases in consumer spending.

¹⁵ The surge in food and oil prices led almost half of African countries to a record two-digit inflation rate, with average inflation rate on the Continent rising from 7.5 per cent in 2007 to 11.6 per cent in 2008. Among the highest figures posted were: Democratic Republic of Congo (DRC) - 26.2 per cent, Kenya 25.8 per cent and Ethiopia 25.3

Table 1: African Comparative Statistics – Avg. Growth Rates and Inflation; 1970 - 2007

Regional Grouping	GNI per capita (US\$), 2007	GDP per capita average annual growth rate (%), 1970–1990	GDP per capita average annual growth rate (%), 1990–2007	Average annual rate of inflation (%), 1990–2007
Eastern and Southern Africa	1245	-	1.4	40
Middle East and North Africa	3666	-0.1	1.6	11
Sub-Saharan Africa	965	-0.1	1.3	35
Western and Central Africa	698	-0.6	1.3	26
World	7952	2.3	2.4	8

Source: Compiled from IMF – DOT statistics, 2008.

Following this, most Sub-Saharan African countries experienced declining growth as average GDP growth rates dropped to 5.1 per cent in 2008 from an estimate 5.7 per cent in 2007. The World Bank noted however that although this recorded growth rate was lower than the average developing country growth rates, it was still above average world growth rates in 2008. The explanation given for this being that the effects of the global crisis as transmitted to SSA countries were not direct and instant, but rather indirect via reduced external demand and fall in commodity prices, especially of the primary exports, including lowered private resource flows to Africa in the form of Foreign Direct Investments (FDIs), remittances or even available aid, in addition to tightening of trade funds by major trading partners such as UK and U.S.¹⁶.

Further news from the IMF notes that, with current and on-going global crisis, African (and other developing) countries continue to face economic growth risks due also to capacity constraints in the form of poor and malfunctioning infrastructure. In addition, for Africa especially, reduced demand for exports induced by tightening of trade funds in the major trading partners (who happen to be hardest and directly hit by the global crisis, i.e. US and

per cent. In regions, EAC recorded the highest inflation, followed by Southern, Western, Central and then North African regions, ADB – African Statistics Year book, (2009).

16 World Economic Outlook: Crisis and Recovery, 93-94, International Monetary Fund, Washington, DC, April, 2009.

Europe) combined with declining commodity prices will no doubt lead to significant reductions in export earnings across the continent¹⁷.

As the rest of the global markets reduce their trade with Africa, it would thus be useful to cultivate domestic markets and take advantage of the preferential treatment extended within the formation of EIs. Borrowing from this and previous such global crisis experiences and taking into account the price instability faced especially by primary products in the global markets over time, Africa has had a long and eventful history of successful and in some cases not so successful attempts to come together in small and big groups (even continent wide – as noted of the Organisation of African Unity – OAU, later transformed in 2001 to the African Union – AU¹⁸), to form EIs in the hope of better preparing itself to absorb such shocks. The IMF notes that so far, many SSA countries that have managed to achieve sustainable growth have been following consistently strong macroeconomic policies with their governments playing proactive roles and have often been part of functioning regional trading groups¹⁹.

This interest follows some of the more popular arguments such as the possibilities of deriving substantial economies of scale with respect to increased market sizes (hence ensuring that they don't just rely on markets outside of Africa), competition and scope of technological development, which would generate lower production costs, better enabling competition with the rest of the world. That is, not only would the lower-cost, more efficient products be offered at better prices, but as a group, EIs offer the advantage of better bargaining powers, enabling economies to negotiate more effectively in global markets for the best possible prices for their commodities.

Subsequently, this would also help not just in direct expansion of trade but by giving an overall boost to economic growth with the end goal being the reaping of such benefits that would

¹⁷ 'Battered by Crisis, African Growth to Fall Sharply,' IMF Survey Magazine: Countries and Regions, World Economic Outlook, April 24, 2009.

¹⁸ AU intends to achieve what the European Union has achieved by 2028.

¹⁹ 'IMF to Assist Africa Hit Hard by Global Downturn,' IMF Survey Magazine: Countries and Regions, World Economic Crisis, February 3, 2009.

accrue to rising global demand, higher prices of primary commodities, and better macroeconomic management that would eventually result in the consolidation of fiscal policies leading to lower inflation rates. In a bid to achieve this, within the strategies put forth, there have been certain select objectives that have particularly stood out: improvement of transport networks, this includes the building of regional roads and rail, development and improvement of ports to cut down on inefficiencies, reduction of corruption to ensure not just enhanced domestic but foreign investor confidence too as the private sector is crucial in enhancing intra-African trade including investments in social welfare via facilitation of better institutional (educational and health) facilities.

These efforts have seen the formation of various types of agreements, with different levels of openness, some formed as simple preferential trading arrangements extended to partner countries while others are more complex, including functioning currency unions, such as the CFA and CMA²⁰ zones. Irrespective of reported poor performance in the quest to achieve their objectives and the many obstacles preventing the smooth operation of EIs however, African countries show a willingness, determination and renewed confidence to get things right, borrowing now especially from the various successes of other trading blocs such as the European Union, North American Free Trade Agreements – NAFTA and Asia-Pacific Economic Co-operation – APEC. This renewed commitment was demonstrated in the signing of the Abuja Treaty in 1991, (enforced in 1994), by the OAU (now AU) members. The treaty calls for gradual formation of continent wide integration in phases and sub groups, starting with the elimination of tariffs²¹ on goods traded within the various regional economic communities to create free trade areas, followed by the elimination of non-tariff barriers after which a common tariff would be adopted, forming the equivalent of a customs union.

Among the existing EIs that have gradually followed this stage by stage progression in the facilitation and implementation of EIs are: SADC (first formed in 1980 as Southern African Development Coordination Conference – SADCC, and transformed to Southern Africa

20 Communauté Financière Africaine – CFA and Common Monetary Area - CMA

21 In 1990, the IMF classified 75 per cent of countries in sub-Saharan Africa as having "restrictive" trade policies. In 2007, only 14 per cent were still considered restrictive.

Development Community in 1992, recently became a fully operational FTA in 2008 and comprises of 15 members); COMESA – Common Market for Eastern and Southern Africa (first formed in 1981 as a PTA and later changed in 1994, now already has 11 of its 20 members as FTAs); and EAC – East African Community (first formed in 1967 and dissolved in 1977 due to political conflict, was revived in 2000 and five years later, was launched as a full customs union on January 1, 2005, following on to become a common market in 2010).

For all of them however, the common goal has been the desire to reduce and eventually eliminate pre-existing inhibitors to better enable increasing and sustainable industrialization, economic growth and development, whether in the form of: natural (most countries are landlocked and have no access to coastal ports, incurring heavy costs in the form of tariffs and other duties to access the rest of the world markets); economic (inclusive especially of poor physical and institutional infrastructure); or political (most African economies underwent colonial rule only to gain independence in the hands of dictators, with governments flawed by the cultivation of self-interest and corruption) barriers. Following are some of the EIs formed within Africa. The dates in the brackets are the formation dates for each EI. Some EIs have more than one year indicated, this is because as mentioned earlier, some EIs were initially formed and for various reasons dissolved only to be revived later, for example the EAC.

Table 2: Economic Integrations in Africa²²

ECOWAS (1975)	COMESA (1981/1994)	SADC (1980/1992)	SACU (1910)
Benin,	Angola,	Angola,	South Africa,
Burkina Faso,	Burundi,	Botswana,	Botswana,
Cape Verde,	Comoros,	DR Congo	Lesotho,
The Gambia,	D. R. Congo,	Lesotho,	Namibia
Ghana,	Djibouti,	Malawi,	Swaziland
Guinea,	Egypt,	Mauritius	
Guinea Bissau,	Eritrea,	Mozambique,	AMU (1989)
Ivory Coast,	Ethiopia,	Namibia,	Algeria
Liberia,	Kenya,	Seychelles,	Libya
Mali,	Madagascar,	South Africa,	Mauritania
Mauritania,	Malawi,	Swaziland,	Morocco
Niger,	Mauritius,	Tanzania,	Tunisia
Nigeria,	Namibia,	Zambia,	
Senegal,	Rwanda,	Zimbabwe	
Sierra Leone,	Seychelles,		
Togo	Sudan,	ECCAS (1964/1983)	
	Swaziland,	CEMAC	
EAC (1967/2000)	Uganda,	Burundi	
Kenya,	Zambia,	D. R. Congo	
Uganda,	Zimbabwe	Rwanda	
Burundi,		Sao Tome & Principe	
Rwanda,	WAEMU/UEMOA (1994)		
Tanzania	Benin,		
	Burkina Faso,		
CEMAC (1999)	Côte d'Ivoire,		
Cameroon,	Guinea-Bissau,		
Central African Republic,	Mali,		
Chad,	Niger,		
D. R. Congo,	Senegal,		
Equatorial Guinea,	Togo		
Gabon			

Most of the sub-Saharan African countries are developing with few in the low incomes bracket as categorized by World Bank statistics. The EIs formed by these groups of countries are referred to in literature as ‘South-South’ agreements²³. As the domestic markets for the developing economies continue to expand, the expected trend is that their export

²² <http://web.worldbank.org>

²³ For details: UNCTAD secretariat reports on "New Geography of International Trade: South-South Cooperation in an Increasingly Interdependent World" (TD/404).

competitiveness will also expand, as observed, since the 1980s, the ‘South’s’ share in global trade has grown from about 7.0 per cent to the current rate of about 13.0 per cent globally. This is observed as the South continues to rapidly become a more important destination for developed countries’ (otherwise referred to as the ‘North’) exports – UNCTAD²⁴.

Consequently, it is possible that the growing importance of the South as a producer, trader and consumer in global markets makes it an important future engine of growth and dynamism for the global economy. For example, total trade by US with Sub-Saharan Africa increased by 28.0 per cent in 2008, of which a total of 75.9 per cent was from crude oil imports. In addition, there was also a significant increase in non-oil imports by U.S from other African countries such as Ghana, whose exports to the U.S increased by 46.1 per cent and Angola by 62.6 per cent. In total, imports by U.S under the African Growth and Opportunity Act (AGOA) in 2008 increased to \$66.3 billion, a 29.8 per cent rise from 2007. It is also observed that there is increased diversification in imports under AGOA of certain significant products such as jewellery (diamonds, gold and other precious stones and metals), horticultural products, animal by-products like leather, more traditional agricultural products like coffee, tea and cocoa, and so on. Although SSA’s exports grew at a higher rate than world total exports, in the global markets, still, in 2008, total SSA exports only commanded 1.83 per cent of total world trade, a slight increase from 1.74 in 2006 and 1.79 per cent in 2007^{24a}.

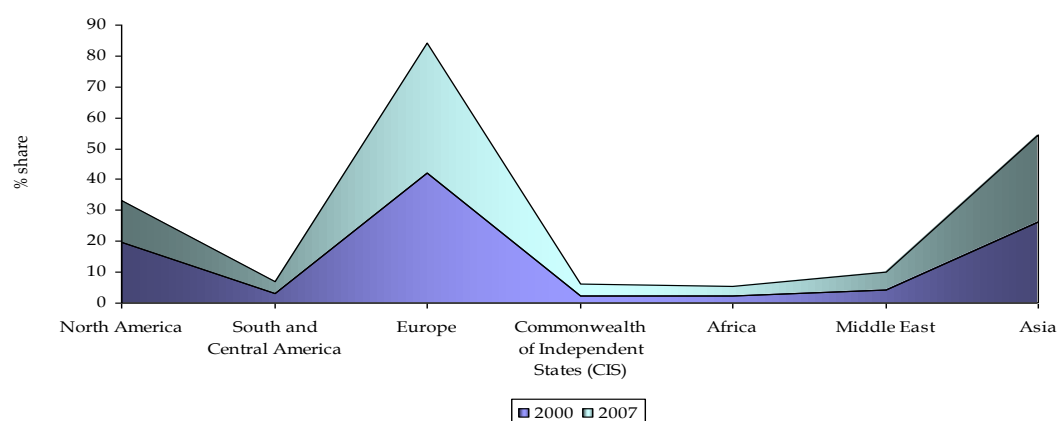


Figure 2: Percentage share of African Exports, in World Trade in 2000 and 2007

24 & 24a; for details: UNCTAD secretariat reports on "New Geography of International Trade: South-South Cooperation in an Increasingly Interdependent World" (TD/404).

Within Africa, the progression of intra-region trade is even slower and has neither progressed as fast as trade with the rest of the world, nor in pace with other EIs. In 2006, intra-EAC trade accounted for only 2.6 per cent of total EAC trade, whilst in comparison during the same year, intra-regional trade amongst Latin American and European countries averaged above 30 per cent of their total trade²⁵.

The chart below shows that between 2000 and 2007, intra-EI trade within Africa averaged at less than 10 per cent, while trade with the rest of the world (ROW) averaged at least 15 per cent, with certain global regions attracting more trade. The data shows Asia to be the top contender of trade partners closely followed by EU. Of all the EIs, SADC, COMESA and ECOWAS have the highest share of intra-EI trade while WAEMU experiences the least of intra-EI trade. Of these also, it's interesting to note that EAC (the only EI that conformed to a CU – Customs Union in the group until 2010), exhibits among the lowest share of intra-EI trade, only slightly better than WAEMU^{25a}.

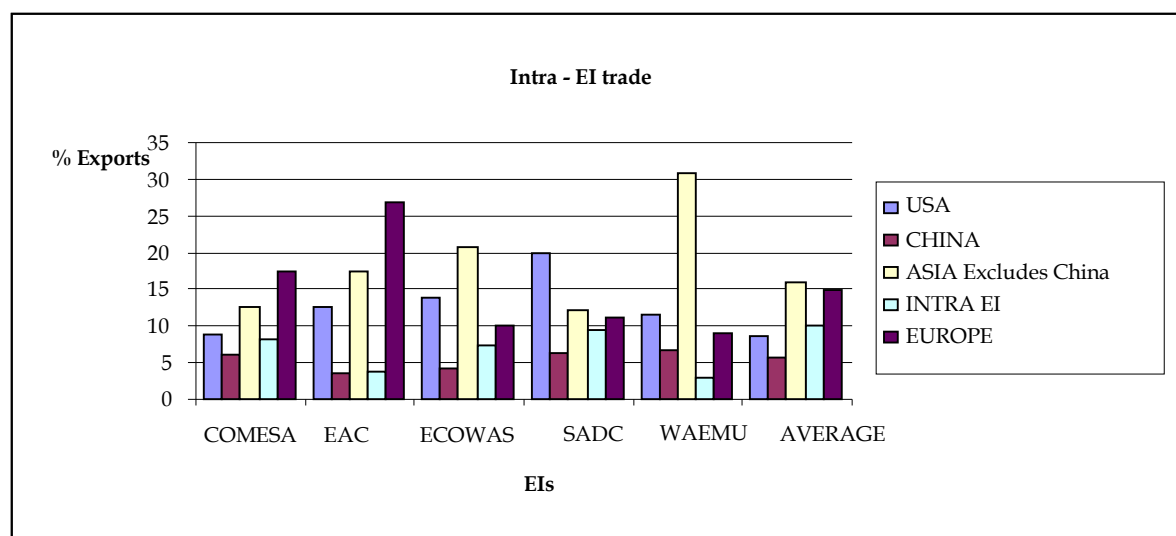


Figure 3: Case of Intra-Africa Trade (Averaged between: 2000-2007)

25 & 25a; http://www.agoa.gov/resources/US_African_Trade_Profile_2009.pdf

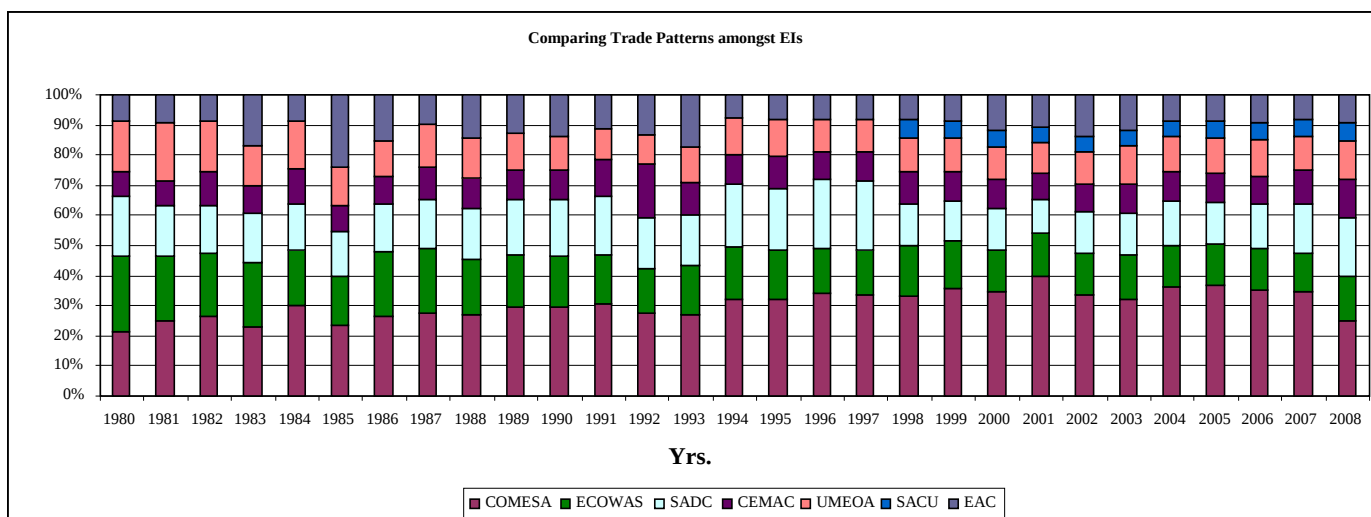


Figure 4: Total Percentage Intra- African Trade within the EIs 1980 - 2008

2.7 Empirical Investigations on the role of Economic Integrations

On the role of EIs, Hazelwood (1975), states their use as, ‘...to strengthen and regulate the industrial, commercial and other relations of the Partner States to the end that there shall be accelerated, harmonious and balanced development and sustained expansion of economic activities, the benefits whereof shall equitably be shared,’ (Hazelwood, 1975). Various studies have set about investigating the effects of forming regional and economic integrations on growth, finding a general consensus that these trade agreements do affect growth one way or another. Such studies include that by Walz (1999) investigating the effects of forming integrations on growth by applying dynamic equilibrium growth models that accounted for their formation. The study found that though regional integrations did cause growth, the rate of growth was determined by pre-existing trade barriers before their formation, the effect of such agreements, that is whether they resulted in trade creation or trade diversion and also the comparative advantage of each member (Walz, 1999).

Winters, et. al., (2004) start their paper on trade liberalization by stating that in the long run most economies realize that they would perform much better operating as open economies, which in turn better facilitates development. In basic terms, an open economy is defined as one open and willing to trade with other economies (Winters, 2004). Today, most nations are open economies, leading to an increased level of interdependence, with a tendency for different nations to specialize in certain areas of expertise, confident that the rest of the world can supply

what else they need. Increased interdependence however also raises the desire for nations to group together with the intent of forming stronger entities that allow for cohesive and stronger dispositions for tackling problems that might arise, especially whilst trading with other nations outside their regions.

Classical trade theorists support this notion by stating that free movement of goods, services and all factors of production will not just equalize the relative prices across those regions, but also that with time, these regions tend to converge in their growth patterns with shared technology and competitive markets fiercely demanding efficiency, hence encouraging and driving growth. Among the most immediate ways of facilitating free movement of goods and services across the borders is formation of EIs. Examples include the East African Community (EAC) that until 1997 was made up of only Tanzania, Kenya and Uganda, but was later joined by Rwanda and Burundi, or the Southern African development Community (SADC).

However, there has been ridicule as observations indicate that EIs can be detrimental to the parties involved especially in the short run, if the said parties are not all at the same level of development. Scholars cite various demerits especially for developing country cases, such as trade diversion effects with some going so far as to call economic integrations ‘two-faced’, by virtue of ensuring the members get free trade and a degree of protection against non-members (Bhagwati, 1996).

Chigora (2008) supports this view by stating that any envisioned multilateralism that would come about if both trade creating effects and trade diversion effects took place is false and instead, trade diversion would only result in new interest groups being created, which would then oppose any move towards open systems. An example is given of the European Union, which is considered likely to withdraw support for multilateralism given its growing membership and higher level of intra-regional than extra-regional trade.

Other problems cited include the loss of sovereignty of some states as predominant nations would have a tendency to pursue and elect for those policies that are advantageous to them and not necessarily that are beneficial to all. Indeed, even African leaders themselves express doubt that formation of such integrations would lead to any good, calling them ‘...impulses to restructure the fragmented regions into a more coherent and stronger economic and political

entity...’ as reported in the African Alternative Framework to Structural Adjustment Programs for Socio-Economic Recovery and Transformation (Shaaeldin, 1991).

Outside of the doom preached around the concept of forming any EIs in Africa however, scholars and other African leaders have found that this is a feasible concept and there is some optimism that EIs could pave the way for increased future developments via new and wider markets. In 1993, the then United Nations (UN) Secretary General, Boutros Boutros-Ghali, noted that ‘...regional cooperation and integration was one of the key areas for the future development of Africa. Regional markets can provide export alternatives for local producers. Regional projects can help to rationalize the use of resources and talent. Through regional alliances, African countries can give themselves the means to negotiate more favourable terms with their international counterparts...’ as a result, African Nations have always put regional and Economic integrations as the centre piece of their development agenda²⁶.

All the same, the differing points of view make room for controversy over the benefits and costs of forming EIs. Questions such as: ‘Are the overall trade creation effects outweighed by the trade diverting effects?’ are asked. According to Eicher (2008), as the questions and debates on formation of integrations increase, so does number of theories predicting one or the other of either increasing or decreasing trade flows amongst non-members and members (Eicher, 2008).

Trade theories infer that trade creation is a result of extra output produced by the member countries as a direct result of freer trade between them. For example, there might be increased specialization and economies of scale when comparative advantage is maximized, increasing productive efficiency within member countries. Trade diversion on the other hand, will arise if countries within trading blocs, shift their trading partners to those protected by trade barriers, hence having cheaper goods at price value (as tariffs and other barriers to trade are lifted), compared to those outside the trade bloc. Production is diverted away from those countries outside the trade bloc (irrespective of whether they experience comparative advantage) and

²⁶ http://www.uneca.org/adfiii/docs/ri_infrastructure_dev.pdf

onto those within the trading bloc, reducing trade across and amongst any nations not within the EIs (Krueger, 1999).

On the other hand, WTO Trade statistics (2008), report that the only reason trade might slow down, would be due to a decline in developed economies' demand. However, even given this prediction, Africa is recorded to have the smallest share of intra-regional trade at 10 per cent closely followed by the Middle East, which records a 12 per cent intra-regional trade. The highest-ranking incident of intra-regional trade is recorded in Europe at 74 per cent, while North America and Australia have a 50/50 share of both intra-regional and inter-regional trade. The same statistics show that Africa's biggest export region is Europe, followed far behind by North America and then even further by Asia with a very small amount being allocated to the African states themselves. This has been blamed on lack of diversity in the continent's trade structure in terms of production and especially exports.

Extensive empirical research using different methods of analysis has been used to establish the relative importance of forming EIs, some finding that sole emphasis on trade liberalisation as a growth and development stimulant is misplaced, but instead should be an avenue towards expanding and encouraging intra-regional trade with the resultant effects of the overall development and growth of all Nations involved. For example, a study assessing Regional Integration Potential in North Africa by Achy (2006), applied a gravity model to examine and analyse the determinants of trade flows in North African countries which are still resistant to open up their markets to international trade. This study found that for EIs to achieve their intended objective and be effective, they would need a redefinition and increased credibility. The suggested redefinition would involve focusing their information, promotion and administration efforts on a limited and consistent number of integration initiatives between the countries within the region. Credibility as suggested would be achieved by implementing transparent follow-up mechanisms and better resolution of trade conflicts amongst members of the EIs (Achy, 2006).

Among many other examples include the transformation of the European Community into the European Union with a deeper level of integration, creation of North American Free trade Agreement – NAFTA and Southern Common Market – MERCOSUR, revival of old arrangements such as the Andean Pact and The Association of Southeast Asian Nations –

ASEAN, among others. According to World Bank (2000), almost all countries are part of one economic agreement or other as can be observed in the numerous notifications to GATT/WTO in the last few years (World Bank 2000). Others have meanwhile considered the importance of possible and potential dynamic effects of EIs and partnerships including resultant economies of scale. Walz (1997), goes on to point out that it is possible to have scale effects in areas such as research and development as a result of increases in productivity demanded by the increased market size after an EI is formed (Walz, 1997).

On similar grounds, it is observed that although unilateral liberalization is beneficial, gains from integration agreements are likely to be larger. This was the result of a study by Puga and Venables (1998), on the different effects by different types of agreements on welfare and incomes, done by looking at agreements between developed and developing countries. The study concluded that agreements between developed and developing countries were likely to bring greater gains especially to developing countries than those between developing countries (Puga, 1998). In support of this observation, a later study by Venables (1999) found similar possible results and further explained the possibility of two outcomes: one, where a free trade area formed by developing countries that held lower relative endowments of human capital than the world's average but different among them, would lead to the divergence of income levels, with the richer partner benefiting at the expense of the poorer. Second, an agreement between high-income partners of relatively higher endowment of human capital is likely to lead to income convergence. Both of these studies favour the formation of an EI, but caution that only in the event of one member being richer is growth necessarily increased (Venables, 1999).

APEC (1999) using GTAP – Global Trade Analysis Project and applying CGE – Computable General Equilibrium modelling analysed possible effects of trade liberalizations and formation of EIs on Asia Pacific economic Cooperation – APEC countries and found that this would result in an increase of incomes by approximately USD 75 billion. Similarly, Dennis (2006) also used the GTAP modelling approach on a study investigating the impact of trade liberalizations on the Middle East and North Africa (MENA) region. This study also found a positive effect on welfare as a result of formation of such agreements (Dennis, 2006). Still on MENA, El-Erian and Salomon (1996), carry out a study analysing the scope and implications of forming greater economic integrations in their paper, 'Is MENA a Region? The Scope for

Regional Integration.’ The study finds that any gains from forming EIs will depend primarily on the implementation of domestic reforms and adherence to external policies that enable these economies to better integrate in the process of globalization, but not directly from simply forming independent EIs (El-Erian, 1996).

In a study examining the effect of EIs on Economic growth, Vamvakidis (1998), presents empirical evidence that countries operating as open economies that were neighbouring more developed but similarly open economies, grew faster than those neighbouring closed or less developed economies (Vamvakidis, 1998). However these results differed depending on model specification and differing degrees of openness by participant countries, with some results implying that small economies should grow faster when they form EIs, a result that was contrary to previous results, examining the impact of EIs during the period between 1970 and late 1980s, showing that formation of EIs did not lead to faster growth. The explanation for these different results being that in that period between 1970s and 1980s, the agreements made did not fully embrace complete openness to trade and were between small and developing countries.

This is observed in a statement by Summers (1991), stating that, ‘effects of a preferential trading agreement among regional groupings are more likely to be positive because neighbours are natural trading partners’, a notion also supported by Lipsey (1957), noting that the joining of an EI with countries that were already trading partners was unlikely to cause trade diversion. In support, earlier works by Aitken (1973) and Bergstrand (1985) showed that formation of European trading blocs helped increase trade significantly in the 1960s and 1970s. In Asia and North America, Frankel and Wei (1995) and later Frankel (1997) also found that trade flows indeed increased after creation of trading blocs in the years between 1972 and 1992. Later, in the early 21st century, the proposal that EIs are overall trade creating is confirmed by Feenstra, et al., (2001) and Frankel and Rose (2001). However, these studies also conclude that in theory, EIs can be either or both of trade creating and trade diverting, as indicated by contrary results found by Rose (2002), showing little evidence of bias towards intra-regional trade and evidence that indicated shrinking trade instead. The study by Rose focused on Protectionism in trade patterns and included in the model many various factors that could affect bilateral trade including geographical advantages such as access to a sea port or lack thereof. As a result, any

differences between actual and estimated trade was explained as a result of these existing artificial barriers to trade (Rose, 2002).

By application of a widely used methodology, that of estimating a gravity equation in the study and analysis of trade, various other studies, including that by Baldwin and Venables (1995), show that integrating markets through EIs may allow economies of scale in domestic production thus enabling consumers to have a wider variety of goods (Baldwin, 1995). These studies however, also note that it is true that such benefits might not be noted across all members throughout time, but that in general, the trading terms after joining an EI will be better for the members compared to others outside of the agreement. On the other hand, this judgment is based on prevailing prior barriers and the pre-existing trade relations among the members and the rest of the non-members. Countries that trade regularly with each other are therefore less exposed to dangers of diversionary effects as countries that do not already trade with each other as mentioned before. However, even as Bhagwati (1995), acknowledges that factors such as lowering of tariffs can indeed cause trade diversion, it is the general consensus that EIs tend to be overall trade creating.

Among African economies, various studies such as those by Foroutan and Pritchett (1993), Lyakurwa, et. al. (1997), Elbadawi (1997) and Ogunkola (1994) have examined the effects of EIs on general welfare and their income generating abilities. These studies generally conclude that so far, EIs have not been successful in achieving their intended objectives. In fact, in 2004, the ECA – Economic Commission for Africa (ECA, 2004), undertook a study that concluded that regional integration in Africa, ‘...proceeded weakly and unsteadily across sectors, countries and regional communities’. However, the same studies also show a positive but slight mark-up in general trade. More directly, Hallaert (2007) asked, ‘Can Regional Integration Accelerate Development in Africa?’ and applied CGE Model Simulations to evaluate the Impact of SADC FTA²⁷ on the Madagascar economy. The study found that SADC FTA would have only a limited impact on Madagascar’s real GDP as a result of the very small share of total Madagascar’s imports affected by the liberalization. By extension however, Madagascar’s

27 SADC FTA – South African Development Community Free Trade Area

trade and production pattern was found to change as a result of this, benefiting the textile and clothing sector, as rigidities in the labour and capital markets were removed, leading to increased total gains in overall production. The study went on to note that gains from the SADC FTA would become substantial only if the regional liberalization was accompanied by a multilateral liberalization (Hallaert, 2007).

Oyejide (2000), noted in his paper, 'Policies for Regional Integration in Africa', that EIs have not just failed in promoting intra-regional and African trade but also in promoting economic growth within the region. The paper however argues that EIs remain a basic ingredient towards the attainment of high and sustainable economic growth in the continent, concluding that several typical features of African economies such as, small population and low incomes, suggest that EIs might provide a suitable mechanism for promoting economic growth through the expansion of intra – regional trade (Oyejide, 2000).

Most of these studies have used aggregate level data to try and study the effects that joining such integrations has on individual economies. In these studies and others, it has been found that the application of the gravity model approach, which applies dummy variables, normally assumed exogenous in the framework, to capture the effects of EIs, has been remarkably successful in investigating the dynamics and consequences of trade liberalizations. Indeed, bilateral trade flows are successfully described by the gravity equation as a log-linear function of the incomes and distance between trading partners. This observation is supported by many scholars carrying out similar studies within and without Africa such as; Bergstrand (1989), Deardorff (1998) and Evenett and Keller (2002). In these studies amongst others, the major and more traditional variables of the gravity model, (distance and GDP), are found to be statistically significant in explaining the variations in trade amongst trading partners.

Described in a little more detail in the methodology section, the 'gravity modelling approach' has long been recognized for its consistent empirical success in explaining many different types of flows such as; migration including tourism and especially trade (Feenstra, 2001). With respect to trade especially, Greenaway and Milner (2002), examine the evidence from existing literature to evaluate the modelling and methodological issues confronted when applying gravity modelling in the analysis of effects of regional agreements on trade. Their paper found that the gravity approach did have a distinctive role to play in the evaluation of trade effects.

They also argued that this role was significantly increased due to both the refinement of theoretical underpinnings and further development of econometric technique (Greenaway, 2002).

2.7.1 Scope of Interest

From the insight gained, this study finds it worthwhile investigating why trade within Africa is at such low levels. This study assumes that this low level of trading amongst and between African countries is the result of increased trade costs in the form of poor transport links, existing tariff and non-tariff barriers and perhaps also language impediment, which makes agreeing to terms difficult. The study predicts that formation of EIs will enhance intra-Africa trade, via reducing the costs of transaction by eliminating tariff and non-tariff barriers, providing for wider markets, not just the big enterprises, but also the rural and micro-enterprises (which are in most cases family owned) as the economic structures are almost similar on income levels.

To explore this idea, the study applies the gravity model and looks at a select few countries within Sub-Saharan Africa (SSA); these countries have been selected carefully although biased by the scope of data available. The study tries to ensure a mixture of countries that do and do not belong to existing EIs, those that do and do not share a language and most importantly, a majority of which carry out some form of recorded trade. This has resulted in a sample of 49 African countries including Algeria as a control. The countries belong to either or some of: COMESA, EAC, ECOWAS, SADC, WAEMU/UEMOA and Commission de la Communauté Economique et Monétaire de L'Afrique Centrale – CEMAC. These groups of EIs have been particularly chosen as they show a relatively significant level of intra-EI interaction and thus provide for data to analyse the degree of trade amongst them. Algeria is included as a control, because although there is little trade with other countries it doesn't belong to any of the EIs taken into consideration in the study.

2.7.2 Hypothesis

- Being a member of an EI influences bilateral trade flows.
- Countries with higher levels of economic development trade more than those relatively less developed whilst economic development is captured by levels of GDP per capita.

- Distance influences inhibit trade; the larger the distance between countries, the smaller the expected level of bilateral trade flows.
- Test the Linder hypothesis (which states that countries with similar economic structures, such as demand and per capita income, will trade more than countries that are dissimilar) for SSA countries.

2.8 The Gravity Model

Generally, trade theories explain why trade occurs but fail to explain why some countries' trade links are stronger than others or why the level of trade between countries tends to vary over time; that is, the incidence and extent of trade. This is where the gravity model comes in, as it takes into account more factors evident in explaining the extent and incident of trade, and has therefore been important in the analysis of international trade flows. However, even with its continued success in estimation and explanation of trade pattern variations, the model comes under scrutiny for its lack of a theoretical background in support of the empirical findings (Deardorff, 1984).

2.8.1 Theoretical Foundations

The Gravity Model, born of the physics function describing the force of gravity based on Sir Isaac Newton's Law of Gravitation, is a mathematical model and a relational theory that describes the degree and level of interaction between two or more points, considering the distance between them. The Classical gravity theory states that the force of attraction between two entities is proportional to their respective masses and inversely proportional to the squared distance between them, such that:

$$F_{ij} = f(M_i M_j D_{ij}^{-2})$$

Where F_{ij} = attraction force between points I and J

$M_i M_j$ = respective masses

D_{ij}^{-2} = Inverse of squared distance between points I and J .

This phenomenon in the study of social phenomena was acknowledged as early as the mid-nineteenth century, as observed by H.C. Carey (1858-1859) and especially so in fields where distance played a significant role. Since then, this approach has been used to account for human behaviour related to spatial interactions such as migrations and trade patterns.

In economics, although the analysis of EIs is well documented as early as 1950s by Viner (1950), who brought to surface the trade creating and trade diverting effects as a result, it was only in 1962 that Tinbergen first used the gravity model to study trade flow patterns. Since then, it has been applied by, Poyhonen (1963), Linnerman (1966) and later expounded by Isard (1975). As a result, it has continued to be widely and extensively used in analysis of bilateral trade flows between any two or more trading partners. These applications however, have come under great scrutiny as until fairly recently, the gravity framework has appeared to exist in a theoretical vacuum, lacking solid and coherent theoretical backing. The model was applied as a static analysis that did not consider or even acknowledge structural differences that would affect determinants of trade such as: trends in the trade flows over time, prices, role of technology, factor endowments or varying demand. In reality however, factor endowments and technologies are neither the same around the world, nor are they constant or immobile across countries.

2.8.1.1 History and Progression

To correct this, a series of papers beginning with Leamer and Stern (1970), who based their argument on a probability model, explaining that the gravity model owed its success to its ability to capture the most important determinants of aggregate demand and supply, have been developed to show how the gravity model can be derived from pre-existing trade theories. Shortly afterwards, they were followed by Anderson (1979), who chose to explain the income variable in the model from the demand side using the utility specification and applying the Armington preferences²⁸ in a model of homogenous goods. Anderson presented a theoretical foundation of the gravity model based on constant elasticity of substitution (CES) preferences and the observation that goods were differentiated by place of origin. This derivation showed how trade costs (assumed to be directly related to transport costs) affected trade flows, following which it is then assumed that if all goods are traded, national incomes will be equal

28 Paul Armington (1969) introduced to international trade theory the assumption that final goods internationally traded are differentiated on the basis of the country of origin. This assumption states that, in any one country, each industry produces only one product that is distinct from the product of the same industry in any other country with the similarity of goods from different regions measured by the elasticity of substitution. He also assumed for the sake of simplicity that there is only one consumer in each country, who viewed the products of one industry originating from different countries as a group of close substitutes: thus a set of assumptions called the Armington assumptions. These relate to the demand side of the model. On the supply side, the model incorporated the standard neoclassical assumptions of constant returns to scale (CRS) and perfect competition in all industries: a combination of these demand and supply side assumptions giving the Armington preferences.

to total value of traded goods with the Armington preferences ensuring that bigger countries with more tradable goods, go on to trade more, thereby increasing their total incomes.

Since Anderson however, it has been increasingly recognized that the gravity equation can be derived from a variety of different models, including Bergstrand (1985, 1989)²⁹. For example, Bergstrand extended the Anderson derivation by adding monopolistic competition and preserved the CES preference structure, replacing the Armington assumption to indicate product differentiation amongst firms instead of countries (thereby encouraging intra-industry trade), suggesting that price effects were important and should also be included in the model as explanatory variables hence approaching the argument from the supply side. In these derivations, Bergstrand introduces and applies the Linder (1961) hypothesis in his trade model. Here, he argues that consumers in countries with similar endowments and same levels of development are more than likely to also share preferences thus increasing the volume of trade amongst them. In 2001, Anderson and van Wincoop further developed this derivation of the theoretical gravity model adding the relative distance effect and formulating the decomposition of trade resistance into three components, namely: bilateral trade barriers between region i and j ; region i 's resistance to trade with all regions, and region j 's resistance to trade with all regions (Harrigan, 1996).

Later, Eaton and Kortum (2001) derived the gravity model from a Ricardian framework, incorporating the Samuelson (1952) iceberg formulation including homogenous goods and existence of different technologies. Helpman and Krugman (1985) did the same from the new-trade theories perspective that embrace increasing returns to scale - IRS and more recently, Deardorff (1998) from a Heckscher-Ohlin (H-O) perspective that explained specialization and considered factor endowments. All these derivations hold certain assumptions constant, with the most common one being that of perfect product specialisation, an assumption that has been viewed as directly responsible for the model's empirical success. In support, Evenett and Keller (1998), indicate strong evidence showing that the volume of trade is highly determined by the extent of product specialisation. In their approach, Evenett and Keller outline three types of

²⁹ See (Helpman, 1985) (Deardorff, 1998) (Anderson, 2003) (Eaton, 2001)

trade models, differentiated mainly by how product specialization is attained within equilibrium.

These are via:

- (i) the Ricardian framework – experiencing technological differences across countries,
- (ii) the H-O framework where there are different factor endowments in the trading partners and,
- (iii) The new-trade theories that incorporate increasing returns to scale (IRS), at the firm level (Paas, 2000).

2.8.1.2 Linking Theory and Derivations

To better demonstrate the link between theory and empirics, Anderson and Van Wincoop's (2003) derivations, which have remained key theoretical explanations for the gravity model, are illustrated below. Ideally, in the first theoretical explanation for the derivation of the gravity model, Anderson (1979) assumed complete specialization (applying the Armington assumptions, that is where final goods internationally traded are differentiated on the basis of the country of origin and are close substitutes) implying that each country's total consumption consists of a share of the goods produced by all other countries (total imports), as well as a share of its own output. In addition there are identical and homothetic consumer preferences across trading regions / countries. It is also assumed here that there are no existing trade barriers, be they tariff, non-tariffs or prohibitive trade costs such as transport costs. Trade is assumed frictionless. Given these assumptions and applying them to a two-country (A & B), two-product (differentiated by country of origin) model; country A's exports to country B are:

$$X_{AB} = \partial_A Y_B$$

Where: ∂_A is the marginal propensity of country B to import goods from country A, while Y_B is income in country B. In country A, local consumers buy $\partial_A Y_B$ amount of good A. In these derivations, it is noted that consumers are utility optimizers enjoying a wide variety of domestic and foreign goods, with their individual preferences assumed to be identical across countries. These are captured by a constant elasticity of substitution (CES) utility function where;

$$U_B \left\{ \left[\left(\sum_{\substack{A=1, \\ A \neq B}}^n X_{AB}^{\theta_B} \right)^{1/\theta_B} \right]^{\varphi_B} + X_{BB}^{\varphi_B} \right\}^{1/\varphi_B}$$

And $A = 1 \dots N$

Where: X_{BB} is the amount B's domestically produced goods demanded by B's consumers, while X_{AB} is the amount of goods produced in country A demanded by the consumers in country B.

$\varphi_B = \{\mu_B - 1\} / \mu_B$: Where μ_B is the CES between domestic and import goods in B.

$(0 \leq \mu_B \leq \infty)$;

$\theta_B = \{\sigma_B - 1\} / \sigma_B$: Where σ_B is the CES among imports in B: $(0 \leq \sigma_B \leq \infty)$.

This specification allows for the difference between the elasticity of substitution between domestic and import goods and that among imports (Anderson, 1979). Bergstrand (1985) further simplifies it to a standard CES function by constraining σ_B and μ_B to be equal. Now given that incomes must equal sales, then it implies that if:

$$X_{AB} = \partial_A Y_B$$

Then total income of country A will be given by the sum of purchases by both local consumers and country B's consumers, such that:

$$Y_A = \partial_A Y_A + \partial_A Y_B = \partial_A Y_W$$

Where Y_W is world income; given by $Y_A + Y_B$

Because of identical and homothetic preferences, it is expected then that the propensity to import and consume goods from country A will equal country A's share of world income, thus;

$$X_{AB} = Y_A Y_B / Y_W$$

The above then forms the underlying, most basic and simplest form of the gravity model. As illustrated, bilateral trade flows will be positively influenced by the incomes of the trading partners and negatively by world income. If all other determinants are ignored, and the above conditions hold, then the intercept of the regression can be interpreted as $\{-\ln(Y_w)\}$ with the log-linear representation shown below.

$$\ln(X_{AB}) = -\ln(Y_W) + \ln(Y_B) + \ln(Y_B)$$

Martínez-Zarzoso and Nowak-Lehmann (2003) find that when applied in a cross-section study, this intercept is irrelevant (Martínez-Zarzoso, 2003).

This formulation of the gravity equation is mainly based on identical Cobb-Douglas preferences; implying identical expenditure shares and income elasticities of unity and only holds when there is perfect specialization in equilibrium. This is a general derivation that does not consider facts such as; factor intensities in production of goods in countries, factor price equalization (FPE), differences in factor endowments across countries among other real on the ground situations, (Helpman, 1985). Interestingly though, even with the above assumptions, if the differences in factor endowments are large enough across the trading countries, (compared to differences in the goods' factor input requirements), then it is possible to have perfect specialization, implying that this general equation can then be derived from the H-O - 2 x 2 x 2 model which requires that the trading countries' relative endowment ratios differ by at least as much as the goods' relative input ratios, as is consistent with diversified production and FPE through trade (Evenett, 2002).

Expanding on the above, Feenstra et. al., (2001), illustrate two different versions of the simple derivation using: product differentiation within the framework of monopolistic competition, where firms maximize profits, consumers utility and there are positive trade costs, and also an illustration that utilizes the Armington formulation of perfect competition, CRS *and* differentiation by country of origin. Their formulations conclude that a country's net exports are more sensitive to its own income than to their partner's incomes, especially where there is free entry and exit of factors and goods, while in the case of commodities being differentiated by country of origin, a country's net exports are observed to be more sensitive to the partner's income than to its own income (Feenstra, 2001).

With or without perfect specialization however, most of these assumptions are not realistic, especially in today's world where globalization has rapidly turned the world into a village, producers do not just target domestic consumers or one partner country's consumers and hence, factors such as trade costs are no-longer negligible. Transport costs now play a vital role in production, planning and pricing. In recognition of this, Anderson and van Wincoop (2003), develop a multi-country general equilibrium model of international trade that most importantly also takes account of exogenous bilateral trade costs. Some of which include; transaction, transport, and border-related costs, a derivation in line with the ice-berg formulation that justifies why prices might differ across countries. In their model, they extend the prevailing

Anderson (Anderson, 1979) model where, goods are differentiated by place of origin, and consumers have CES preferences (Anderson, 2003). This formulation is illustrated below.

Let:

P_A = prices of goods in country A.

$P_{AB} = P_A t_{AB}$ = prices of goods from country A in country B

$t_{AB} \geq 1$ (Normally captured as; c.i.f – cost insurance and freight – and given as; $1 +$ trading costs per unit of exports).

Following economic theory of demand and supply and rational consumer behaviour, this implies that the expected results of increased prices would inevitably reduce demand, and in the simple formulation, this would be shown as:

$$X_{AB} = Y_A Y_B / t_{AB} Y_W$$

In line with this, Anderson and van Wincoop (2003), note that even as bilateral trade costs are a negative influence on trade, they should be measured against price indices, and thus derived a normalization procedure where they derived price indices referred to as ‘multilateral resistance’ variables. These constitute trade costs with all other partners including those costs that are not so readily observable. With this understanding, they continued on to derive a micro-founded gravity equation of the form:

$$X_{AB} = Y_A Y_B / Y_W \left\{ t_{AB} / \pi_A P_B \right\}^{1-\sigma}$$

Where: X_{AB} = nominal exports from A to B,

$Y_A Y_B$ = nominal incomes of countries A and B

Y_W = world income; $Y_W \equiv \sum Y_i$ and

$$Y_i = Y_A + Y_B + \dots + Y_N$$

$\sigma > 1$ = Elasticity of substitution across goods and,

π_A and P_B are country A and B’s price indices, following which:

$$\pi_A^{1-\sigma} = \sum_A P_B^{1-\sigma} \theta_B t_{AB}^{1-\sigma} V_A$$

And

$$P_B^{1-\sigma} = \sum_A P_A^{1-\sigma} \theta_A t_{AB}^{1-\sigma} V_B$$

Here: θ_B = world income share of country B, further defined as $\theta_B \equiv Y_B / Y_W$

π_A = outward multilateral resistance variable, consisting of the summation of all bilateral trade costs (t_{AB}), weighted by destination countries – B.

P_B = inward multilateral resistance variable, consisting of the summation of all bilateral trade costs (t_{BA}), weighted by origin countries – A.

In the above formulation, Anderson and van Wincoop (2003) assume that trade costs are symmetric such that ($t_{AB} = t_{BA}$) implying then in their formulations that ($\pi_A = P_B$) and that they can in turn be proxied by two trade cost functions; i.e. border barriers and physical distance between trading partners. In their derivations, trade costs functions are of the format:

$$(t_{AB} = b_{AB}\rho\partial_{AB})$$

Where: b_{AB} = border-related variable

∂_{AB} = bilateral distance and

ρ = distance elasticity.

Aside from further proving that the gravity model does indeed have a theoretical backing, this formulation also illustrated that bilateral trade flows $\{X_{AB}\}$, depend on bilateral trade barriers relative to average international trade barriers as illustrated by; $\{t_{AB}\}$ (Anderson, 2003).

The biggest debate following this derivation has been the issue of proper measurement of the expressed multilateral resistance terms, with critics pointing out flaws including: misspecification of the trade cost function, leaving out important although sometimes unobserved costs, the fact that bilateral trade costs are not always symmetric, as observed with current and differing levels of EIs, many trading partners do not always receive or impose the same tariffs. In addition, it is also observed that in reality, trade barriers are both time invariant and time variant. These problems have been further discussed by various scholars such as Novy (2007), who follows the same framework, but derives an analytical solution for measurement and representation of multilateral resistance variables, where he considers not just international trade but also intra-national trade. In his derivations, trade costs are derived from time-varying data that is observable. In addition, the Anderson and van Wincoop multilateral resistance terms are explored and derived from both the Ricardian and the heterogeneous-firms models, to solve for the general equilibrium model for bilateral trade costs. These trade cost functions are then replaced in the general gravity equation (Novy, 2007).

In the debate following measurement and effective representation of these trade costs, distance has been suggested and widely used instead as a proxy. Among the reasons for continued use of distance are: Distance is an indicator of time elapsed during shipment and is a proxy for

transport costs; for most developing countries especially within SSA, most exports are raw materials, cereals among others, which are perishables, and for these, distance determines time spent in transit, while survival of the goods continues to be a decreasing function of travelling time, transaction costs including crossing of borders, the more borders crossed, the greater the costs, including time, currency exchange transactions and in the case of language barriers, these costs escalate, which is also captured in the cultural distance argument. This argument suggests that the greater the physical distance, the greater the chances that there will be many cultural differences, which escalate the costs of trade transactions as communication can be difficult, or the buying and selling cultures could differ, causing misunderstandings and delays. For example, in some countries bargaining is an accepted everyday vital part of a successful trade transaction, while in some, this is highly frowned upon.

As discussed, various scholars show the applicability and strength of gravity modelling approach in bilateral trade analysis. In a study in 2002, using cross-sectional data from a sample of almost all industrialized countries, Evenett and Keller address the issue of ‘model identification’ that tried to distinguish which trade theory best derived a model that generated gravity-like trade predictions. Their study shows that the gravity model could be derived both from Krugman’s new-trade theory of Increasing Returns to Scale (IRS) and the H-O trade theories, allowing for both perfect and imperfect specialization. They further found that though similar forms of the gravity equation could be derived from different theoretical approaches, there were characteristic differences. Their study notes that the models based on IRS predicted intra-industry trade, with indications that specialization and trade are increasing functions of the share of intra-industry trade, giving some support to the IRS model, while that on H-O only predicted inter-industry trade (which they defined as trade in goods with different factor intensities). Both models with imperfect specialization predicted a direct increase in trade as relative factor endowments increased. However, the perfect specialization version of the H-O model not only over predicts trade volumes, but was also strongly rejected by the data, making it a wrong specification through which to explain the success of the gravity equation (Evenett, 2002).

Previously, on a search of a theory through which the gravity model could be derived, Feenstra, et. al., (2001) extended this analysis using the Rauch (1999) trade classification and found strong evidence suggesting that the monopolistic competition models of international trade best

accounted for the success of the model when tested within the framework of imperfect product specialization (Feenstra, 2001). However, this study agrees with Deardorff (1998), who argues that, the gravity equation does not prove the validity of one theory or another, but it just confirms a fact of life, and is so far an empirically tested and approved tool via which these established theories of trade can be formally tested and reconciled with the reality on the ground.

Thus, while theory outlines impeccable ways in which trade costs can be captured, the basic underlying message is that the more the costs, the less the trade experienced, for purposes of ease in econometric analysis, these trade costs are captured by distance and in some instances, a dummy variable is used for cultural barriers such as language difference, with the expected negating effects. This study's main interest is analysing bilateral trade, and utilizes the generalized gravity model, where the theory discussed serves to form a strong backing for using this methodology.

Simply put, the gravity model explains bilateral trade flows amongst trading partners as being directly proportional to their economic mass (proxied by national incomes – measured as real Gross Domestic Product – GDP) and inversely related to geographical distances between them. Krugman (1991) explains that nearness of trading centres can influence trade between any two countries because of low transportation costs. Hence, the bias towards more trade within regional blocs, an observation that is consistent with many empirical studies, including: (Rose, 2002), (Bergstrand, 1989) and (Deardorff, 1998). In these studies, amongst others, the major and more traditional variables of the gravity model, that is distance and GDP, have been statistically significant in explaining the variations in trade amongst trading partners.

2.8.2 Empirical Specification and Formulation

As observed, the basic gravity equation proposes that bilateral trade flows are positively related to the GDPs of trading partners and negatively related to bilateral trade costs, proxied by the distance separating them. For the purposes of trade flow analysis, the gravity model is estimated in natural logarithms in its linear form, giving the estimated coefficients in terms of elasticities, enabling a comparison across countries and goods, which help to give direct measures of the resultant responsiveness of trade flows to the explanatory variables. Assuming two trading partners, (previously A and B but now I and J) the basic formula can be given using

different specifications. The most commonly used is where bilateral trade flows are a positive function of the respective countries' total real GDP, thus:

$$\ln(T_{ij}) = \beta_0 + \beta_1 \ln(Y_i) + \beta_2 \ln(Y_j) + \beta_3 \ln(dist_{ij}) + \varepsilon_{ij} \quad (2.1)$$

$$\beta_1, \beta_2 > 0; \beta_3 < 0$$

Subsequently, instead of only real GDP, bilateral trade could be positively related to both GDP and Population (Pop), such that the resulting formulation is given as:

$$\ln(T_{ij}) = \beta_0 + \beta_1 \ln(Y_i) + \beta_2 \ln(Y_j) + \beta_3 \ln(Pop_i) + \beta_4 \ln(Pop_j) + \beta_5 \ln(dist_{ij}) + \varepsilon_{ij} \quad (2.2)$$

Pop is taken to depict market size and the bigger the market the more trade takes place, in which case, the expected coefficients of Pop; $\beta_3, \beta_4 > 0$; however, in the event that tradable commodities are substitutes and import substitution effects dominate, then it's possible that Pop of destination country will affect trade negatively so that $\beta_4 < 0$.

In certain cases, trade is regarded as directly related not to real GDP, but GDP per capita. Various scholars have different views on which method to use to adjust the GDP to GDP per capita; that is either to use the one that is GDP-(PPP) - Purchasing Power Parity adjusted or GDP-(MER) – Market Exchange Rate adjusted. Gros and Consiarz (1996), advice against using GDP-(PPP) stating that estimates of trade potential should be made on the basis of international value of total goods and services a country produces and not on the wealth of citizens (Gros D. and Gonciarz, 1996). On the other hand, in a study on bilateral trade flows within the Baltic Sea region in 1998, Paas (2000) found that the best estimates were obtained whilst applying GDP-(PPP) (Paas, 2000). Iversen (1998) contributes by noting that for developing economies especially, no particular measure is absolutely perfect and that the proper specification lies between the two, largely depending on the demographics of the trading partners (Iversen, 1998). A less controversial approach however and the one most commonly used is where GDP is deflated by the total Pop. In that case, the formal representation is as:

$$\ln(T_{ij}) = \beta_0 + \beta_1 \ln\left(\frac{Y_i}{Pop_i}\right) + \beta_2 \ln\left(\frac{Y_j}{Pop_j}\right) + \beta_3 \ln(dist_{ij}) + \varepsilon_{ij} \quad (2.3)$$

Both coefficients of the GDP per-capita are expected to be positively related to trade, that is:

$$\beta_1, \beta_2 > 0$$

Finally, it is possible to specify the equation such that trade is a positive function of both GDP and GDP per capita, where the specification is as follows:

$$\ln(T_{ij}) = \beta_0 + \beta_1 \ln(Y_i) + \beta_2 \ln(Y_j) + \beta_3 \ln\left(\frac{Y_i}{Pop_i}\right) + \beta_4 \ln\left(\frac{Y_j}{Pop_j}\right) + \beta_5 \ln(dist_{ij}) + \varepsilon_{ij} \quad (2.4)$$

The coefficients to be estimated remain as specified above.

2.8.3 Borrowed Applications

Among the first studies to apply this model is that by Tinbergen (1962), who took into account the existence of Free Trade Areas by examining and explaining the cross-sectional variations in trade flows of country pairs. The study included variables such as incomes – proxied by real GDP and per-capita incomes which was the GDP deflated by population, bilateral distance between trading partners and included controls for certain common aspects such as language, common borders and mutual membership to an EI, captured using dummy variables (Tinbergen, J. 1962). That is, a dummy variable is given a value of 1 where trading partners belong to the same EI, share a common language or border and zero if they do not. In its most basic format thus, this gravity model is represented as shown below

$$\ln(X_{ij}) = \beta_0 + \beta_1 \ln(Y_i Y_j) + \beta_2 \ln(dist_{ij}) + \beta_3 D_{ij} + \beta_4 EI_i + \varepsilon_{ij} \quad (2.5)$$

$$\beta_1, \beta_4 \geq 0; \beta_2 \leq 0; 0 \geq \beta_3 \geq 0$$

Where:

- X_{ij} – Value of bilateral trade between country I and J (exports plus imports).
- Y_i and Y_j – the national incomes for countries I and J proxied by GDP
- Y/Pop – Income deflated by population
- $dist_{ij}$ – the bilateral distance between the trading countries
- D_{ij} – control vector for variables representing alternative trade theories such as prior relationships, overall trade policies and geographic specific factors or even exchange rate risks among other unobservable trade costs.
- EI_i – dummy representing current membership to an EI of either country.
- ε_{ij} – Error term capturing other shocks that would affect the trade between country I and J .
- $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ – Coefficients to be estimated.

With time however, the assumption that dummy variables are exogenous has raised concerns as economists realize that joining an EI is often not a random decision, but rather one that is influenced by many other factors including the compatibility of trading policies, proximity to each other, trading relationships pre-EI, affiliations and memberships to other existing EIs and the extent of integration. Thus the basic gravity model has been gradually modified to accommodate the additional concerns and as a result now includes an increased number of explanatory variables and in some cases, even different estimation methods.

One such modification is that by Ghosh and Yamarik (2004), who modify the traditional gravity model to include time fixed effects to eliminate the outside aggregate shocks and remove any spurious correlation that would arise. In addition, they also account for the differing degrees of integration, namely Preferential Trading Agreements (PTAs), Free Trade Areas (FTAs), Customs Union (CU), Common Markets (CM) and Monetary Union (MU) (Ghosh, 2004). Their study uses the data by Frankel and Rose (2002) and notes that levels of integration differ with every EI. Thus, instead of allocating all a singular dummy variable, they create additional dummy variables to capture the different levels of involvement for each pair of countries, at every point in time. The vector of variables then include: $PRTA_{ij}$ and $PRTA_i$, where both the $PRTA_{ij}$ and $PRTA_i$ for each pair of countries in every point of time is one of the aforementioned types of integrations. In addition, a set of other dummies is included to measure for actual level of integration. That is; are the EIs integrated and the agreements implemented or are they still in the process of implementation. This is captured by the $ARTA_{ij}$ and $ARTA_i$. The gravity model they estimated including the new set of parameters was as follows:

$$\ln(trade_{ij}) = \alpha_t + \beta_1 \ln(Y_i Y_j) + \beta_2 \ln(dist_{ij}) + \beta_3 X_{ij} + \beta_4 RTA_{ij} + \beta_5 RTA_i + \beta_6 PRTA + \beta_7 PRTA_{ij} + \beta_8 ARTA_{ij} + \beta_9 ARTA_i + \varepsilon_{ij} \quad (2.6)$$

The description of the parameters remains the same as mentioned above with the slight difference of RTA meaning Regional Trading Arrangements and α_t representing the time-fixed effects. The coefficients following, measure degree of influence on trade by existence of an EI, type and level of the EI and the actual implementation of the EIs. Each of coefficients b_5 and b_7 , measure extent of trade between countries within the trading bloc and those without,

measure the actual trade creating or diverting effect of the EIs, with a positive sign implying openness of the entire region to import from outside the EI whilst a negative sign implies less trade with members without the EI and is interpreted as evidence of trade diversion. The study intended to find out whether differences in degree of integration and implementation affected the effectiveness of EIs in raising volume of trade among members and found that, membership to an EI did increase intra-bloc trade. The study also concluded that the higher the level of integration, the more the volume of total intra-bloc trade generated and created.

2.8.4 The Applied Model

Because African economies are somewhat similar in their economic structure, this study adopts the model applied by Tinbergen (1962), and modifies it slightly by including the absolute difference in the trading partner's real GDP. We also add extra dummy variables for common language and participation in an EI. Thus the specification as used exactly is:

$$\ln(X_{ijt}) = \beta_0 + \beta_1 \ln(Y_{it}) + \beta_2 \ln(Y_{jt}) + \beta_3 \ln(Pop_{it}) + \beta_4 \ln(Pop_{jt}) + \beta_5 \ln(DY_{ijt}) + \beta_6 \ln(dist_{ijt}) + \beta_7 L_{ijt} + \beta_8 Z_{ijt} + \beta_9 EI_{it} + \varepsilon_{ij} \quad (2.7)$$

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_7, \beta_8, \beta_9, \beta_{10} > 0; \beta_5, \beta_6 > \text{or} < 0$

And:

- X_{ij} – Real value of bilateral trade between country i and j (exports).
- Y_i and Y_j – The national incomes for countries i and j proxied by real GDP
- Pop_i and Pop_j - Population for countries i and j (000s) – thousands
- DY_{ij} – Absolute difference in countries i and j 's real GDP
- $dist_{ijt}$ – The bilateral distance between the trading countries
- L_{ij} – Dummy variable measuring whether both countries i and j share a language.
- Linder hypothesis: $(\ln Y_i - \ln Y_j)$
- Z_{ij} – Dummy variable measuring whether both countries i and j belong to the same EI at the same time.
- EI_i - Dummy representing current membership to an EI of either country.
- ε_{ij} – Normal random error with zero mean and constant variance capturing other shocks affecting the trade between country i and j , and is assumed so for all observations.

- t – Time period t : 1980 - 2008
- $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}$ – Coefficients to be estimated.

DY_{ij} Serves to test for the Linder hypothesis³⁰ i.e. countries with similar levels of per capita income will have similar tastes with relatively similar production capacities and will therefore most likely produce similar but differentiated products and trade more among themselves. If, $\beta_5 < 0$, then this assumption will hold true.

2.9 Data

This study considers data from 49 African Countries. These countries are chosen to represent different EIs, to be representative of trading partners within/without and between the EIs, while also representing the different regions of Africa; the Northern, Southern, Central, Eastern and Western. The EIs chosen include; CEMAC, COMESA, EAC, ECOWAS and SADC. The data is collected for the period of 1980 to 2008, (29 years). We begin from 1980, because in the time period before then, we observe too many inconsistencies in the data available and numerous missing observations, which would make our results very biased and consequently misrepresentative. Also, the study allows for a lapse of time to allow for stabilisation and firm establishment of governments after the 1960s wave of newly gained independencies, and the trade reforms that followed shortly after, as the now independent states sought to grow and develop their young enterprises via the introduction of structural adjustment programmes – SAPs within the region. The period after 2008 provided for a lot of missing unreported data and is thus dropped out of the sample.

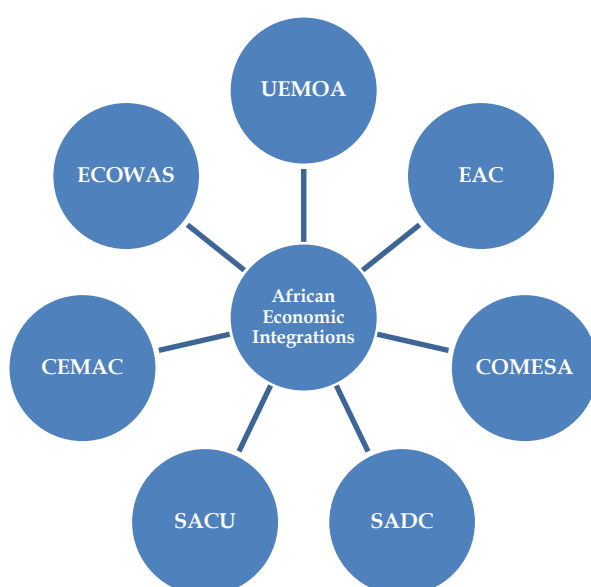
As indicated, whilst collating the data set, the study encountered a problem of zero variables especially in the exports category. These are thought to be the result of mostly missing information and rounding off errors as opposed to actual zero-trade, however, the log-linear

³⁰ Linder hypothesis states that countries of similar per capita incomes should trade more intensely with one another. The same derivation has also been used to test for H-O factor-endowment differences, despite its contradicting nature to that of H-O assumptions stating that countries are more likely to trade due to their dissimilarities, especially in per capita incomes (Hummels, 1995) and (Frankel, 1997).

gravity equation does not accommodate zero flows, as the log of zero is undefined. There are various ways of dealing with zero flows, for example, most empirical studies choose to simply drop the pairs with zero trade from the data set and estimate the log linear form by OLS. This method is favoured when there is more information on the zero flows and it is clear that the zeros are random and thus hold unimportant significance and can therefore be dropped from the sample without affecting the results. Another common approach to dealing with the zero flows and that employed by this study is that of retaining the zeros, especially as we cannot decisively say whether there really is zero flows or whether they are the result of reporting errors, by replacing the dependent variable with the problem of zero observations, in this case, exports with $(\ln+1)$.

However, this approach requires use of appropriate estimation techniques, as application of OLS could yield inconsistent estimates, especially given that the substitution of small values to prevent the omission of observations from the model is *ad hoc* with no guarantee that the underlying expected values are correctly reflected. As such, the study applies FEM which in this case also acts to correct for the potential misspecification bias. The process of estimation is discussed further in the chapter.

The chart below describes the inter-relationships observed



2.9.1 Data Measurements³¹

For the purposes of our study, we use the variables described below. All the data is annual and gathered from various sources, with a bulk of it gathered from the Economic and Social Data Service, which in turn collates data from a varied array of institutions and data banks, such as: World Bank World Development Indicators, IMF – International Financial Statistics, Direction of Trade statistics as well as World Economic Outlook. In addition, we also obtained National data from specific Central Bank’s statistical bulletins where possible, such as for countries like Kenya and South Africa.

X_{ij} – Real value of exports from country i to country j in US dollars

GDP – Real Gross Domestic Product in constant 2000 prices

Pop – Number of people in either country i or j .

Dist. – measures the distance between the major trading centres of country i and j in Kilo meters (Kms).

(0, 1) Dummies:

- L – common language
- Z – both trading partners belong to the same EI
- E – only one or both of them belong to any EI

The table below gives the variables used and the basic individual statistics thereof.

Table 3: Basic Individual Statistics

Variable	Obs	Mean	Median	Max	Min	Std. Dev.
LN _{XIJ}	52374	2436.004	0.000	127000000	0.000	127000000
LN _{YI}	48509	2.667	2.531	3.914	1.752	3.914
LN _{YJ}	48246	2.668	2.533	3.925	1.752	3.925
LN _{POPI}	50569	8.515	8.918	11.873	2.290	11.873
LN _{POPJ}	50567	8.692	8.967	11.873	4.158	11.873
LND	52374	3.480	3.535	4.037	0.931	4.037
YI _{YJ}	46291	0.441	0.160	4.117	0.000	4.117
L	52374	0.210	0.000	1.000	0.000	1.000
EI	52374	0.917	1.000	1.000	0.000	1.000
Z	52374	0.301	0.000	1.000	0.000	1.000

³¹ All observations on real GDP, total exports and imports (in constant 2000 US dollars), population are annual and obtained from the WDI data base of the World Bank and WTO – DOTs, IMF, and IFS via ESDS data base, while the data on the distance (in kilometres) between the major trading partner cities is obtained from calculating a distance matrix using <http://www.mapcrow.info/>

2.10 Estimation Process

To solve the model specified above, the study applies panel data estimation techniques. This approach has been successfully used in the analysis of gravity models used for the explanation of various different kinds of flows including the general analysis of effects of Trade Liberalizations such as Regional and Economic Integrations, on trade flow patterns and has been found to be quite effective, (Bergstrand, 1989) and (Deardorff, 1998). This gravity modelling approach is also favoured by Eichengreen and Irwin (1997), labelling it '*the workhorse of empirical studies of regional integration, to the virtual exclusion of other approaches.*' Following this, the study borrows from Tinbergen's (1962) application of the same in the first study of its kind, explaining how international trade patterns and input-output analysts begun to develop multiregional systems.

This study assumes imperfect substitutability of commodities across countries, including the fact that imports from each country are proportional to its GDP and uses the dummy variables and country pair-fixed effects to collate common variables such as language, and membership to an EI including other country specific effects that do not change with respect to time such as distance.

In applying the above gravity model which captures the determinants of bilateral trade flows, it is expected that GDP will act as a positive trade enabling factor, whilst distance (used to proxy trade barriers like transport and other transaction costs), serves to increase the relative price of imported goods, hence hampering trade between partner countries (Krugman, 1995). However, it is also possible that trade can increase or decrease with respect to factors other than joining or forming an economic integration, or the fact that over time and with increased development, trade increases, as such, these elements too are taken into account for the participating countries within the period under study.

To observe the above predictions, the study applies Panel data estimation techniques and regression analysis methods using the econometric software – Eviews. For panel estimation, any of three kinds of modelling approach can be used depending on which suits the data best. The three approaches are distinguished by how they each view the intercept – the term that will represent the variables excluded in the model and these include:

- **POLS** - Pooled Ordinary Least Squares regression is the same as running Ordinary Least Squares (OLS) estimation except that POLS assumes constant intercepts and individual coefficients across the cross-sectional individuals in the equation, but also includes an extra intercept, in this case captured by a dummy. The end result is given as an overall (group) coefficient estimate. However, this model works best for groups that are almost similar, homogenous, if they are not, the model will have very large standard errors, calling for a more advanced approach.
- **FEM** – Fixed Effects Modelling does not assume a constant intercept and instead applies different intercepts across cross-sectional individuals and /or over time using differential intercept dummies. The problem with this approach however is that due to the numerous inclusions of dummy variables for the different variation-intercepts, it's possible to run out of degrees of freedom, making estimation tricky, increasing standard errors in the model. Also, although this approach can estimate individual and/or time-specific effects from time - and individual - variant variables, it cannot detect for example; individual-specific effects regarding the time-invariant individual-variant variables in the estimation.
- **REM** – Random Effects modelling on the other hand, expresses both the specific effects for time and or individual invariant variables as random variables captured in the error terms, as opposed to expressing these unobserved effects as the fixed intercept (captured by dummies) as in FEM. In addition, REM can estimate either effect irrespective of if the variables are either spatial and time invariant or just one of them and invariant of the other. These variables are treated as random variables with zero means and constant variance.

However, in order to decide which approach best suits the data either of two tests is carried out, the Hausman or the Lagrange Multiplier (LM) tests³².

³² The LM test was developed by Breusch and Pagan (1980) based on the combined time series (t) and cross-sectional (i) residuals - (eit) from the pooled ordinary least square (OLS) regression. Under the null hypothesis, the LM statistic follows a chi-square distribution with two degrees of freedom and if the null hypothesis cannot be rejected, then the estimates of REM are not statistically different from those of the pooled OLS model and its okay to apply POLS – Eviews 7 User Manual.

2.10.1 Techniques

Here we briefly discuss possible alternative estimation procedures to be used. As our study covers a total of 49 African reporter (exporter) and partner (importer) countries in a pair wise panel, chosen on the basis of the importance of representing the entire continent in terms of both geography and economic integration participation, trading partnerships and of course availability of required data, and spans over twenty-nine years, we are presented with a panel data set, with which to obtain valid estimates. Panel data has advantages in terms of being able to capture the relevant relationships overtime, while also monitoring unobservable trading-partner-pairs' individual effects. In order to make optimal use of the available data, the estimation must therefore account for both the cross-sectional and time-series information.

One option could be that all the observations are treated as equal and a pooled model is estimated using OLS (*Ordinary Least Squares*) that is POLS. In econometric analysis, pooling assumes that the regressions parameters do not change over time and that they do not differentiate between various cross-sectional units, thus employing a constant coefficient across time (Gujarati, 1995). In addition, Pindyck and Rubinfeld (1991), conclude that pooling cross-sectional data and time series data create new problems for regression analysis, such as that the models experience misspecification of the error term, that carries with it errors from both the time series as well as cross-sectional series (Pindyck, 1991).

Although it is likely that POLS estimation would gain in efficiency due to the increased number of observations, still estimation results would be biased due to neglected (individual) heterogeneity, especially as our estimation uses an unbalanced panel data set that includes individual effects in the regressions. In addition, our data set suffers from zero {unreported and missing} values. To correct for this, we take the log of exports (used to represent total trade) plus one.

i.e. $-\ln(X_{ij} + 1)$

In a similar study, Westerlund and Wilhelmsson (2006), show exhaustively how even a small per cent of zero values in the sample (in their case 10% in the dependent variable) can lead to biased results when using OLS, even with a large sample. As a solution, they suggest the use of Poisson Maximum Likelihood (ML) procedure in a situation where the trade flows are registered as zero observations which they find to have smaller bias and produce relatively

good size properties, although this is only observed of small samples, (Westerlund, 2006). The ML estimator was first observed to perform better than OLS for panel data sets in a Monte-Carlo study by Maddala and Mount (1973) in (Baltagi, 1994).

An alternative includes running a FEM (*Fixed Effects Model*) – OLS or REM (*Random Effects Model*) – GLS (*Generalized Least Square Estimators*) regression. While FEM explicitly takes into account the bilateral trade heterogeneity by specifying that all explanatory variables are assumed to be correlated with fixed individual effects that vary from geographical factors to policy rules, it also wipes out any time-invariant variables. This implies that any additional information in the model that does not vary with time such as country size, or language is dropped from the sample. For this study, the cross-sections included are 1806, which would create a problem as the number of dummy variables included to establish the different individual effects increases dramatically, exhausting the degrees of freedom.

This can be countered in various ways, for example, we could use the Hausman Test instrumental variable estimation to consistently estimate the impacts of time-invariant variables, which is easily done by including an additional second step in the regressions whereby, another regression is run with the individual effects as the dependent variable and distance and dummies as independent variables, **or** we could difference the variables among others. These too however, cause problems as for example, differencing is prone to distorting parameter values and removing any long-run effects thereof (Asteriou, 2007). On the other hand, under the stronger assumption that (unobserved) individual effects are randomly distributed but uncorrelated with all regressors, the REM allows us to estimate the parameters on both time-varying and time-invariant variables, simultaneously. The REM model has various advantages including the fact that it has fewer parameters to estimate compared to the FEM and in addition, allows for the introduction of dummies to capture the significance of various factors that are sometimes time-invariant, such as the joining of an EI.

Although the REM is superior to the FEM model, as the FEM is a limited version of the REM, it is not always justifiable to use REM over FEM as REM is defined on the assumption that fixed effects are uncorrelated with explanatory variables. As indicated, to proceed we undertake a Hausman (1978) test (HT) to clarify which of either FEM or REM best suits the model to be estimated. The HT tests the null hypothesis of no correlation between the

individual effects and the regressors such that the REM – applying GLS estimators are both consistent and efficient against the alternative that they are inconsistent. If the null hypothesis is rejected, then it is recommended to use the FEM. We determine that indeed it is the FEM and not the REM that is suitable for the current study³³.

As there are (49 x 48) observations per time period, we address the panel as an unbalanced panel due to few missing observations that we subsequently drop from the sample size, but despite this, the large size of the panel provides a basis for consistent estimation. To begin with, we prepare the data for analysis by checking for errors within the data set, such as misspecification, multi-collinearity among others. Even though ours is not a simultaneous equations model, multi-collinearity is still a possible concern as trade does impact on national incomes, both variables of which are in our model.

This can be done in a number of ways, among them; regressing each of the dependent variables on the rest of the dependent / explanatory variables and comparing the goodness of fit proxied by the R²s, to that of the general model, if these newly computed R²s are greater than the R² for the trade model, then this indicates the presence of serious multi-collinearity. The second test is that of simple correlation test statistics. We use the simple correlations to test for multi-collinearity in this study and find that there is no serious multi-collinearity. In addition, we correct for any present heteroscedasticity by using White's heteroskedasticity-corrected covariance matrix estimator done easily in Eviews. Below, we follow Rahman et. al. (2006) to demonstrate the two different stages of the regression required when applying FEM analysis.

2.10.1.1 Estimation and Econometric concerns

First we estimate the basic gravity model, applying OLS (*Panel Least Squares*) approach both to ascertain its applicability to the data set being used and to assert the theoretical arguments. The model estimated is as described below:

$$\ln(X_{ijt}) = \beta_0 + \beta_1 \ln(Y_{it}) + \beta_2 \ln(Y_{jt}) + \beta_3 \ln(dist_{ijt}) + \varepsilon_{ij} \quad (2.8)$$

³³ See Appendix I – Hausman test, Simple correlations and Individual statistics

Theory suggests that both β_1 and β_2 will be positive as incomes (GDP) influence trade positively, while β_3 will be negative, indicating that distance hampers trade. Next we run our augmented model as defined in equation 2.7. As observed earlier, OLS is unsuitable for the estimation of gravity models and with panel data sets; we have the additional cost of both time variant and time invariant variables. This is so because besides the basic components of the gravity model, in this next step, we analyse the effects of the core component of the study, the effects of Economic integrations, which is captured by including the dummy variables;

EI (EI is one if any of the trading partners belong to an EI and zero otherwise)

Z (Z is one if both trading partners belong to the same EI and zero otherwise)

We estimate one form of the model including just EI, another with Z and yet another with both to see if there is any great significance of one partner country or both belonging to an economic integration. Additional variables include a third dummy for sharing the same language, and an additional variable to test for the Linder hypothesis.

As the HT indicated the FEM estimation is preferred to REM and given the complication of both time variant and in-variant variables, following various studies that have used similar but not identical methods while estimating a gravity model such as; (Carrillo, 2002), (Paas, 2000) and (Frankel, 2001), we proceed to test the various problems that afflict panel estimations before proceeding on to run the FEM and as described, we take precaution to ensure that we do not drop the time-invariant variables out of the sample. In this regard, we follow one of the suggestions, the two step procedure and proceed with the regression as follows; first, we analyse the time dimension, giving an analysis of how incomes and rising populations have affected the trends and movements in trade within Africa. Here, the model – equation 2.7, is regressed, whilst omitting all the time-invariant variables, in this case, the dummies and distance variables after which equation 2.9 below is then regressed.

$$\ln(X_{ijt}) = \beta_0 + \beta_{ij} + \beta_t + \beta_1 \ln(Y_{it}) + \beta_2 \ln(Y_{jt}) + \beta_3 \ln(Pop_{it}) + \beta_4 \ln(Pop_{jt}) + \varepsilon_{ij} \quad (2.9)$$

Unlike in REM where the intercept terms are considered to be random variables, here we introduce country-pair specific effects β_{ij} where; $\beta_{ij} \neq \beta_{ji}$ and β_t is year specific fixed effects. Both α_0 and β_0 are considered to be country specific effect. On the other hand, slope coefficients are considered consistently estimated with the transformed error term constant for all countries, much like with REM. The other coefficients estimated remain as explained earlier in the text.

From this estimation, we then move on to the second stage of the regression where now we include all the variables including the time invariant variables omitted before. While in the first stage, regression coefficients measure the time dimension effect of the variables brought about by both historical (such as experienced war times, draught periods) and on-going effects (like increase in population), the second stage, coefficients measure cross section specification effects, including cases where structural causes could lead to economic structural distortions such as explained by Coulibaly and Fontagné (2004). In this second stage, we employ the estimated country-pair specific effects as the dependent variable and regress on both time varying and time-invariant variables.

Doing this manually however might give rise to problems with the standard errors that would complicate the coefficients estimated and their interpretations and as a result we instead apply a different simpler procedure that employs the same principle, that is TSLS (*Two Stage Panel Least Squares*) instrumental variable approach, as executed by the econometrics software used (Eviews). Here, we continue on to specify the preferred requirements for the regression such as selecting fixed cross-section estimates. Next, we estimate the model and introduce time restrictions, in 9, 11 and 13 year intervals to see in which time period trade was most significantly affected by membership to economic integration. The time chosen is informed by among others, Nitsch's (2001) conclusion that 5 years is not a long enough period to determine the effects of EIs or monetary unions, thus we use longer time periods to ensure the effects of the EIs is captured. Because trade is an active component combined with the institution of economic integrations, it is considered possible that previous trade transactions can indeed affect current transactions, and for this reason, we estimate a dynamic model too and compare results observed.

2.11 Estimated Results

As shown in Appendix 1I, the basic gravity model confirms that trade flows amongst and between African countries follow the expected normal gravitational rules according to economic theory. Trade is indeed positively influenced by incomes and negatively influenced by distance. As expected however, the application of OLS results in unreliable results, in addition, the results indicate the presence of serial correlation. Appendix 1 shows the Hausman

results with a test statistic indicating it is preferable to apply FEM estimation technique and not REM. After employing this technique to the same basic gravity model, we note that although the process renders DW insufficient to test the existence or lack thereof of serial correlation, it corrects for it and the results are much better. As observed before, they continue to confirm the theoretical underpinnings of the gravity modelling approach³⁴. Given this, we go on to estimate the rest of the models as described above.

Table 4 below gives and compares the results of the augmented gravity model, (equation 2.9), with the inclusion of each and both of the economic integration dummy variables; in addition, the results of the dynamic model are also presented. In Appendix 3, we show and compare the results of the model in specified time periods.

Dependent Variable: LNXIJ.

³⁴ The results of this are presented in Appendix 2.

Table 4: Effects Specification: Cross-section fixed (dummy variables)

Instrument list: C LNYI LNYJ LND LNPOPI LNPOPJ YIYJ L Z EI LNYI(-1) LNYJ(-1) LNPOPI(-1) LNPOPJ(-1)				
Method	Panel Two-Stage Least Squares			Panel Generalized Method of Moments (GMM)
Model	I – coefficient	II – coefficient	III – coefficient	IV – coefficient
C	-16.56354	-16.19408	-16.4279	
	(-12.96265)	(-12.19384)	(-12.82922)	
LNXIJ(-1)				0.304754***
				(36.46496)
LNYI	0.418198***	0.414688***	0.418852***	0.258334***
	(2.812121)	(2.811261)	(2.812593)	(2.735586)
LNYJ	0.344389	0.342398***	0.326949***	0.236181**
	(3.922442)	(3.889778)	(3.90556)	(2.517591)
LNPOPI	0.939192***	0.945012***	-3.353559***	0.489199***
	(3.88255)	(3.89559)	(-12.09807)	(2.994164)
LNPOPJ	2.292241***	2.289218***	0.94092***	1.628752***
	(9.732446)	(9.714018)	(3.894251)	(9.838812)
LND	-3.407522***	-3.508634***	2.291694***	-2.627104***
	(-13.19837)	(-13.17423)	(9.745914)	(-10.42677)
YIYJ	-0.16421***	-0.165984***	-0.165682***	-0.169664***
	(-3.82537)	(-3.825342)	(-3.834164)	(-3.234867)
L	0.312041	0.283563	0.290985	0.201647
	(1.134776)	(0.98094)	(1.065901)	(0.721232)
Z	0.52083***		0.563585***	0.312357
	(4.341132)		(4.753165)	(1.484391)
EI	0.32179**	0.47395***		0.361005**
	(2.337807)	(3.361895)		(2.381231)
Statistical significance : *** - 1% , ** - 5% , * - 10%				
R-sq.	0.64187	0.641697	0.64184	
Adj R-sq.	0.626645	0.626474	0.626623	
S.E. of regression	1.698504	1.698893	1.698555	
F-statistic	42.16014	42.15279	42.17894	
Prob(F-statistic)	0	0	0	
Instrument rank	1815	1814	1814	
Mean dependent var	2.159975	2.159975	2.159975	-0.556612
S.D. dependent var	2.779749	2.779749	2.779749	1.71442
Sum squared resid	122831	122890.2	122841.3	95990.11
Durbin-Watson stat	0.934804	0.93393	0.934897	
Second-Stage SSR	122831	122890.2	122841.3	
J-statistic				540.7083
Instrument rank				360

2.11.1 Explaining the Results

Here we explain the results obtained from the three cases we consider. First we estimate an equation with all the variables as defined in the applied model, then we modify it slightly by manipulating the different variables to see if their exclusion or inclusion affects the results, and then we estimate a dynamic model on the presumption that bilateral trade could very well be dynamic as trade relationships not only take time, but can sometimes be the sole determining factors of the existence or lack thereof of present day trade. For example, it might be considerably easier to trade with a country with which one has already established contact, than a new one, also, depending on whether the economies in question are growing or not, this may affect how much they are willing and able to import or export. Hence we estimate model's I, II, III and IV.

We also observe that the model fits the data reasonably well. The estimated coefficients as shown in the table above correspond to stated expectations. The study seeks to establish how important variables such as national incomes, population, distance, common languages and most importantly, membership to an EI, are in facilitating or hindering trade amongst and between African countries. In Model I, we observe that both the national incomes of trade partner countries and their populations are highly statistically significant in influencing trade, even more so, the population of the importer country, which is seen to have a statistically more significant effect. With a coefficient of 2.29, the model indicates that the population of the destination (importer country) has an especially strong determining factor in total trade. This is in agreement with economic theory and rules of demand and supply, it is rational to expect that the more populous a nation, the wider the possible market share and the higher the demand. This also implies that considering all else constant, for every 1 per cent increase in the population of an importer country, overall bilateral trade increases by 2.29 per cent, this also implies that import substitution doesn't dominate in the destination country.

As expected, we note that the coefficient of distance which is a proxy of transportation costs, has a negative and statistically significant impact on bilateral trade within the region, this effect is however, devastatingly strong as the model shows that, if all else remains the same, then bilateral trade decreases by more than 3 per cent, for every 1 per cent increase in the distance between any two trading partners. In Africa, where transport and communication networks are now only beginning to be highly developed and advanced, it is not uncommon to find that some

roads and rail services are out of commission for varying periods of time for among many reasons, natural wear and tear, repairs or reconstruction etc. As a result, whether or not there is a need for re-routing goods and services is a persistent concern for traders and producers. The study also took into account the possible effect sharing of a border might have, this was done by including a dummy variable with the value of 1, when the trading partners shared a border and 0 otherwise. Upon estimation, it is observed that though distance in itself is a significant factor in determining trade, sharing of a border did not serve to encourage trade in any significant way, and including this in the estimation did not change the results, leading to the conclusion that it was not significant and thus left out.

By including the absolute difference of the log of real GDP for both partner countries, we hoped to test for the strength of the Linder hypothesis, against the H-O hypothesis. In other terms, this seeks to confirm the theory that countries with similar characteristics (which for ease of calculations are mainly captured by their national incomes) trade more than countries that are dissimilar. This study agrees with the Linder hypothesis, observing a negative and highly significant coefficient, in all the models including the dynamic estimation shown in Model IV.

Whilst controlling for language by inclusion of a dummy variable that is one when the trade partners share a language and zero when they do not, we observe that although sharing a language has a positive effect on overall trade, it is not really an important part of determining the trade share between countries. The effect is not statistically significant in all three models and (ex)including it does not change the rest of the variables impact or significance, they remain more or less the same. This can be explained away in efforts that have since the early 1960s gone towards streamlining education systems. While English (and other international languages including Swahili and French) is not necessarily the national language or the language of instruction in all countries, the ministries of education often include these as subjects in both high school and primary school curriculums.

This way, the majority of working class groups have an effective knowledge of most languages used for transaction purposes, few countries use little known languages as both national languages and language of instruction. An example is Tanzania whose national language is Swahili and so is the language of instruction, however, residents receiving a formal education are often taught English as a foreign language to improve on acquired skills. On the other hand,

while Kenya and Congo both have Swahili as their national language, the official language of instruction in Kenya is English, while it is French in Congo.

Just like for the common language dummy variable, we interpret the coefficients of joining an EI by observing their coefficients, but because the dependent variable is in log form, these coefficients are not translated into percentages. To find their percentage significance, we could, take the anti-log – *base e* – of the estimated dummy coefficient, subtract 1 from it and then multiply the difference obtained by 100¹². However, our study only seeks to find if these factors are significant and if the impact is great. Given that this is the main focus of the study, it is interesting to note that even as trade between African countries is noted to be so low, countries belonging to the same EI trade just fractionally more than countries that do not belong to the same Economic Integration.

Model III shows that belonging to the same EI, is highly significant to enabling trade within the region, and so is belonging to any EI as shown by Model II. Model I however shows that while belonging to any EI has a sufficiently significant positive impact on bilateral trade within Africa, belonging to the same EI has an even more significant and higher impact. These results are as expected and with the numerous and intertwined EIs within Africa, it does not explain why the statistics drawn show that trade within the region amongst the countries is at minimum rates.

These results are much like those found in numerous other studies analysing trade flows and their determinants, as seen in Bergstrand (1989) among others³⁵. In their studies, the major and more traditional variables of the gravity model (distance and GDP), are found to be statistically significant in explaining the variations in trade amongst trading partners. That is, whilst GDP has a positive effect on trade, distance is seen to have a negative effect, in most of the cases, this is statistically significant, whilst in others, although the effect is registered as negative, it is not statistically significant. For example, Elbadawi (1997) agrees that distance is indeed a

³⁵ See, (Achy, 2006)· (Deardorff, 1998)· (Elbadawi, 1997)· (Evenett, 2002)· (Lyakurwa, 1997)· (Ogunkola, 1994)· (Summers, 1991)· (Walz, 1997) and (Winters, 2004)·

significant factor in impeding or contributing towards trade, noting that while agreements between widely separated countries such as USA-Israel FTA or the EU-Israel FTA are trade relationships, their motivation is merely political and not necessarily designed to capture efficiency gains from lowering barriers or expanding trade by trading with and among countries with relatively low transportation costs (Elbadawi, 1997). In Africa on the other hand, although it is noted that the EIs are motivated by various reasons besides trade, most EIs tend to be consisted of members within close proximity of each other. In addition however, these studies also continue to show that the formation of economic integrations increased trade in various periods. For example, that formation of European trading blocs helped increase trade significantly in the 1960s and 1970s (Bergstrand, 1989). Much later so did Frankel and Wei (1995) and Frankel (1997) in Asia and North America, in the years between 1972 and 1992 (Frankel, 1995) (Frankel, 1997). In another study, Frankel and Rose (2001) confirm that trade blocs, here referred to as EIs do increase overall trade (Frankel, 2001).

By finding results that support the Linder hypothesis and in conjunction to the added observations of a strong positive effect of joining the same EI, the study confirms that being similar, streamlining and employing similar policies especially in this case, trade policies does indeed encourage and promote more trade.

2.12 Conclusions

The gravity model has been established as a standard tool for studying and analysing trade flows and the effects of EIs, as has been observed form various econometric studies reviewed also establishing that the application of the gravity model in the analysis of bilateral trade can be theoretically justified.

By application of this gravity estimations, our model fits the data well and provides precise and plausible results, with the estimates of the traditional gravity model exhibiting statistically significant statistics, as per expectations, with incomes influencing trade positively and distance negatively, implying thus that proximity would enhance trade. Our results however could imply proximity in itself does not seem to necessarily be the key promoter of trade, instead, accessibility to the trade partners' markets matters more as observed by the inclusion of a border dummy. It is possible that the trade routes and hubs already established do not

necessarily run from nation to nation across borders but across already established trade agreements, and it is the proximity to these that matter.

Given that to date, most of these EIs still operate as free trade areas at the highest implementation, while some could only qualify as preferential trade agreements, we also chose to study different time periods, randomly chosen, so as to introduce dynamism, whilst also observing if there is any significant difference in trade, when a longer time period is allowed to observe the effects of being part of an EI. By comparing the first few years and a group of others in-between through to the current period, we observe that EIs, though generally a positive influence on bilateral trade, their impact was not always significant through all the periods, as observed in the table below. This could possibly be explained by the previously mentioned fact that, most EIs within the region, though registered and acknowledged as existing, are mainly in their formative stages, with few developments and slow progress occurring over the years following.

The results in Table 5 below are interesting. They show that while belonging to the same EI (denoted by dummy variable – Z) was highly significant in the formative years, between 1980 and 1988, this is not the case for the following years. The study shows that between 1990 and 2000, the impact has reduced and this time, belonging to any EI is beneficial to overall bilateral trade. Economic theory suggests that this is observed of cases where joining an EI helps promote trade as countries now acquire bargaining power. Here, belonging to any EI (denoted by dummy variable – EI) is observed to be more significant. In the last case however between 1993 and 2008, being part of an EI irrespective of whether it is the same as the trade partners or not held a positive effect, but this is no longer significant, an observation that may explain the statistics showing less intra-Africa bilateral trade.

As the world has become more and more globalized, and movement of factors and technology become less restricted, the rest of the world has found a niche via which African markets have been captured and maintained. That is, due to slow growth in developing industries, the manufacturing sector is ill equipped to produce for the current domestic (African) market demand. As such, most of the produce fit for export in most of the African nations is mainly raw materials, or semi-processed goods in need of further processing before final consumption. Not having the ability to complete the value-adding process, there is perhaps today little incentive to trade between them.

Table 5: Effects of EIs through different time periods

		C	LNVI	LVNJ	LND	LNPOPI	LNPOPJ	YIYJ	L	Z	EI	R-sq.	Adj R-sq.	S.E.of reg	F-stat	Prob (F-st)	D.W
80-88	Coeff	-11.173	1.033	1.668***	-2.483***	1.622**	3.570***	-0.495***	1.219***	0.558**	0.329	0.724	0.678	1.404	15.729	0.000	1.610
88-96	Coeff	-19.546	-0.577*	-0.174	-2.236***	2.020***	1.544***	-0.145	0.632	0.513	0.445	0.743	0.710	1.429	22.377	0.000	1.587
90-00	Coeff	-22.130	0.332	0.122	-2.823***	0.760	2.917***	-0.357***	0.400	0.305	0.977**	0.717	0.687	1.532	23.865	0.000	1.421
93-08	Coeff	-9.953	0.696***	0.328***	-4.206***	0.754***	3.501***	-0.128*	0.058	0.239	0.086	0.740	0.720	1.514	38.364	0.000	1.122

*** - 1%, ** - 5%, * - 10%

Dependent Variable: LNXIJ

Method: Panel Two-Stage Least Squares

White cross-section standard errors & covariance (no d.f. correction)

Instrument list: C LNVJ LVNJ LND LNPOPI LNPOPJ YIYJ L Z EI LNVJ(-1) LVNJ(-1) LNPOPI(-1) LNPOPJ(-1)

Effects Specification; Cross-section fixed (dummy variables)

In addition, the study has not made a distinction between economic integrations that are simply trade agreements and those that are monetary unions. For example, UEMOA as an EI also hosts a monetary union. The study realizes there could be a difference in the trade relations of countries that also share a common monetary union compared to those that do not, this relationship will be further explored in a different study.

All the same, a complete integration process, which is what African nations are moving towards, implies that there will be streamlining of among others, trade and industry policies. It also means that by removing restrictions and barriers to entry, factors of production, labour, capital and technology will be free to roam, encouraging investments and industrial growth. If all the factors are accessible and available, then it is possible that the manufacturing sector will expand, production will include value addition, so that while for example Ethiopia produces coffee in abundance, instead of only exporting the raw beans to Europe for further processing, they can do their own processing and export the final product within easily accessible neighbouring countries, which would also save on a lot of the transaction costs and transportation costs incurred otherwise.

Results indicate that with the current move towards more liberalized markets, financial, factors or goods and services, it is not enough to simply remove trade barriers by way of removing or reducing tariffs. Instead, measures to stimulate investment flows from intra-regional and also extra-regional sources should be sought as trade entails the interaction of many sectors of the economy and advancing all is necessary to promote trade. Still, attempts must be undertaken to increase total intra-African bilateral trade, which can be achieved in various ways, including, diversification of products for export and improvement of production processes and quality produced.

With respect especially to intra-Africa trade, it's suggested that the process of integration should proceed at a faster rate and encourage more openness especially with

regard to importation of capital goods which would in turn increase the export capacity. With this in mind, one of the strategies in place by the African states, is the formation of a fully integrated and successful Economic Union that will see all these benefits revealed, the culmination of which entails a complete integration of all sectors of the economy, political, foreign, socio-economic and financial, eventually sharing a single currency. Monetary Unions (MUs) are normally formulated towards the later stages of forming Economic Unions and are generally more like a strategic push to hasten complete integration and harmonisation of the member economies systems. Africa intends to operate a single currency by 2028. As identified by literature and noted by Sachs and Warner (1995), the level and depth of trade-openness is among the most important macroeconomic variables in the advancement of growth and economic development (Sachs, 1995).

Given the insight presented in this section, the research in the next chapter seeks to find out if indeed Africa is ready for such a commitment, the formation of a currency union at least, if not a full blown economic union, and if so, whether it is predicted to succeed where a long history of experimenting with lesser integrated EIs has produced positive but not highly significant results in promoting trade. The study chooses EAC, the fastest advancing EI in the region to perform this analysis.

Chapter 3

HOW OPTIMUM A CURRENCY AREA IS THE EAST AFRICAN COMMUNITY?

Currency Unions (also referred to as Monetary Unions – MUs, in this thesis), incorporate a common currency among a group of countries / states. Within these, there is the formation of central monetary authorities that determine the monetary policy for the entire group, for example, the European Union. The United States (US) could also provide for such an argument. Although each US state has an independent local government, they all cede control over general policies including; foreign, agricultural, welfare and monetary policies, to the federal government. MU consists of the final stage towards complete integration and is thus important in forming a complete Economic Union – EU. As previously described, an EU is a complete form of integration, with harmonization of all policies at all levels for all member states. An EU is however not a pre-requisite towards the formation of a MU as will be further described in the chapter.

3.1 Monetary Unions (MUs) and Optimum Currency Areas (OCAs)

Mundell (1961) is credited as the first to propose and lay the theoretical foundations of the Optimum Currency Area (OCA), later expounded upon by (McKinnon, 1963), and (Kenen, 1969)³⁶. Generally, monetary unions are formed as part of a larger strategic push to integrate the countries entering the EU and often in combination with advanced free trade agreements. Globalization and the rapid expansion of international trade however, has inevitably led to international financial concerns as many developing

³⁶ To fully comprehend the progression of the theory of Optimum Currency Areas, see; (McKinnon, 1963) (Mundell, 1961) (Kenen, 1969) or (Tavlas, 2009) for a detailed summary of these works.

countries struggle to either keep pace or put in place exchange rate regimes that are both stable yet in line with changing global markets. Such difficulties have led to seeking refuge within the confines of MUs. Does this in itself however provide for a solid solution to such problems and do all countries and regions suffering from such instabilities or simply seeking to further deepen their integration procedures qualify for a successful MU?

Frankel and Rose (1996), drawing on earlier works by Mundell, define an OCA as a region for which it is optimal to have its own currency and its own monetary policy (Frankel, 1996). Often, this is determined by the attainment of pre-set conditions. So far, the truest test to the qualifying optimality of a monetary union is the ability of the said region to collectively adjust and respond to asymmetric shocks (Mundell, 1961). It is argued that, the higher the degree of asymmetric shocks to the MU, (where this implies the similarity of incidence and occurrence of both supply and demand shocks, including the response to said shocks, that is the speed of adjustments by the economies), the more the members of a MU stand to gain from its formation, while the more diversified the economies, the less the asymmetric shocks, hence less benefits from the harmonization of the monetary policies from forming a MU (Kenen, 1969).

Mundell (1961), in the quest to find out the proper settings for a currency area, observes that although regions that shared a currency would stand to gain by facilitating more trade as the transaction costs associated with exchange rates and currency conversion are removed, in addition to having a common unit of accounting, a single currency could possibly cause inflationary pressures that might arise in the presence of asymmetric shocks and nominal rigidities in both prices and wages. For example if there is shifting demand from one region to another, this would normally be resolved by allowing for the individual currencies to either depreciate or appreciate, something that would require independent monetary sovereignty. He argues however that, if the associated labour is allowed to move to where demand increases, then this problem

would self-resolve. For this reason, he notes that for maximum benefits to be reaped from a monetary union, it is best if there is labour mobility within that region (Mundell, 1961).

Today, this view is however not the only constraining critique of whether a region is fit to form a monetary union or not. In practical terms, labour mobility is not as flexible, fast and free as Mundell proposes it should be, as costs of moving are high, which makes it impossible to plan around the assumption that labour can shift in tandem with changing demand. Another critique to this approach stems from the fact that capital mobility and the possible role played in spreading shocks within regions and across the globe as markets opened up and investors diversified their reach, was initially ignored.

Later, by incorporating and assuming perfect capital mobility, the Mundell-Fleming model uses the IS/LM macro-economic framework to examine the effectiveness of fiscal and monetary policies for small open countries under both fixed and flexible exchange rates. This model shows how monetary policies are rendered ineffective if the small countries try to maintain fixed exchange rates, in the current world of near perfect capital mobility. In this instance, the balance of payment will be at equilibrium at the world interest rate and it is shown that deviating from this equilibrium by domestic interest rates in the event of a monetary contraction or expansion results in pressure for the currency to either appreciate or depreciate via either capital inflows or outflows.

Consequently, to reduce this pressure, it is required to apply either monetary expansion or contraction policies, the cyclical result of which is a completely ineffective monetary policy. If these countries are in a MU, then they are similar to that country employing a fixed exchange rate regime, without the option to independently administer such monetary policies. In this case then, fiscal policies are shown to be quite effective as would also be, in the case of a fixed exchange rate system, where in response to asymmetric shocks, individual regions or countries can instead apply discretionary

fiscal policies such as taxes or adjusting government spending (Rose, 1994) and (Williamson, 1999). More recently, this proposition is supported in a study by Madhur (2002), where the question, ‘...If countries with diverse sub-regions can adopt a common currency, why not a region with diverse countries?’ is asked, citing examples of countries as variedly diverse as China and the US (Madhur, 2002).

In response, the study found that: labour and capital are freely mobile within a country, although it is noted that formal labour mobility across sub-regions in China are somewhat constrained by official restrictions, while across countries, these restrictions are more rigid. In addition, the study also finds that it is possible to apply fiscal policy and put in place inter-regional resource transfers within a country and within a budget, a particularly difficult adjustment mechanism to operate across countries. This is observed as it is generally difficult to have a large centralized budget at the MU level to make resource transfers across countries, thus concluding that to manage a MU for a group of countries with varied levels of development, it is better if there is also freer flow of capital and labour across borders, although country specific fiscal policies can be applied because in the short run, labour mobility cannot be relied on to solely self-correct asymmetric shocks across the member countries of a MU³⁷.

To date, the theory of OCA has been adjusted and readjusted as various studies continue to uncover different important aspects that better facilitate effective and efficient functioning of MUs. Previously, McKinnon (1963) examined the effects of size of an economy on currency unions, concluding that smaller countries tended to be more open and have less nominal rigidity, thus making them better candidates for MUs. This is

³⁷ For more details on specific effects and scope of country specific discretionary fiscal policies, see (Bayoumi, 1997).

also observed later in an extended study where Mason (2008), notes that any potential overall gains from formation of a MU far outweighed overall gains received from increased trade as a result of Economic Integrations (EIs) without a MU, as further hypothetical analysis concluded that these gains (those from establishing an EI and not a MU) were in turn ‘dwarfed’, if African countries were to dollarize and adopt a more established and much stronger currency such as the Euro (used in Mason’s study). Mason notes that dollarization would be a quicker less costly approach, saving on the resource costs of operating a central bank. In addition, a more stable currency would also provide a better form of store-of-value and likely attract more investor confidence.

However, Mason notes that the loss of monetary sovereignty as a result of dollarization makes it unlikely that Africa would opt for this less costly approach to a single currency. The general observations from this study indicate that any positive results of a MU highly depended on the membership; for example, a MU that facilitates higher levels of trade would be expected to be generally more beneficial than one that does not (Masson, 2008). Alesina, et. Al. (2002), propose that aside from trade facilitation incentives, existence of low-quality domestic monetary authorities and the possibility of availability of high-quality foreign monetary authorities also increases the willingness to enter a MU, citing that countries will form MUs, if the partners bring with them the possibilities of better and stronger monetary institutions with lower inflation that provide better chances to responding to asymmetric shocks. In support, Frankel and Rose also observe that monetary union’s geographical disposition is equally important in the formation of monetary unions. In their study, they note that since countries tend to trade more with stronger neighbours (as predicted by the gravity model in analysis of trade flows), then benefits accruing from formation of a monetary union with a stronger economy (or in the case of dollarization, the adoption of a strong economy’s currency) would naturally be expected to outweigh those from a monetary union with a weaker economy (Alesina, 2002).

Literature also suggests that the key ingredient towards the effective application and functioning of a MU is the co-movement of relative prices and outputs across members after economic shocks to the system. The argument proposes that equality in national incomes and per capita incomes is not necessarily essential as even with equal or nearly equal incomes within a MU, if the co-movements of relative prices and outputs across countries is low, conducting a common monetary policy for the union as a whole becomes difficult. This argument asserts that income differentials across member countries could only be problematic and constraining in the application of common monetary policies if they largely reflect the dissimilarities in production structures across countries and by extension movements in relative prices and outputs across them. This is a relief, yet a point of concern for Africa as the continent boasts a varied range of national incomes and incomes per capita. However, within the specific trading blocs and groups of EIs, there is a slight similarity in production structures and given that the initial stages advocate for step wise MU formation beginning at the basic EI level, this is potentially not a worrying constraint (Kwan, 1998).

From the above discussions, It is generally thus accepted from the numerous and various other contributions deriving from the theory of an OCA, that benefits of a MU will increase or decrease given: greater mobility of factors of production across member countries including flexibility in wages and prices within the MU, existence of more symmetric shocks across the member countries and also a larger share of trade amongst members of the MU, implying the enhancement of deeper and higher degree of openness among the economies within the MU.

3.2 African Monetary Unions: A Brief History

In a bid to form significantly stronger and more cohesive EIs, Africa clearly has a plan to set up a single currency and the success observed in Europe in the implementation and full application of the Euro only fuels the determination to see this through. The

institution of a MU is among the primary objectives outlined by the African Union – AU (composed of all 53 members), to be achieved by 2028, and was first formally put forth at the signing of the Abuja treaty in 1991, which clearly defined strategies to see its fulfilment. These incorporated the establishment of continent-wide economic cooperation, to be initiated by strengthening the existing (and encouraging the formation of new) EIs across the continent.

The main purpose of which was continent wide political and economic empowerment with proposals overseen by the African Economic Community (AEC), a monetary arm of the AU. To fully implement the foundations and eventual completion of this plan, three financial institutions; African Central Bank, African Monetary Fund and the African Investment Bank are to be created and established by 2028. This remains the primary objective of the AU as was noted by Muammar Gaddafi, the self-proclaimed 'king of kings' among the traditional kings of Africa, former Libyan leader and then chairman of AU, who insisted that African states work towards achieving a United States of Africa and discouraged taking comfort in their being individually independent³⁸.

Coherent monetary cooperation amongst African economies has been a vision since the early 1900s, with common currencies existing in East Africa managed by the East African Currency Board (EACB) in 1919, extending so far into Eritrea as well as south into Zanzibar. World War II came and went and on the onset of the 1960s, changes that saw the headquarters of the EACB move from London to Nairobi took place, among others that included a strengthening of the Board and an increment in its roles. However, as the individual countries independently sought independence, there was a

³⁸ <http://www.africa-union.org/root/au/index/index.htm>

disintegration of the East African currency system leading to different currencies for each of the individual states and the termination of the EACB end 1966, although the East African Shilling continued to be used as legal tender up until 1969 (UNECA, n.d.).

Other regions have also been observed to have similar currency integrations even where the participating economies have not been fully integrated in other areas, such as Malawi, Zimbabwe and Zambia, formerly Nyasaland, the Southern and Northern Rhodesia respectively. These countries had a Southern Rhodesia Currency Board (SRCB) which was established in 1938, amended in 1954, giving rise to the Bank of Rhodesia (hosting the same duties as a Central Bank) in 1956. Similarly, this monetary union came apart in the early 1960s, shortly following the Bank's closure in 1964 (UNECA, n.d.).

Unlike the case for the East and South Central African states, the South African states; South Africa, Lesotho, Botswana and Swaziland all held different individual currencies during the colonial periods, later adopting the Pound Sterling in 1881. In the early 1920s however, South Africa established the Reserve Bank of South Africa, which issued the South African pound, which also passed for legal tender in other countries in the southern Africa. In 1961, two things happened, the Rand was formally adopted and the Pound Sterling ceased to be used among these countries. Later on, in 1974, the Rand Monetary Agreement (RMA) was formed but only a year later, Botswana pulled out and following distress calls from Lesotho and Swaziland, who felt that they were deprived of provisions for monetary control, the RMA was amended in 1986 (UNECA, n.d.). The collapse of these currency boards has since led to creation of individual central banks with distinctly different monetary policies across Eastern and South African countries.

On the other side of the continent, within the Franco-phone countries especially, the monetary unions created have been somewhat longer lasting and less volatile than those

previously discussed. As French colonies, most West and Central African countries have maintained their Franc-based currencies with two distinct Franc-based monetary unions in West and Central Africa still functioning today. The French colonial Franc, which was pegged to the metropolitan Franc, with the currency issue being backed by a convertibility guarantee of the French Treasury, and by restrictions on the degree of Government, contrasts the Anglophone based monetary system. While the British currency boards were modelled on the currency arrangements embodied in the British 1844 Bank Act³⁹ (i.e.: their balance sheets and functions looked like those of the Issue Department of the Victorian Bank of England), the French-based banks had their currencies backed to a considerable extent by claims on banks and lent substantial sums to the local banking system. To date, there has only been one devaluation against the French Franc (by 50 per cent in January 1994), upon when Rene Pleven the then French finance minister was quoted as saying, ‘...In a show of her generosity and selflessness, metropolitan France, wishing not to impose on her far-away daughters the consequences of her own poverty, is setting different exchange rates for their currency...’ (Nyuydine, 2007).

The CFA Franc, whose name has gradually evolved with time⁴⁰ and changes in the political arena whilst managing to keep its initials, was officially created in 1945.

39 Sir Robert Peel's Bank Act of 1844 (7 and 8 Victoria, cap. 32) is among the most celebrated and discussed acts of parliament. The objective was to regulate the issue of bank notes, with chief provisions being four fold. First, no new bank of issue was to be created after 1844. Second, all banks of issue in operation then, aside from the Bank of England, were prohibited against issuing beyond a fixed amount ascertained under the act. Third, that the issue department of the Bank of England be separated from the banking department. Fourth, the issue of Bank of England notes should be regulated by requiring all notes issued beyond £14,000,000 be issued in exchange for gold, (W. Neilson Hancock, 1855).

40 Initially, the CFA Franc was Colonies françaises d'Afrique (French colonies of Africa – pre 1958), then Communauté française d'Afrique (French community of Africa – pre independence in early 1960s) and finally Communauté Financière Africaine (African Financial Community – post independence, late 60s onwards).

Today, the CFA is used in twelve countries across Africa, all former colonies of France except for Guinea-Bissau (a former Portuguese colony) and Equatorial Guinea (formerly a Spanish colony). These twelve countries are however divided amongst them with a western union – WAEMU and a central union - CEMAC. However, although both regions carry the same monetary value against other currencies, their currencies, that is, the West African CFA (XOF) and the Central African CFA (XAF) are not interchangeable in the two regions (Savvides, 1998).

Thom and Walsh (2002), claim that the effects of MUs on trade patterns are an important and topical subject. This is the leading sentiment as various scholars and authors have tried to show just how extensively the formation of MUs can affect trade flows, raising numerous counter arguments to the same (Thom, 2002). However, most such studies are focused outside Africa, for example around the European Union with far reaching impacts on suggestive possible trickle down effects to the rest of the world, especially in the context of Africa. These include, Lane and Honohan (2000) who ask, ‘Will the Euro Trigger More Monetary Unions in Africa?’ later concluding that though the arrival of the euro would in a sense widen the available options for a common peg for African currencies, prevailing structural characteristics of African economies are ‘quite different’ from those of European economies. They then say that little evidence exists to trigger any contagious attacks on African currencies by the euro, but still note that the most likely route to new monetary cooperation in Africa is through a common peg to the euro, with respect to any other northern currencies, here referring to the US Dollar or the Sterling Pound or via the formation of a common African currency (Honohan, 2000).

3.2.1 The Ladders

Currently, with the Organization of African Unity (OAU) planning for a single currency to be operational by 2028, most of pre-existing EIs already have outlined steps in

readiness to institute this. These steps include as noted before, the gradual step-by-step integration via elimination of tariffs and formation of Free Trade Areas (FTAs), after which the EIs would be merged as an Africa-wide Customs Union, leading to the establishment of a common currency by 2028. Accordingly, several semi projects have been outlined with different time frames with at least four regional groupings currently intent to form monetary agreements. Teshome (1998) notes at least six EIs within the continent, which could form the main building blocks for such a continent-wide integration initiative (Teshome, 1998). These include;

3.2.2.1 SADC

The Southern African Development Community (SADC) currently hosting a functioning Common Monetary Area (CMA) is the most geographically cohesive monetary union constituting of South Africa, Swaziland, Lesotho and Namibia. SADC is currently a fully operational FTA having abolished the previously remaining trade restrictions within each member state on August 17, 2008, in line with agreements made in a meeting of leaders in 2006, in which it was agreed that the experienced underdevelopment and backwardness within Southern Africa will only be overcome through fully committed economic cooperation and integration. Within the guidance of the SADC treaty, the set objectives include achieving development and economic growth, alleviating poverty, enhancing standards and quality of life of the member citizens including the enhanced support for the socially disadvantaged.

Thus SADC as an EI sets to evolve common political values, systems and institutions while promoting self-sustaining development on the basis of collective self-reliance, through achieving complementary harmonization between the inter-dependence of Member States in both national and regional strategies and programmes among others. All the set objectives culminate in the establishment of an economic and monetary

union (the final step in formal pursuit of EI) by 2018; where by all members states will share a single currency⁴¹.

3.2.2.2 CFA

Communauté Financière Africaine commonly known as the CFA zone, is perhaps the most interesting of monetary agreements within Africa, it is also currently the largest and most enduring of currency blocs, composed of two sub-zones with distinctly different structural economic and political characteristics within and between its member countries. These are the West African Economic and Monetary Union – WAEMU and the Economic and Monetary Community of Central Africa – CEMAC derived from its French abbreviation; (*Communauté Économique et Monétaire de l'Afrique Centrale*).

Although members of the CFA zone enjoy currency convertibility, more prudent and stable fiscal and monetary policies than most of the rest of SSA, including substantial financial and technical assistance from host country France, Amin (2000), found in a study investigating the long term development effects in the CFA Zone Countries of Sub-Saharan Africa, that not much of these additional advantages helped towards increased development and growth within the region, noting that there was no more rapid economic and human development in the CFA-zone and CFA countries in comparison to the rest of SSA.

The reason for this finding, as explained by the study was the resultant institutional rigidity imposed by the monetary and exchange rate arrangement, leading to negative effects on the different economies, hence curbing long term continued growth. An

41 <http://www.sadc.int/index/browse/page/52>

example cited includes the lack of self-correcting mechanisms within the economies, of experienced imbalances that would be rectified by flexible exchange rates as experienced by other non-CFA member states. Instead, it was found that CFA member states tried to correct these imbalances by applying internal adjustments rendered difficult with minimal funds, aggravated by capital flight due to a generally weak banking sector irrespective of the strong and prevailing monetary systems.

3.2.2.2 ECOWAS

The Economic Community of West African States (ECOWAS), is an already established fully operational FTA and now almost a Customs Union. Although long standing and persistently committed to ensuring full integration with a diverse membership of 15 countries and a mission to promote EI in, ‘...all fields of economic activity, particularly industry, transport, telecommunications,..., commerce, monetary and financial matters...’, ECOWAS presents as the most challenged African EI, in the vision towards creation of a monetary union or implementation of a coherent monetary agreement. This difficulty arises from the fact that ECOWAS consists of both Anglophone and Franco-phone countries, a sub-group of which (WAEMU) is already an established monetary union and part of the West African CFA zone. To succeed in the formation and implementation of a single currency, three options seem viable for ECOWAS: The expansion of the pre-existent CFA monetary zone to further encompass the rest of the ECOWAS non-CFA countries.

The major hurdle to this option however is the political set-up, with the Anglo-phone countries resistant to adoption of the Franc based system, hence the second viable option which has been explored, involves the formation of an independent monetary union by the ECOWAS Anglophone countries, hence the creation of WAMZ – West African Monetary Zone, in April 2000 with the signature of the Accra Declaration by leaders of Gambia, Ghana, Guinea, Liberia, Nigeria and Sierra Leone. WAMZ intends to institute a common monetary and exchange rate policy and in 2001, WAMZ created

West African Monetary Institute – WAMI, tasked with facilitating preparatory activities for the establishment of a common Central Bank, The West African Central Bank – WACB that will be responsible for the issuing of a single currency in the five countries.

Eventually, ECOWAS intends to bring together the two monetary unions and create a single currency for the whole region. A third option might be the formation of an entirely new currency to be used by all ECOWAS members, again, this is not a politically (mostly by members of WAEMU who already have a monetary union in place and operational) supported option as it would result in initial substantial financial losses to WAEMU Members and destabilization of their currently relatively stable monetary regimes.

3.2.2.2 COMESA

In its stated vision, the Common Market for Eastern and Southern Africa – COMESA aims at becoming ‘...a fully integrated, internationally competitive regional economic community with high standards of living for all its people, ready to merge into an African Economic Community.’ However, COMESA is still in the very initial stages of formation of an EI with almost half its member states still instituting trade barriers such as restrictive tariffs to other member states although there are preferential agreements on bilateral basis for all its members. This process has probably taken longer than otherwise planned due to the widely varied diversity amongst member states in both economic and political setting.

In addition, COMESA is the most representative African EI composed of countries from north, central and southern Africa. Of all its members, the strongest country is Egypt, which unlike South Africa in the case of SADC, is not as actively involved in the proceedings of the EI.

3.2.2.2 EAC

The East Africa Community, re-established in 1999, is a revival of the previous East African Cooperation between Kenya, Tanzania and Uganda that collapsed in 1977, due to political conflicts within the region. Unlike COMESA, EAC benefits from active participation of all the member countries that now include Rwanda and Burundi, which led to the swift enforcement of EAC as a full Customs Union by 2005. With its closely set goals and clear intentions to pursue deeper integration, with full intra-regional tariff liberalization within a five-year plan, EAC strategically moved on to a newly confirmed Common Market (2010) and now awaits the establishment of a Monetary Union culminating in full harmonization of the member states economic and political structures.

In fact, although not as active as their intended roles, the EAC has set about harmonizing certain sectors of their economies, beginning with the legislative and judicial sectors, this was done by the formation of the East African Legislative Assembly – EALA and the East African Court of Justice – EACJ which facilitate implementation of harmonized Municipal Laws in the EAC context. So far, the implementation of the Customs Union, characterized by a common EAC Customs Management Act and a Common External Tariff, has since led to overall improvement of the region's performance, (albeit slow and uneven) with significant gains such as; convertibility of East African currencies; enhanced coordination in macro and budgetary policies; better resource management and benefits allocation such as observed from the effects of shared management of Lake Victoria; including the revival of regional co-operation in other fields⁴². Resulting from this successful launch of the

⁴² <http://www.eac.int/about-eac/eac-history.html>

Customs Union, EAC continued on to finalize the proceedings towards a Common Market (July 2010), fully expecting and actively seeking to shortly follow this by the institution of an East African Monetary Union – EAMU by 2012.

3.3 Increasing Trade – Towards Complete Integration

Foroutan and Pritchett (1993) conclude that, ‘...even in the absence of trade restrictions, the scope for trade among African countries is intrinsically modest,’ and wonder if perhaps there is need for a new approach towards economic integration (Foroutan, 1993). This observed weak intra-regional trade flows including the slow progress of EIs over time necessitates further exploration of EIs and their performance in Africa.

Perhaps the mere removal of trade barriers does not encourage trade?

Borrowing from the European Union (EU) experience, it is observed that EIs eventual long term success is largely dependent on their depth. There are varied and much more extensive gains involved when integration is extended beyond the goods market to also include services, and factors of production. In addition, as mentioned earlier, weak and corrupt political and institutional settings would generally gain from harmonization, which would help in the structuring of more stable and sustainable macroeconomic policies. This kind of harmonization, also prescribed in the formal stages of forming complete economic integrations, leading up to an Economic and Monetary Union – EMU such as the EU, would go a long way especially in promoting not just good governance but also in strengthening weak relations amongst African nations, especially given that up until now, despite all the pre-existent EIs, tariffs within Africa continue to be high, with a number of sectors still protected.

As discussed, for a while now, African countries have been attempting to link themselves together, in various groups via different and diverse types of regional and

economic integration agreements. The history of which trails back at least to the Berlin Conference's 1885 decree that navigation should be free on the Niger and Congo rivers. Regional economic cooperation for the facilitation of international trade and payments has therefore long been high on the African policy agenda, with noteworthy cooperative initiatives and concessions instituted in both public infrastructure such as ports and railways and other logistical infrastructure, especially for the international access of land-locked countries (Oliver, 1994) in (Ndulu, 2007).

In most of these cases, these endeavours have been geared towards the desire to generate and encourage growth by eliminating the stumbling blocks that contribute to slow growth within the structural elements of African countries, such as geographical features, for example where the cooperation of coastal neighbours would be ideal for more effective and efficient trade with the rest of the world. However, the integrations are yet to show promising growth rates within the continent itself as has been observed by the Economic Commission for Africa (ECA) and the African Union (AU) in the third follow up of 'Assessing Regional Integration in Africa' (2008). In this report, the share of intra-African trade is observed to have grown from approximately four per cent in the 1980s to twelve per cent in the first half of the 2000s. Compared to other regional groups (outside Africa) however, this is a markedly low growth rate. The same report then calls for more efforts to enhance trade within the various African regional economic communities. Given the low level of African trade, Mason (2008) wonders if there are not additional measures that can be instituted to further stimulate trade within the region.

Among the various suggestions include the advancement of stable macroeconomic environs, such as effectively managing inflation and public finance to help accentuate the confidence of local and international investors whose decisions can then pave way for more development oriented activities. Consequently, the eventual formation of Monetary Unions is suggested as a way to ensure a reduction in trading costs among

other benefits that would go towards encouraging trade and by extension, promoting economic growth. In this respect, various monetary and trade cooperation channels have been explored. We note that, Mundell (1961) agrees, citing that among the major benefits of a monetary union includes the facilitation of trade amongst participating members while its main disadvantage is the loss of independent monetary policy.

Similarly, Rose (2000) finds that when two countries share a common currency, trade between them is on average three times more than countries that have similar characteristics but that bear different currencies. A follow up of that study is found to reduce that magnifying effect on trade by the sharing of a common currency, but still retains the argument that trade is increased and at least doubled by the existence of a common currency (Rose, 2001). In Africa, Mason and Pattillo (2004) found that the effect of a common currency on African countries would be just about the same as that predicted by Rose (2000), that is, trade would increase.

Monetary unions generally constitute the sharing of a single currency by a group of countries. There are various forms of Monetary Unions. For example: the CFA zone previously mentioned takes the form of a multilateral monetary union, where countries share the same currency, administered and managed by the same central bank: or Dollarization. Dollarization can either be partial or full dollarization; the latter is where the dollar (or choice currency adopted) acquires full legal tender status with any retained domestic currency relegated to a secondary role. In this case, the country not only loses the ability to institute independent monetary policies, but also control of the national supply of money. There is also partial dollarization which constitutes a country retaining its domestic currency as legal tender, but holds dollars (or the adopted currency) as deposits or even cash, still the domestic economy retains control of its money supply and consequently, its ability to conduct any independent (or partially so) monetary policy. An example of a dollarized African country is Liberia.

Either way, dollarization generally implies the unilateral adoption of the currency of a stronger country's currency and this is especially common of the US dollar not just by Liberia, but also by other countries like Ecuador among other Caribbean and Pacific countries. Also dollarization can often be unofficial, that is where a foreign currency is widely used and circulated within an economy but does not hold legal tender status, case example in Africa including Zimbabwe. Zimbabwe's national currency is the Zimbabwean dollar, but the US dollar is generally accepted and widely used by local citizens as a means of transaction, in this case, also favoured as a means of store-of-value due to its more stable status.

In addition, countries can also form monetary integrations by forming an exchange rate union, where they apply fixed parities, which include permanent arrangements that link the different currencies as is the case of a CMA, such as is experienced by Lesotho, Swaziland, South Africa and Namibia (Masson, 2004).

3.4 Gains and Losses of Monetary Unions

Given this determination and obvious intentions to form and fully integrate a single currency in Africa, what are the expected gains and losses thereof should Africa succeed?

In general terms, MUs are favoured for their overall role in improving the general performance of economies, rather concentrating on financial aspects that include but do not limit to inflation and exchange rates. MUs are then considered as the ultimate steps towards ensuring non-inflationary monetary policies with benefits such as enhanced central bank credibility and deeper capital markets, all crucial towards increasing productivity and output. In addition, there is also focus on the enhanced investor confidence stimulated by a stronger more stable currency, especially as some small SSA developing countries greatly rely on Foreign Direct Investments (FDIs), to stimulate their domestic growth.

In addition, there is elimination of costs of printing and maintaining a separate national currency including the chance to establish a policy anchor to serve as a guide around which expectations are formulated and policies can revolve. This guides the implementation of automatic mechanisms that enforce monetary and fiscal discipline in addition to carrying a competitive international currency, hence effectively participating in the restoration of reformed international monetary systems (Kenen, 1986) and (Corbo, 1995). In a way, MUs will also help curb the power of market speculations in affecting prices and disrupting the effective application of monetary policies (Ishiyama, 1975).

For trade purposes however and inferring from new trade theories, as introduced by Krugman (1987), resultant effects of MUs tend to be self-explaining. Krugman explains that all things being equal, producers move their capital to whichever country provides for the lowest production costs, observing that an economic activity's location is rather determined by the total prevailing costs, among which transaction costs play a big role (Krugman, 1987). In this case, their formation not only significantly reduces the transaction costs between trading partners, but also provides for macroeconomic stability by way of managing inflation and eliminating exchange rate volatility (Lyakurwa, 1997). This also comes with the added benefits of reinforcement of the EI trading bloc giving it more bargaining power and more 'voice' during international economic discussions and markets facilitating better chances at improving overall trade policy and resultant terms of trade. Thus it is possible that MUs play a significant role in determining trade flows within a region.

Among the less traditional and theoretically perceived benefits of any regional and economic integration is the undocumented insurance that EIs carry along with them, providing for a cushioning effect protecting members from problems including terms of trade shocks like potential resurgence of protectionism in developed countries. MUs are no different, and this is an especially valuable (although potentially hazardous)

benefit for African countries as MUs would un-officially, (although not always as observed of the EU), insure participant countries against drastic future macroeconomic instability, that might arise in the event of catastrophes including domestic conflicts and also act as a countervailing influence against domination by other more powerful neighbours. Usually, with flexible exchange rates, an individual currency's value has no guarantee against devaluation, especially if struggling to fight inflationary pressures stimulated by highly volatile world prices, a common trait amongst primary products including even more unstable oil prices. In this case, such insurance would help insulate against potential inflationary effects while also providing for more equal terms in the financial and capital markets within the MU.

The benefits of a monetary union however, despite not causing possible trade diversion do come at a cost (Frankel, 2001). According to most all MU literature, the key economic cost from formation of MUs is the loss of national autonomy in monetary policy, thus including loss of the ability to independently influence exchange rates and interest rates, which are henceforth determined by the country whose currency has been adopted. That is, the 'anchor' country or in the case of establishing a single currency, this role is left to the combined central bank – ideally representing each member country's interests. It is possible that the interests of the stronger economies thus reign in such decisions. In the case of dollarization, the country that adopts the foreign currency can in some cases lose investment opportunities as interest rates are determined by the host country and will fluctuate in line with these, thus the adopting country has to rely on the hopes that policy performance of the anchor is better than their own, sometimes, that is not usually always the case.

However, costs associated with this loss of monetary independence depend upon how well the individual countries were conducting monetary policy prior to joining the MU. Alesina and Barro (2001), note that it's possible for MUs to instead stimulate commitment to greater macroeconomic stability from countries experiencing mixed

cycles in their success in implementing monetary policy. In addition, Mundell (1997), asserts that sometimes it would not be in a country's interest to join or form a MU if it wants: different rates of inflation from those within a MU; to use the exchange rates as an instrument of employment policy (increasing or reducing wages) or as a beggar-thy-neighbour instrument to capture employment from other countries; does not want to sacrifice seigniorage from the use of its money as an international means of payment; this especially applies to large countries which might also not want unfriendly countries to benefit from the scale economies due to size advantages of the large MU or also fearing that addition of another currency would result in more difficult implementation of national macroeconomic policy and also because monetary integration removes a distinctly significant dimension of national sovereignty, signalling national independence (Mundell, 1997).

In addition countries would shy away also if the proposed MU is composed of members with potentially politically unstable countries with no domestic political and economic leadership capable of maintaining a fixed exchange rate system in equilibrium or they are poorer and will thus expect; aid, equalization payments, or favourable terms whilst allocating the MU's expenditures. In some cases, there is observed issue of statistical secrecy with some countries not wanting to share this information; or just because the country does not agree with the degree and tenets of the integration implied by joining the MU in terms of common policy measures or legislation⁴³. An example of a country that has chosen to opt out of a MU is Canada, irrespective of the fact that Canada trades almost entirely with the US, the decision to operate an independent currency stems from the difference in both countries terms of trade patterns (Brash, 2000).

⁴³ <http://www.geocities.com/Eureka/Concourse/8751/edisi04/ocata.htm>

As shown by previous discussions, trade is a *key factor* towards enhancing growth and development, also noted previously, regional trade within Africa is minimal, relying heavily instead on trade with the ROW and yet even then, its total share in world trade remains quite marginal. Alesina and Barro (2001) liken MUs to a common language that better facilitates effective communication, thus promoting trade and investments amongst member countries, citing that while dealing with different currencies, total transaction costs including costs of obtaining information about prices would be higher, providing for disincentives to trade and investment (Alesina, 2001). Inferring from results found by Frankel and Rose (2001) on a study investigating the effects of monetary unions on the long run growth of real incomes in the participant countries, this study embraces the opinion that:

- *Monetary Unions stimulate trade and further facilitate increased bilateral trade*⁴⁴ amongst the member countries and by extension, the increase in trade results in overall increased incomes, thus facilitating economic growth and the development of member countries (Frankel, 2001).

This notion is similarly supported by Mason (2008), who concludes, in a study investigating whether the resultant trade effects of creating a monetary union justified their creation within Africa, that, ‘...although the formation of monetary unions was not the ultimate answer to all of Africa’s problems,...Given the small size of African economies, the formation of monetary unions seems a logical way to boost trade while improving monetary policy...’ (Mason, 2008).

⁴⁴ ‘...there is no evidence or indication that trade created as a result of a monetary union comes at the expense of trade diversion...’ (Frankel, 2001)

3.4.1 Evidenced Empirics – Suitability and Effects of MUs on Trade

In a study carried out by Rose (2000), on the direct effects of sharing a common currency on international trade flows, done by estimating a modified gravity model, using a sample of 230 countries and incorporating a dummy variable to capture the effects of a common currency on bilateral trade flows, it was found that sharing a common currency increased bilateral trade flows three fold amongst the member states. Later, while studying the effects of adoption of the euro by European countries, Rose and van Wincoop (2001), found that the adoption of this would have a possible 60 per cent increase in trade amongst the European Union members (Rose, 2001). These results were later confirmed by Micco et al., (2003) in a study on the possible effects of the formation of the European Monetary Union (EMU) that found major significant positive effects on bilateral trade between members when compared to trade between non-EMU countries (Micco, 2003).

These results have however been greatly debated following other consequent studies using different approaches. Despite the varied opinions on what methodology best represents the effects of sharing a common currency, the general consensus reached has been that trade flows are indeed affected by existence or lack thereof of a common currency. On a follow up of the Rose (2000) study, Glick and Rose (2001) used annual observations from 1848 to 1997 and applied panel estimation techniques to compare results obtained from pooled cross-estimations with those obtained from a general fixed-effects specification, confirming the earlier results that sharing a common currency does, increase bilateral trade between member countries. Using the pooled observations, the results showed a four-fold increase in trade due to formation of a common currency while the fixed-effects estimations showed a doubling of trade resulting from sharing a common currency (Glick, 2001). The pooled cross-section results are however disqualified on the note that they are biased due to the exclusion and mis-measurement of trading pair-specific variables.

On a similar note, Alesina, et. al., (2002), using the instrumental variable approach to the common currency dummy in the gravity model which incorporated the trade effects of monetary unions, confirmed a positive MU effect on trade and suggested that countries with more volumes of trade amongst each other would benefit more from the adoption of a common currency, than countries with low volumes of trade amongst them. Whilst reanalysing the work by Rose (2000), but in a different context, Nitsch (2001), finds that the adoption of the US dollar would translate into no trade increases, and concludes that at best, the effects of any monetary union formations were unreliable. Among other concerns raised was that fact that Rose used data with five year intervals, which is found to be misleading as some researchers say five years is not a period long enough to capture the full trade effects of a monetary union (Nitsch, 2001). However, upon using a longer time lag, 10 to 20 year intervals in the data, Pakko and Wall (2001), find that any trade reducing effects of sharing a common currency are further magnified. They further conclude that any common currency sharing may in fact be trade reducing as opposed to trade increasing (Pakko, 2001).

In addition, other critics of Rose (2000) also note that the decision to join a monetary union is not usually random, and this assumption can lead to biased estimates of the effects of forming one. As such, authors such as Persson (2001) propose the use of a different methodology that takes into account the probability of economies joining a monetary union, which he labels the ‘propensity score’ for each set of countries, and after treating this effect, he estimates the monetary union effect using the treated observations and finds that sharing a common currency has a positive effect on bilateral trade flows. This method allows for the non-random decision to join a monetary union aspect to be taken into account (Persson, 2001). This position is backed by Tenreyro (2001), who argues that omitted factors, which may at the same time, strengthen trade links and increase the propensity to join monetary unions, may lead to a positive bias in the OLS estimates.

3.5 The Expected Fit

Do the generally qualifying criteria apply in Africa, in the quest and pursuit of forming a MU?

Already it is noted that degree of trade amongst and within the region is very minimal, however, it is worth mentioning that there is high factor mobility within the region, mostly in favour of labour and less so in capital. Due to macroeconomic instabilities, political conflicts and weak financial institutions, investor confidence is not very high within Africa and there are often cases of domestic capital flight. Hence the option of capital mobility is not really constrained by barriers but instead by the lack of capital to move freely from one region to another. African countries are mostly price takers in the world markets, while within the region, wages and prices are not quite so flexible, and the asymmetric shocks are exceedingly varied in effect across the continent. In addition, the economic growth rates and development levels are significantly varied, resulting in similarly varied effects from shocks to the systems and in the responsive measures undertaken. Inclusive, is the existence of weak financial sectors with inadequate region-level resource pooling mechanisms that provide for harmonized co-operation in the region.

A common other factor noted is the similarity in products, mostly within the primary commodity categories, thus offering limited variety. Also, although Africa intends to borrow from lessons learned through the creation and institution of the Euro by the European Union⁴⁵, there seems to be a gap in following the procedures as followed by Europe, such as the embracement of political integration and creation of a supranational entity empowered to override sovereign national governments, currently distinctly noted in the prevailing lack of political cooperation and stability combined with an even

⁴⁵ For details on the history and progress of the Euro, see: http://ec.europa.eu/euro/index_en.html

more diverse spectrum in governance, that would help towards creation of preconditions necessary for monetary cooperation whilst sharing a common currency (Foroutan, 1993). All of these typical characteristics of many SSA countries, including the dynamism in structure and operational set-up, hardly qualify the continent as an OCA (in theory). This is irrespective of the backdrop of massive efforts to prove otherwise, shown in the determination to see through the successful implementation and progression of existing EIs. Scholars have further pointed out that such diversity can play a bigger role in undermining sustenance efforts of a MU than in its institution (Bayoumi, 2000).

However as noted by Alesina and Barro (2001), globalization and the increasingly diminishing role of independent national monetary policies, especially for small economies will continue to encourage the initiation of monetary unions across the globe and Africa is not an exception. Following this, Laabas and Limam (2002), argue that the main considerations of an OCA and especially in the suitability of members proposing to form the MU is a strong political will and a commitment by all the members to the resulting fixed exchange rate arrangements.

3.5.1 Scope of Interest & Endogenous OCA Theory

In this study, we proffer the idea that not only will the formation of a MU work towards enhancing continent wide integration as a result of policy measures that follow such a decision, but this will also by itself greatly enhance intra-regional trade.

This theorem is supported by Frankel and Rose (1998), introducing the endogenous OCA theory. The endogenous OCA theory asserts that countries wishing to join / form a MU may not necessarily satisfy the requirements indicated above for the successful institution of a MU, but that they may indeed satisfy those requirements of an OCA (*ex post*) after forming the MU. Frankel and Rose based their argument on the experiences

of institutionalising the Euro where they found that some of the criteria for the administration of a successful currency area like openness to trade and business cycle correlations were endogenous.

The main rationale for these assertions do not digress far from the original theory as they are based on the observed results that a MU, removes exchange rate risks, whilst enhancing price transparency which goes on to stimulate increased FDI (mentioned earlier and especially important for some small developing SSA economies) whilst also fostering long term relationships that generate interdependence, eventually culminating in increased trade amongst the members from which, indirectly, incomes earned go towards facilitating growth and economic development. This also facilitates a deepening of the economic and financial ties amongst the members, hence furthering and strengthening initial EI attempts, (Tavlas, 2008) and (Sideris, 2009).

In order to correctly quantify the suitability of member countries for prospects of forming a MU, various approaches are considered, among the two most common include: the construction of an index (the OCA index), that is based on forecasted values of exchange rate variability. Here, it is assumed that the exchange rates are determined by economic variables such as relative costs. This approach first derived by Bayoumi and Eichengreen (1997) has since been applied by various other scholars including (Frankel, 1996). In 1998, Jonung and Sjöholm sought to find out the success of a MU between Finland and Sweden, later including the rest of Europe, by calculating indices based on among others, the degree of factor mobility, wage flexibility, product diversification and similarity of production structures, similarity of economic and political policies, including the co-variation in economic activities. Their research found that while Finland and Sweden constituted an OCA, they were not suitable members for the European Monetary Union – EMU, (Jonung, 1998). Other scholars applying this technique include; (Rose, 2000), (Glick, 2001) and more recently, (Horvath, 2007).

However, these indicators have been found to be misleading and not generally applicable to all cases as they are susceptible to prevailing exchange rate regimes. That is; they could be endogenous to the exchange rate regime as a result of either of two outcomes; where the MU is responsible for facilitating greater trade amongst members than would otherwise be the case whilst operating under floating exchange rates, making the degree of openness and the volume of intra-MU trade endogenous to the exchange rate regimes. Or; in the case where the very structure of an economy may be affected by changes in the policy regime, that is; where the degree of flexibility of wages in the labour markets and the prices in the product markets are likely to be larger under a credible MU than under a floating exchange rate regime. Also for example, the response of shocks to both labour and product market prices could differ depending on exchange rate regimes, observing that this was faster under the gold standard than under monetary regimes with greater exchange rate variability, (Eichengreen, 1996).

The second approach commonly used for the purposes of quantifying the optimality of a currency area and that applied in this study was developed by Enders and Hurn (1994)⁴⁶ and is based on the Generalized Purchasing Power Parity Theory (G-PPP). This theory, suggests that the (possible) non-stationarity of real exchange rates (RER) may be related to that of their long-run macroeconomic determinants. The rationale behind this theory suggests that although it is possible that the RERs of different economies might not by themselves be stationary, due to non-stationary fundamental

46 Enders and Hurn (1994) developed G-PPP method as a revision of an earlier analysis method using relative Purchasing Power Parity (PPP), to quantify optimality of a currency area. This method asserted that within an OCA, RERS between member countries are stationary to long-run mean or common trend overtime and if not, then shocks are never reversed and there will be no reversion to a long-run trend. The main critique to this method was that it was relying on two country models, completely ignoring any possible effects other countries outside the MU may have on bilateral exchange rates. See also (Sideris, 2009).

economic variables and their different growth patterns, if these fundamental economic variables are sufficiently integrated (experiencing convergence and symmetrical shocks, as is expected they should, within a MU), then RERs should move together and be so interrelated, sharing common stochastic trends that they form co-integrating relationships (Enders, 1994). Thus the G-PPP approach undertakes to examine the optimality of a currency area by testing whether the RERs of the proposed MU members with respect to a base currency are co-integrated⁴⁷.

3.5.2 Focusing on the EAC

Given these suppositions, the study thus seeks to find out; to what extent do the SSA countries constitute an OCA, more specifically, is the EAC ready for a MU?

Due to the extent of the EAC integration, being the only currently fully operational Common Market – the most advanced stage within the formal theoretical progression towards full economic integration within Africa and the determined efforts towards establishing a single currency, this study undertakes the task of finding out if EAC does provide for an OAC and if it should continue with its plan to form a MU by 2013. In this respect, a couple of studies have also shown interest and have sought to find out the optimality of an OCA within EAC, using different methodologies and different time periods.

As recently as 2001, Mkenda posed the same question; wondering if EAC was an OCA using observations for the period 1981 to 1998. To answer this question, the author applied the G-PPP methodology whilst also including a set of derived and calculated indices that would indicate the optimality of a MU by the EAC, when the EAC

⁴⁷ Co integration here means that the bilateral RERs of members of a proposed MU have at least one stationary linear combination.

constituted Kenya, Uganda and Tanzania. The results found that the various indices calculated based on the theory of OCA, gave mixed verdicts, while the G-PPP method supported the formation of a MU by EAC. Using G-PPP, the research established the presence of co-integration between the real exchange rates in East Africa for both the periods 1981 to 1998, and 1990 to 1998, suggesting that in conjunction with OCA theory, EAC countries experienced similar shocks to their macro-economic variables. However, the study also noted that although the three economies had different growth rates and experienced different levels of inflation, pre-SAP (Structural Adjustments Programmes) period; the recent trend was one of convergence, while cautioning that the success of a MU, though supported by the G-PPP approach, was also highly dependent on both pre-existing cultural ties of the countries concerned and political will. Currently however, there is evidence of strong political will towards ensuring the success of any form of integration that further helps growth and development in the region, (Mkenda, 2001).

The most recent study is by Kishor and Ssozi (2009) who studied whether the EAC constitutes an OCA by analysing the degree and evolution of business cycle synchronization between the EAC countries for the period between 1970 and 2007. They did this by estimating a structural VAR model using an unobserved components model of structural shocks. This approach seeks to examine whether co-movements in macroeconomic variables have a common element that represents the general state of the economy, while also applying a time varying parameter model to estimate the evolution of business cycle synchronization with the common demand shocks over time. In their study, they found that the proportion of shocks common across different countries was small, thus weak synchronization, but that despite these small levels of synchronization, there was an increase in the degree of synchronization after signing of the EAC treaty in 1999. Thus in their study, Kishor and Ssozi, suggest that though the level of sharing common shocks is still low, the improved degree of synchronization since the EAC Treaty was put in force presents evidence of EAC being a plausible

OCA. Their study suggested that, business synchronization and hence common shocks to the system would be gradually enhanced with increased access to economic information, cross-border investment and trade, including more efficient exchange and payment systems (Kishor, 2009).

Previously, Buigut and Valev (2004) also sought to find out if the proposed EAMU was an OCA and like Kishor and Ssozi, also applied a structural VAR approach, and used a two variable VAR model to help identify supply and demand shocks for the EA countries. While Kishor and Ssozi used all current five economies within the EAC, Kenya, Uganda, Rwanda, Burundi and Tanzania, in 2004, EAC consisted of only three economies, excluding Rwanda and Burundi (Buigut, 2004). Therefore, while Buigut and Valev (2004), examined the suitability of the EA region in formation of a monetary union, it is possible their results might have been affected by the fact that both Rwanda and Burundi did not share similar trade policies at the time, which might significantly affect their demand and supply structures. The results of their study were mixed, with proportions of output variability as a result of supply shocks being similar while those accounted for by demand shocks varied widely in the variations observed in price levels. However, their conclusions lean towards encouraging the formation of a MU, with the evidence that although shocks were not highly correlated, further analysis with lagged correlations indicated that increased integration would improve the symmetry of experienced shocks.

This study largely borrows from Laabas and Limam's (2002) study that sought to study how ready the GCC (Gulf Cooperation Council – planning to fully incorporate a single currency by 2010) countries were for a MU, although by the time our study was undertaken, the GCC were yet to succeed. Their study finds that even given the weak intra-GCC and inter-industry trade and lack of diversification (very similar elements of EAC), GCC countries form an OCA and the institution of a MU would enhance trade, if steps were taken towards more specialization within the respective industries. Also,

a MU in the GCC was predicted to result in more synchronized business cycles upon achieving more convergence in the economic and institutional structures (Laabas, 2002). However, the study recommended that full benefits would only be reaped upon completion of the requirements of becoming a common market by the GCC economies. Other studies include: Antonucci and Girardi (2006) on a study of the European Monetary union – EMU countries, examining the effects of structural changes on the behaviour of RERs; Choudry (2005), Kawasaki and Ogawa (2006) and Wilson and Choy (2007) on whether the East Asian countries should form a MU and Neves et. al., (2007) on if MERCOSUR economies can form an OCA.

3.5.3 Significance and Contribution

As observed above, the AU is clearly planning for a single currency to be operational by 2028 in its efforts to form significantly stronger and more cohesive EIs. This it aims to achieve by gradually, in a step-by-step form, assimilating and eventually merging the already formed EIs. Currently, most of pre-existing EIs are already implementing the semi-projects outlined in readiness to institute these plans, among them the EAC. In 2007, EAC welcomed two new members, and is today ranked as a fully operational common market. EAC seems keener towards forming a monetary union, with a set date of 2013, (albeit, yet to be realized). Given this, this study aims to find out how suitable the region is for the formation of a MU and seeks to confirm / dispute previous studies by augmenting the data used by increasing both time period and adding two new variables (Rwanda and Burundi) as new additions to the EAC.

From the previous chapter, given the obvious importance of trade and by adopting Frankel and Rose's (1998), endogenous OCA theory, the study operates under the assumption that a more stable currency would not just provide a better form of store-of-value and likely attract more investor confidence, but would also stimulate overall trade and further facilitate increased bilateral trade amongst the member countries and

by extension, increase overall incomes, thus facilitating economic growth and development of member countries. From this assumption, where MUs are found to be generally positive, the study then seeks to find out, how suitable EAC is, as an OCA given new membership, while also seeking to find if in the recent years, the results found by Mkenda (2001) and Buigut and Valev (2004), still hold true and if those found by Kishor and Ssozi (2009), using a structural VAR model are consistent with the ones we find using G-PPP.

3.5.4 Broad and General Tested Hypothesis

- H_0 = That the East African Community comprises an Optimum Currency Area
- H_1 = That the East African Community does not comprise an Optimum Currency Area

3.6 The G-PPP Test

3.6.1 Theoretical Foundations

The GPPP approach, extended first by Enders and Hurn (1994), is founded on the background of the theory of Purchasing Power Parity (PPP). The PPP theory asserts that, PPP holds, if a series of real bilateral exchange rates is found to be stationary indicating that the two countries are well integrated. In addition, given that real bilateral exchange rates (RBER) are functions of nominal exchange rates and their trading partner's relative price ratios, formally investigating this also requires that nominal exchange rates must equal the difference between the relative prices ratios between the partner countries, including any short run deviations from PPP, captured in an error term (e).

We represent *RBER* as:

$$RBER = (R_t^* P_t^*) / P_t$$

Where: (R_t^*) is nominal exchange rate of the base currency (P_t^*) is the consumer price index – CPI of the base country and (P_t) is the CPI of the domestic country. This can be translated into a linear function such that:

$$\ln r_{ber} = \ln r_t^* + \ln p_t^* - \ln p_t \quad (3.1)$$

For PPP to hold, then:

$$\ln r_t^* = \ln p_t^* - \ln p_t + \varepsilon$$

Implying that these short-term deviations (ε) equal $REBR$ and therefore; (ε) must equal zero. Hence:

$$\varepsilon = \ln r_{ber} = \ln r_t^* + \ln p_t^* - \ln p_t \quad (3.2)$$

And;

$$(\varepsilon) = 0$$

So that:

$$\ln r_t^* = \ln p_t^* - \ln p_t \quad (3.3)$$

Enders and Hurn (1994) question the validity of the PPP hypothesis in standard bilateral tests, citing that influences of outside countries on bilateral exchange rates are ignored.

To rectify this, the GPPP theory is further formulated upon the notion that although the real bilateral exchange rates – $RBER$ of the economies are non-stationary, (as traditionally, fundamental macroeconomic variables determining real exchange rates of a group of economies are observed to be non-stationary), the said fundamental variables can be sufficiently integrated such that the $RBER$ share common trends, thus forming a co-integrating relationship. In this case then, the economies in question form an OCA with respect to Mundell's OCA theory, which posits that two economies constitute a currency area if they present similar real disturbances (Mundell, 1961).

In this regard, if even one stationary linear combination of otherwise non-stationary $RBER$ is identified, then it is reasonable to conclude that there is sufficient economic

interdependence to warrant the long-run equilibrating conditions amongst the fundamental macroeconomic variables. According to Sideris (2009), if this is the rationale applied, then the existence of an equilibrium path for a linear combination of *RB*ER rules out the presence of real asymmetries, implying the long-run sustainability of a monetary area, which should ideally be the end result of forming a monetary union (Sideris, 2009).

In its simple version, the GPPP test merely seeks to find if there are any co-integrating vectors between *RB*ER of members within a MU or intending to form a MU. This involves testing to see if there is an equilibrium relationship between the different *RB*ER. As introduced by Enders and Hurn, GPPP tests show that: If there are n – number of countries in the world, a currency area of z – numbers of countries, (where $z \leq n$) will exist with long-run equilibrium relationships between the $(z - 1)$ bilateral exchange rates.

To test this, a co-integration test of the following linear translation is run:

$$\ln r_{1it} = \alpha_0 + \beta_{1(i+1)} \ln r_{1(i+1)t} + \dots + \beta_{1z} \ln r_{1zt} + \varepsilon_t \quad (3.4)$$

Where:

$\ln r_{1it}$ – is the natural logarithm of the *RB*ER between country (1) – (base country) and country (i) in time (t) derived as before:

$$RB\text{ER} = \frac{(R_t^* P_t^*)}{(P_t)}$$

α_0 Is the intercept while,

$\beta_{1(i+1)} \dots \beta_{1z}$ – are the parameters of the co-integrating vector representing linkages (economic interdependencies) among the economies within the currency area. That is, the degree of co-movement of the *RB*ER and,

ε_t – is a stationary stochastic disturbance term.

3.7 Data

The study uses annual data for nominal exchange rates and consumer price indices from 1970 to 2009 for all the EAC countries and carries out three tests for co-integration using three different base countries. The currencies include the Kenyan, Ugandan and Tanzanian shilling, the Burundi and Rwandan franc, the US dollar and the British Pound Sterling. Because both Rwanda and Burundi joined the EAC much later, their sample period is adjusted to capture this. In addition, Ugandan data is missing for the first 10 years of the study period between 1970 and 1980. Given that CPIs are the indices published for all involved countries, we take these to capture both domestic and foreign prices

From among the EAC countries, Kenya is used as the base country as it is the stronger economy of the five with higher GDP and a higher trade to GDP ratio, to check how ready the EAC countries are to form a single currency. We also use both the Great Britain Pound Sterling (GBP) and the US dollar (USD) as these two are among their strongest trading partners, as well as having all the countries in the EAC quote their exchange rates relative to the USD. In addition, Enders and Hurn (1994) indicate that the estimated co-integrating vectors are linked to aggregate demand functions of the goods market clearing relationship, which goes to imply that the more similar the estimated aggregate demand functions within a MU amongst the members, the lower the expected magnitude of estimated (β s)⁴⁸.

⁴⁸ Data is compiled from IFS statistical data site, via ESDS and some from Central Bank of Kenya – CBK annual statistical bulletins, ordered from Kenya, EAC annual statistics bulletins, Penn World Tables including World Development Indicators of the World Bank (2009).

<http://data.un.org/Data.aspx?d=CDB&f=srID%3a6090>

<http://data.un.org/Explorer.aspx?d=CDB&f=srID%3a5980>

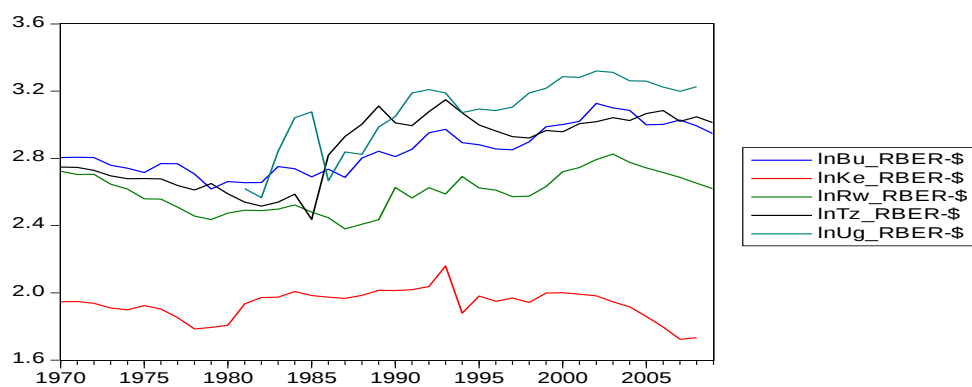
3.8 Estimation Process

The methodology followed here includes an initial analysis of individual *RBER* series, following which we test for stationarity of each of the series, if any of the series is found to be stationary, then we conclude that PPP holds and the partner countries are already well integrated, however, given that these economies are not in economic integrations with either of Britain or the USA, this conclusion would only apply to the *RBER* using the Kenya Shilling (Kshs) as a base currency. We test for stationarity by applying unit root tests and determining the order of integration, after which, the Johansen co-integration test is applied and the existence or lack thereof of long-run equilibrium (represented by the existence of at-least one co-integrating relationship) among the *RBER* as posited by the GPPP test is analysed. After confirming existence of co-integration, this is established, we also apply the Error correction model – ECM and generate an impulse response function to enable us to trace out the effects of a one-time shock to any one of the *RBER*.

3.8.1 Descriptives

LNBU – logarithm of *RBER* in Burundi; LNKE – logarithm of *RBER* in Kenya; LNRW – logarithm of *RBER* in Rwanda; LNTZ – logarithm of *RBER* in Tanzania and LNUG – logarithm of *RBER* in Uganda

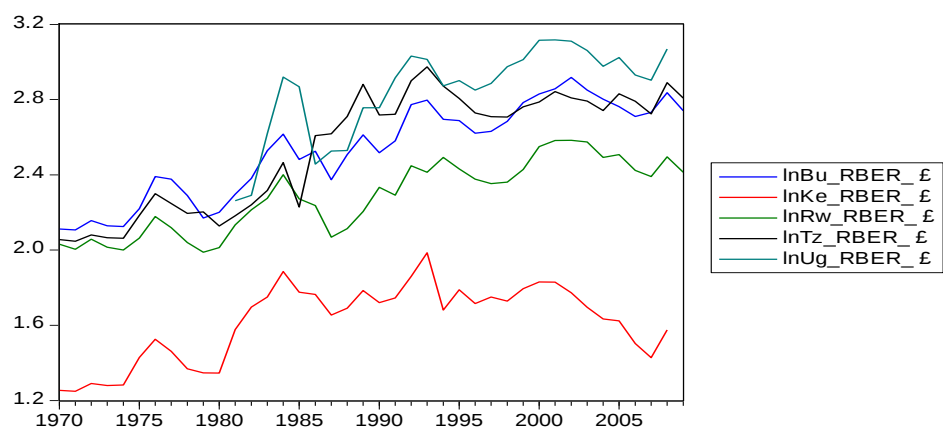
<http://data.un.org/Explorer.aspx?d=ComTrade>



	LNBU	LNKE	LNRW	LNTZ	LNUG
Std. Dev.	0.137471	0.088354	0.115291	0.203923	0.212959
Skewness	0.270127	-0.502645	0.002093	-0.442544	-1.076041
Kurtosis	2.018128	3.613947	2.064015	1.763398	3.131021
Jarque-Bera	2.093245	2.254752	1.460143	3.854279	5.423390
Probability	0.351122	0.323882	0.481875	0.145564	0.066424
Observations	40	39	40	40	28

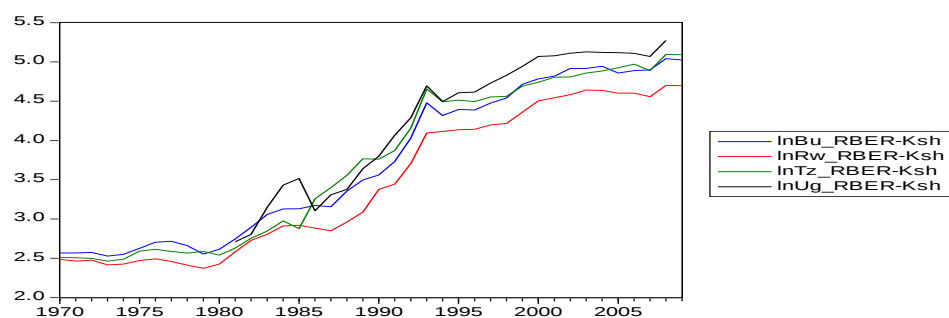
Figure 5: RBER using the USD as the base currency

Figure 5 above gives the real bilateral exchange rates - RBERs of the five EAC countries using the US dollar - USD as a base currency, while Figure 6 shows the RBERs using the British pound sterling – GBP and Figure 7, using the Kenya shilling – Ksh. Of the three, we observe that with the Ksh, all the RBERs move in tandem, gradually increasing over time, as compared to when the USD or the GBP are used, however also noting that the USD provides for a much smoother and constant RBER. By using the graphs below as a primary test, we observe that the currencies of the EAC using the Ksh as a base currency indicate a co-integrating relationship, with similar movements indicating similar reactions to shocks to the system. Still, a co-integration test is required to confirm this conclusion.



	LNBU	LNKE	LNRW	LNTZ	LNUG
Std. Dev.	0.250739	0.202303	0.192839	0.310146	0.240768
Skewness	-0.362486	-0.460694	-0.114339	-0.407870	-1.110183
Kurtosis	1.828011	2.060963	1.661819	1.516501	3.265744
Jarque-Bera	3.165238	2.812463	3.071702	4.777002	5.834081
Probability	0.205436	0.245065	0.215272	0.091767	0.054094
Observations	40	39	40	40	28

Figure 6: RBER using the GBP as the base currency



	LNBU	LNRW	LNTZ	LNUG
Std. Dev.	0.956666	0.902036	1.004172	0.835136
Skewness	0.091268	0.139804	-0.016345	-0.508450
Kurtosis	1.336870	1.311248	1.293704	1.770597
Jarque-Bera	4.665532	4.883439	4.854192	2.969771
Probability	0.097027	0.087011	0.088293	0.226528
Observations	40	40	40	28

Figure 7: RBER using the KSHS as the base currency

3.8.2 Defining Co-integration

Bierens (2000), observes that the basic idea behind co-integration is that if all the components of a vector time series process say Z_t have a unit root, that is, are $I(1)$ processes, this implies the existence of $\xi^T Z_t$ linear combinations without a unit root (Bierens, 2000). These are the linear combinations that may then be interpreted as long term relations between the components of Z_t or in economic terms as static equilibrium relations. This in turn then determines if, there is a stable long-run relationship amongst the macro-economic variables being analysed, in this study, real bilateral exchange rates of the different EAC countries.

According to Enders (1995), co-integration analysis confirms the existence or lack thereof, of long-run ex-post stable relationships between and among the variables in question, making this methodology ideal for the purpose of investigating whether EAC is an OCA (Enders, 1995). Co-integration analysis as observed by the Royal Swedish Academy of Sciences has progressed fairly fast due to its observed usefulness in applied work, especially after the discovery that using standard statistical inference to test for hypothesis about coefficients might lead to spurious results. By using Granger's (1981) formulations, they give a basic explanation of co-integration, summarized below. In their definition, it is noted that although most macro-economic variables tend to be non-stationary at levels, economic theories are generally formulated for variables at levels.

For this reason, as first noted by Granger and Weiss (1983) in the Granger representation theorem, co-integration analysis was formulated for purposes of analysing non-stationary data yet still providing meaningful information, Granger argues that to be meaningful, equations need to be consistent, developing that further to introduce the concept of degree of integration of variables. This is the number of times a time-series variable must be differenced for it to become stationary. That is, a variable that is stationary after differencing (d) times is said to be integrated of order d or $I(d)$.

Given: $y_t = \alpha + \beta x_t + \varepsilon_t$

Where ε_t is white noise with zero mean, and both $y_t \sim I(d)$ and $x_t \sim I(d)$, that is non-stationary, integrated of order (d) , then it follows that, $y_t - \beta x_t \sim I(d)$. It is noted that non-stationary variables dominate stationary $I(0)$ variables, such that, if $x \sim I(d)$ and $z_t \sim I(0)$, then $x_t + z_t \sim I(d)$, but more importantly, there exists an exception in that, if $\varepsilon_t \sim I(0)$, then the linear combination of $y_t - \beta x_t \sim I(0)$, for which there exists only one such combination, implying a unique coefficient β .

Thus in general, if a linear combination in a set of $I(d)$ variables is $I(0)$, it implies the variables are co-integrated. Given this and as previously mentioned, it is necessary for the order of integration of all the variables to be the same before running the co-integration tests, hence we run stationarity tests.

3.8.3 Stationarity

For a time series like in our case *RBER* to qualify as a stationary series, it should satisfy the criteria of having the mean, variance and covariance and autocorrelation all constant over time. i.e.: $E(RBER_t) = \mu$ - have a constant mean.

$Var(RBER_t) = \sigma^2$ – have a constant variance

$Cov(RBER_t, RBER_{t-1}) = \gamma_s$ – constant covariance

The graphs above on first glance confirm that the series are not stationary; they also indicate some volatility, although not very high. In addition, because stationarity of a bilateral real exchange rate would mean that PPP holds between the two countries, we conclude that these pairs of countries are not sufficiently integrated. In Graph 3 however, where we have used Kenya as the base country, we notice an upward trend in the series, with the RBER seemingly moving together. The graphs are not sufficient evidence however of non-stationarity, we thus need formal analysis to aid in knowing the exact nature of the series, including the order of integration. Same order of

integration is contended as important in co-integration analysis, here, a variable is said to be integrated of order ‘ d ’ if it has to be differenced ‘ d ’ times in order to be stationary. To do this formally, we use the Unit Root Test.

3.8.2.1 Unit Root Tests

For purposes of this study, we run the two standard kinds of unit root tests, both the Augmented Dickey-Fuller – ADF test and the Phillips Perron’s – PP test.

ADF Test.

To check for the presence of a unit root, the ADF test uses the t – statistic to test a couple of hypotheses depending on the time series properties including:

- 1.1 When the series is flat with no trend and a potentially slow turn around zero,
- 1.2 When it is flat and potentially slow turning around a non-zero value and
- 1.3 If the series has a trend (downwards or upwards) and is potentially slow-turning around a trend line drawn through the data.

All three scenarios fit our data with the last one especially fitting the RBER using the KSH as the base currency. For all three however, the null hypothesis (H_0) remains the same, with the last case claiming a different alternative hypothesis (H_1)

Given:

$$\Delta rber_t = \alpha_0 + \lambda rber_{t-1} + \beta_2 \Delta rber_{t-1} + \beta_3 \Delta rber_{t-1} + \dots + \varepsilon_t$$

The null hypothesis being tested is:

$$H_0 = \text{there is a unit root: } H_0 = \lambda = 0$$

In this case, the t – statistic $>$ ADF critical value and for the data to become stationary, it is necessary to difference it.

The alternative:

1.1 And 1.2

$H_1 = \text{there is no unit root: } H_1 = \lambda < 0$

Here, the t – statistic $<$ ADF critical value, here the data is stationary and does not require to be differenced.

1.3

$H_1 = \text{the data is trend stationary: } H_1 = \lambda < 0$

Here, the t – statistic $<$ ADF critical value, and for the data to be stationary, there is need to introduce a time trend, differencing does not help.

PP Test

PP test uses non-parametric corrections based on estimates of the long-run variance of time series and runs a formal test for a unit root in the presence of a structural change at the time period, $t = \tau + 1$. This test also uses a t-statistic and just like the ADF, the PP test also tests for unit roots under different series properties.

2.1. The first form assumes that there is a zero drift unit root process underlying the observed time series, RBER in this case.

2.2. Where there is a constant, but also the tests assumes that a zero drift unit root process underlies the observed time series.

2.3. Here the test assumes that a unit root process with arbitrary drift underlies the observed time series.

As shown in the table below, all three data sets show results that portray presence of unit roots at level but then become stationary after first difference. The individual series unit roots are not presented here for simplicity purposes. All series are however found to be I(1) processes.

Table 6: Group levels and first differenced unit root test

Group unit root test: Summary: Sample: 1970 2009									
USD: Series: LNBU, LNKE, LNRW, LNTZ, LNUG: Automatic selection of maximum lags based on SIC: 0 to 2									
Exogenous variables: Individual effects: Newey-West bandwidth selection using Bartlett kernel									
Null: Unit root (assumes individual unit root process)									
Levels					First difference				Obs
Method	No Trend		Trend		No Trend		Trend		
	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**	
ADF - Fisher Chi-square	7.52434	0.6752	13.637	0.1902	104.912	0	84.4412	0	170
PP - Fisher Chi-square	8.72114	0.5588	9.10831	0.5219	117.92	0	103.729	0	177
GBP: Series: LNBU, LNKE, LNRW, LNTZ, LNUG: Automatic selection of lags based on SIC: 0 to 6									
Null: Unit root (assumes individual unit root process)									
	No Trend		Trend		No Trend		Trend		
Method	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**	
ADF - Fisher Chi-square	11.7426	0.3027	20.7209	0.0231	102.273	0	89.9357	0	171
PP - Fisher Chi-square	11.1258	0.3478	11.0641	0.3525	116.036	0	132.394	0	177
KSHs: Series: LNBU, LNRW, LNTZ, LNUG: Automatic selection of lags based on SIC: 0 to 1									
Null: Unit root (assumes individual unit root process)									
	No Trend		Trend		No Trend		Trend		
Method	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**	
ADF - Fisher Chi-square	2.0467	0.9795	3.82223	0.8728	65.0947	0	51.2118	0	140
PP - Fisher Chi-square	2.10613	0.9776	3.92563	0.8638	64.7832	0	50.9196	0	140
** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.									

3.8.4 Co-integration Tests

Given that results show that the variables only need to be differenced once and all the series become stationary, then the times series is considered to be integrated of order one – $I(1)$. There are two different methods of running co-integration tests; the first approach was introduced by Granger (1981), later expounded on by Engle-Granger (1987) as a two-step procedure. Later, this was further expanded by Johansen (1988) and again later by Johansen and Juselius (1990), introducing the Maximum likelihood - ML procedure.

For tests that include a sample of more than two times series variables, the Johansen and Juselius ML technique based on the error-correction representation of the Gaussian Vector Autoregressive – VAR models, is preferred due to its ability to account for both the short-run and the long-run dynamics of the data (Johansen, 1990). In addition, the

test also provides estimates of all the co-integrating vectors and tests statistics for their number (Johnson, 1990) and (Camarero, 1996).

Also, the JJ-ML approach is preferred as unlike the Engle-Granger (1987) technique, it does not restrict the endogenous variables or ignore the possibility of more than one co-integrating vector, especially given a model with more than two variables. In this approach, all the variables are assumed explicitly endogenous, ensuring no arbitrary normalization has to be made without testing. Additionally, it involves a single step procedure, less complicated than the two-step Engle-Granger method, by relaxing the assumption of a unique co-integrating vector and taking into account the error structure of the underlying process.

The model proposed by Johansen (1988) is a q -variate unit root process Z_t , written as:

$$\Delta Z_t = \Pi_0 d_t + \sum_{j=1}^{p-1} \Pi_j \Delta Z_{t-j} + \gamma \beta^T Z_{t-p} + \varepsilon$$

$$\Delta Z_t = Z_t - Z_{t-1}$$

Where:

d_t Is a vector of constant and or seasonal dummy variables, adding up to zero

$\Pi_j = q \times q$; $j > 0$ is a parameter matrix

$\beta = q \times r$ and $\gamma = q \times r$ are parameter matrices of full column rank, where r is the number of liner independent co-integrating vectors, or the number of columns of β . All matrices are estimated using OLS – Ordinary Least Squares, as described by Johansen, (1988). $\varepsilon_t \sim i.i.d. N_q(0, \Sigma)$

While the determinant of $(I - \sum_{j=1}^{p-1} \Pi_j L^j)$ has all the roots outside the unit circle.

If $r = q$ then $\gamma \beta^T$ and if $d_t = 1$, then the above model will generate a stationary AR (p) process Z_t . The Johansen ML procedure suggests two types of tests to determine number of co-integrating vectors which both construct a likelihood ratio test, testing the same null hypotheses against different alternative hypotheses (Johansen, 1988).

3.8.3.1 Maximum Eigen Value hypothesis:

The 1st – The lambda-max test (named so because the test statistic involved is a maximum generalized Eigenvalue), – tests the null hypothesis that there are; r co-integrated vectors for $r = 0, 1 \dots q-1$ against the alternative that there are; $r+1$ co-integrating vectors:

$H_0 = r$ co integrated vectors where $r = 0, 1, \dots, q-1$

$H_1 = r + 1$ co-integrating vectors

3.8.3.2 The Trace test hypothesis:

The 2nd – The trace test (named so because the test statistic involved is the trace; that is, the sum of the diagonal elements, of a diagonal matrix of generalized Eigen values), – tests the null hypothesis that there are r co-integrating vectors for $r = 0, 1 \dots q-1$ against the alternative that there are q co-integrating vectors:

$H_0 = r$ co integrated vectors where $r = 0, 1, \dots, q-1$

$H_1 = q$ co-integrating vectors

The Johansen's co-integration test is none-the-less very sensitive to lag length, hence to ensure there is no lag misspecification, for the co-integration test, we first determine the preferable order of the lag by first using the un-differenced series to estimate a suitable VAR Model and then with the help of Eviews, employing all of the: LR – Likelihood Ratio, FPE – Final Prediction Error, AIC – Akaike Information Criterion, SC – Schwarz Information Criterion and HQ – Hannan-Quinn Information Criterion tests each at 5% level, to determine the correct lag structure. As shown below in Table 7, these tests determine 1 lag for the RBER-USD series, 2 lags for the RBER-GBP series and again, 1 lag for the RBER-KSHs series. These are the lag structures we use to carry out the co-integration analysis.

Table 7: VAR Lag Order Selection Criteria

Sample: 1970 2009; Exogenous variables: C; Included observations: 26 – RBER-USD						
Endogenous variables: LNBU; LNKE; LNRW; LNTZ; LNUG.						
Lag	Log-L	LR	FPE	AIC	SC	HQ
0	129.18	NA	4.89E-11	-9.551983	-9.310041	-9.482312
1	199.58	108.3157*	1.55e-12*	-13.04469	-11.59304*	-12.62667*
2	226.91	31.53697	1.65E-12	-13.22408*	-10.56272	-12.4577
RBER-GBP						
Endogenous variables: LNBU; LNKE; LNRW; LNTZ; LNUG.						
Lag	Log-L	LR	FPE	AIC	SC	HQ
0	120.27	NA	9.70E-11	-8.866694	-8.624752	-8.797024
1	178.82	90.07686	7.66E-12	-11.44746	-9.995810*	-11.02944
2	215.64	42.48337*	3.93e-12*	-12.35661*	-9.69525	-11.59023*
RBER-KSHs						
Endogenous variables: LNBU; LNRW; LNTZ; LNUG.						
Lag	Log-L	LR	FPE	AIC	SC	HQ
0	56.481	NA	2.07E-07	-4.03699	-3.843437	-3.981254
1	129.77	118.3925*	2.58e-09*	-8.443960*	-7.476194*	-8.165279*
2	141.95	15.93178	3.82E-09	-8.150355	-6.408375	-7.648727
*Indicates lag order selected by the criterion						

Table 8, below shows the results obtained from the application of the Johansen co-integration test. We note that the results show presence of long-run relationships, within the RBER series, implying that the economies thereof are sufficiently integrated. Both the Trace statistic and Eigen-value tests reject the null hypothesis of $r = 0$ (no co-integrating vectors) against the alternative hypothesis $r > 0$. That is, there is at-least one or more co-integrating vectors.

These tests thus show, while we can reject the null of no co-integrating vectors, we cannot accept the null of $r \leq 1$ against the alternative of $r > 1$, (except in the RBER-USD series) as the rest show up to four co-integrating vectors, at 5% level of significance. However, for purposes of the Johansen's co-integration estimation technique, Turner (2009) has shown that confusion over specification of deterministic terms that are included in the VECM has led to application of incorrect critical values, as used in certain econometric software, including Eviews (applied in this study) which

often leads to wrongly either accepting or rejecting the null hypothesis of no co-integration. To avoid a similar error, we apply the critical values derived by Turner, (Turner, 2009).

These lead us to confidently conclude that there does indeed exist, co-integration amongst the RBERs of the EAC and that they thus form the basis of a possibly successful MU as their RBERs converge in the long-run. The JJ co-integration tests clearly show that the null hypothesis of no co-integration is strongly rejected in all three cases using the USD, GBP and KSHs as base currencies. As observed in Fig 7 especially, the currencies tend to move in tandem in the long-run, providing us with the supportive evidence for the validity of GPPP and the possibilities of a successful OCA in the East African region. However, the presence of these co-integrating relationships implies that the series have an error correction representation, which requires us to apply an error correction model – ECM, (Engle, 1987).

The application of an ECM by running a VECM model in addition further aids us in establishing and confirming the long-run equilibrium relationships implied by the co-integration tests, including also giving us insights into the short-run mechanisms and behaviours of the RBERs. To do this, we run a VECM – Vector Error Correction model.

Table 8: Johansen-Juselius co-integration test

RBER using USD as base currency											
Series: LNBU; LNKE; LNRW; LNTZ; LNUG: Sample (adjusted): 1984 2008: Included obs. 25											
Trend assumption: Linear deterministic trend: Sample (adjusted): 1984 2008: Included obs. 25											
Unrestricted Co-integration Rank Test (Trace)						Unrestricted Co-integration Rank Test (Maximum Eigen-value)					
H0	H1	Eigen-value	Trace - Statistic	0.05 Critical Value	Prob.**	H0	H1	Eigen - value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
r = 0	r = 1	0.803	82.3363*	69.819	0.0036	r = 0	r = 1	0.803	42.2752*	33.877	0.0040
r ≤ 1	r = 2	0.523	40.0611	47.856	0.2203	r ≤ 1	r = 2	0.523	19.2589	27.584	0.3948
r ≤ 2	r = 3	0.409	20.8022	29.797	0.3701	r ≤ 2	r = 3	0.409	13.6676	21.132	0.3929
r ≤ 3	r = 4	0.229	7.13454	15.495	0.5621	r ≤ 3	r = 4	0.229	6.75385	14.265	0.5187
r ≤ 4	r = 5	0.015	0.38069	3.8415	0.5372	r ≤ 4	r = 5	0.015	0.38069	3.8415	0.5372
Trace test indicates 1 co-integrating eqn.(s) at the 0.05 level						Max-Eigen-value test indicates 1 co-integrating eqn.(s) at the 0.05 level					
RBER using GBP as base currency											
Series: LNBU; LNKE; LNRW; LNTZ; LNUG: Sample (adjusted): 1984 2008: Included obs. 25											
Trend assumption: Linear deterministic trend: Lags interval (in first differences): 1 to 2											
Unrestricted Co-integration Rank Test (Trace)						Unrestricted Co-integration Rank Test (Maximum Eigen-value)					
H0	H1	Eigen - value	Trace - Statistic	0.05 Critical Value	Prob.**	H0	H1	Eigen - value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
r = 0	r = 1	0.895	142.925*	69.819	0.0000	r = 0	r = 1	0.895	56.2605*	33.877	0.0000
r ≤ 1	r = 2	0.846	86.6646*	47.856	0.0000	r ≤ 1	r = 2	0.846	46.6920*	27.584	0.0001
r ≤ 2	r = 3	0.603	39.9726*	29.797	0.0024	r ≤ 2	r = 3	0.603	23.1198*	21.132	0.0259
r ≤ 3	r = 4	0.414	16.8528*	15.495	0.0310	r ≤ 3	r = 4	0.414	13.3641	14.265	0.0690
r ≤ 4	r = 5	0.130	3.48878	3.8415	0.0618	r ≤ 4	r = 5	0.130	3.48878	3.8415	0.0618
Trace test indicates 4 co-integrating eqn.(s) at the 0.05 level						Max-Eigen-value test indicates 3 co-integrating eqn.(s) at the 0.05 level					
RBER using KSHs as base currency											
Series: LNBU; LNRW; LNTZ; LNUG: Sample (adjusted): 1984 2008: Included obs. 26											
Trend assumption: Linear deterministic trend: Lags interval (in first differences): 1 to 1											
Unrestricted Co-integration Rank Test (Trace)						Unrestricted Co-integration Rank Test (Maximum Eigen-value)					
H0	H1	Eigen - value	Trace - Statistic	0.05 Critical Value	Prob.**	H0	H1	Eigen - value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
r = 0	r = 1	0.960895	141.2261*	47.85613	0.0000	r = 0	r = 1	0.960895	77.79613*	27.58434	0.0000
r ≤ 1	r = 2	0.833169	63.42994*	29.79707	0.0000	r ≤ 1	r = 2	0.833169	42.97861*	21.13162	0.0000
r ≤ 2	r = 3	0.405430	20.45133*	15.49471	0.0082	r ≤ 2	r = 3	0.405430	12.47801	14.2646	0.0940
r ≤ 3	r = 4	0.282672	7.973317*	3.841466	0.0047	r ≤ 3	r = 4	0.282672	7.973317	3.841466	0.0047
Trace test indicates 4 co-integrating eqn.(s) at the 0.05 level						Max-Eigen-value test indicates 2 co-integrating eqn.(s) at the 0.05 level					
* Denotes rejection of the hypothesis at the 0.05 level											

3.8.5 VECM - Vector Error Correction model

A VECM is a restricted VAR – Vector Auto Regressive model that models the short run dynamics of variables given the influences by long-run deviations from long run equilibrium. According to Engle and Granger (1987), a VECM run in the presence of a co-integrated series already satisfies all the classical OLS assumptions like, normal homoscedastic residuals, no serial correlation, minimum multi-co-linearity, with the variables in the model likely to exhibit the appropriate signs. That is, iff, the series in question are co-integrated then, the possibility of the estimated regression being spurious due to errors such as omitted variable bias, autocorrelation and endogeneity is ruled out. As shown in Bonham et. al., (2009) among others, a general order p VEC model applied in Johansen's test can be represented as:

$$\Delta rber_t = \Pi rber_{t-1} + \Gamma_1 \Delta rber_{t-1} + \dots + \Delta_{p-1} rber_{t-p+1} + \varepsilon_t \quad (3.5)$$

And:

$$t \in Z$$

Such that:

$rber_t$ is a $k \times 1$ random vector

The $rber$ series is a VAR(p) process

Whilst Π, Γ_1 and Γ_k are $k \times k$ fixed coefficient matrices and

Π matrix has rank $r \leq k$ and $\Pi = \alpha\beta^t$

Where α is a $k \times r$ loading matrix and β is an $r \times k$ co-integrating matrix.

ε_t is a $k \times 1$ white noise

By finding the rank of co-integration for the VECM, we also automatically find the rank of the co-integrating vectors. In the results obtained for the VECM below, we apply both the number of lags and co-integrating vectors specified above in the co-integration and lag order selection tests.

Table 9: Vector Error Correction Results

Vector Error Correction Estimates							
Sample (adjusted): 1983 2008: Convergence achieved after 1 iteration							
Standard errors in () & t-statistics in []							
Co-integration Restrictions:							
B(1,2)=1,		B(1,4)=1, B(2,3)=1, B(3,5)=1,			B(1,1)=1, B(2,2)=1		
RBER_USD: 26 obs.		RBER_GBP: 25 obs.			RBER_KSHS: 24 obs.		
Co-integrating Eq.	CointEq1	CointEq1	CointEq2	CointEq3	CointEq1	CointEq2	
LNBU (-1)	2.885788 (-0.68373) [4.22064]	0.038675	-0.38337	-0.63487	1	-0.45828	
LNKE (-1)	1	0.526042	-0.01599	0.086797			
LNRW (-1)	-3.251516 (-0.5862) [-5.54681]	0.032323	1	-0.62796	-0.49399	1	
LNTZ (-1)	-0.607325 (-0.16976) [-3.57745]	1	0.034829	-0.00188	0.048432	-0.04191	
LNUG (-1)	0.738053 (-0.21695) [3.40190]	-0.001333	-0.47958	1	-0.5394	-0.46306	
C	-2.336861	-3.811524	-0.04199	0.164887	-0.09473	0.239696	
RBER_USD							
Error Correction:	D(LNBU)	D(LNKE)	D(LNRW)	D(LNTZ)	D(LNUG)		
CointEq1	-0.094606 (-0.07967) [-1.18747]	-0.14541 (-0.07671) [-1.89559]	*0.13347 (-0.06376) [2.09318]	0.092416 (-0.13581) [0.68050]	*-0.565902 (-0.09811) [-5.76824]		
	RBER_GBP						
	Error Correction:	D(LNBU)	D(LNKE)	D(LNRW)	D(LNTZ)	D(LNUG)	
CointEq1	-0.212487 (-0.11644) [-1.82483]	*-0.3119 (-0.118) [-2.64321]	*-0.137223 (-0.0579) [-2.37007]	*-0.609613 (-0.16198) [-3.76349]	-0.212362 (-0.17987) [-1.18062]		
	CointEq2	-0.401912 (-0.73076) [-0.54999]	0.150092 (-0.74054) [0.20268]	*-2.346554 (-0.36335) [-6.45802]	-0.749594 (-1.01655) [-0.73739]	-1.341483 (-1.12884) [-1.18837]	
		CointEq3	0.446427 (-0.47632) [0.93723]	0.622477 (-0.4827) [1.28958]	*-1.031298 (-0.23684) [-4.35440]	0.517061 (-0.66261) [0.78035]	*-1.419857 (-0.7358) [-1.92969]
RBER_KSHS							
Error Correction:	D(LNBU)		D(LNRW)	D(LNTZ)	D(LNUG)		
CointEq1	-1.111713 (-1.26437) [-0.87926]	0.724849 (-0.71777) [1.00986]	-2.265139 (-1.5195) [-1.49071]	2.419491 (-1.91817) [1.26135]			
	CointEq2	*-3.265243 (-1.44701) [-2.25654]	*-2.71192 (-0.82146) [-3.30135]	-3.201312 (-1.739) [-1.84089]	-1.525116 (-2.19526) [-0.69473]		

The above VECM, Table 9, shows the co-integration equations for all three RBER models, using USD, GBP and KSHS as base currencies. The first part under co-integration restrictions gives us the coefficients on the co-integrating vectors for the different co-integration equations. We expect these coefficients to be negative and significant. Most of them are. Below that, are the adjustment coefficients, the error correction terms (ECMs), these should be mostly negative and significantly different from zero. We find that most are. For example, as seen in the first model, RBER_USD; Burundi (LNBU) has an ecm of -0.212, Kenya (LNKE) has -0.145, and Uganda (LNUG) has -0.565, which are negative and as expected, significantly different from zero, although that for Burundi is not significant. We also observe a non-significant and positive adjustment coefficient for Tanzania (LNTZ) and a positive but significant one for Rwanda (LNRW). In addition, the t-statistics on the error correction term vary with the majority being significant which shows support of the co-integration results. These are marked with an asterisk.

In addition, these adjustment coefficients indicate the speed at which various RBERs in the system adjust towards their long-run equilibrium in response to any shock or deviation from GPPP. In the first model, using USD as a base currency, the Ugandan (LNUG) currency has the most rapid rate of adjustment at 56.5%, while that for Tanzania (LNTZ) though positive and not significant is the lowest one at 9.2% a year. In the other two models, RBER_GBP and RBER_KSHs, we observe a mixture of both negative and (non)significant coefficients and positive but not significant ones. We also note that for the case where the base currency is Ksh, the rate of adjustment is two and sometimes three times more rapid, explosive actually, implying that the currencies are already moving in tandem and that the time it takes for readjustment upon experiencing a shock is somewhat non-existent.

The very diverse nature of these exchange rates also raise the concern of how they each react to variations due to different shocks on either one of them. That is a shock on the

Burundi exchange rates might induce a different change to the real bilateral exchange rate of Uganda from that which is induced to Tanzania's real bilateral exchange rates. To determine these differences and identify which ones are of particular significance, we generate impulse responses, as reported in the tables below.

Below, Figure 8 shows the impact resulting on real bilateral exchange rates (using the USD as the base currency) should there be a shock to either one of the other countries exchange rates, we observe that if there is a shock to either Rwandese, Ugandan, or Tanzanian RBER, this would initially cause a rise in the Burundian exchange rates whilst both Kenyan and own shocks would result in an initial decline. None of these changes persist, and there is a levelling off by the fourth period, showing an overall quite fast short-run equilibrium adjustment process. However, though the adjustments are quick in all cases, Kenya shows an exception depicted in the second panel. In this panel, we observe that shocks to other exchange rates induce a series of initial raises and subsequent declines in the Kenyan exchange rates, and these changes continue to oscillate before levelling off towards the end of the periods 9 – 10, which implies that shocks to Kenyan exchange rates take longer to stabilize after initial shocks to own and partner country exchange rates.

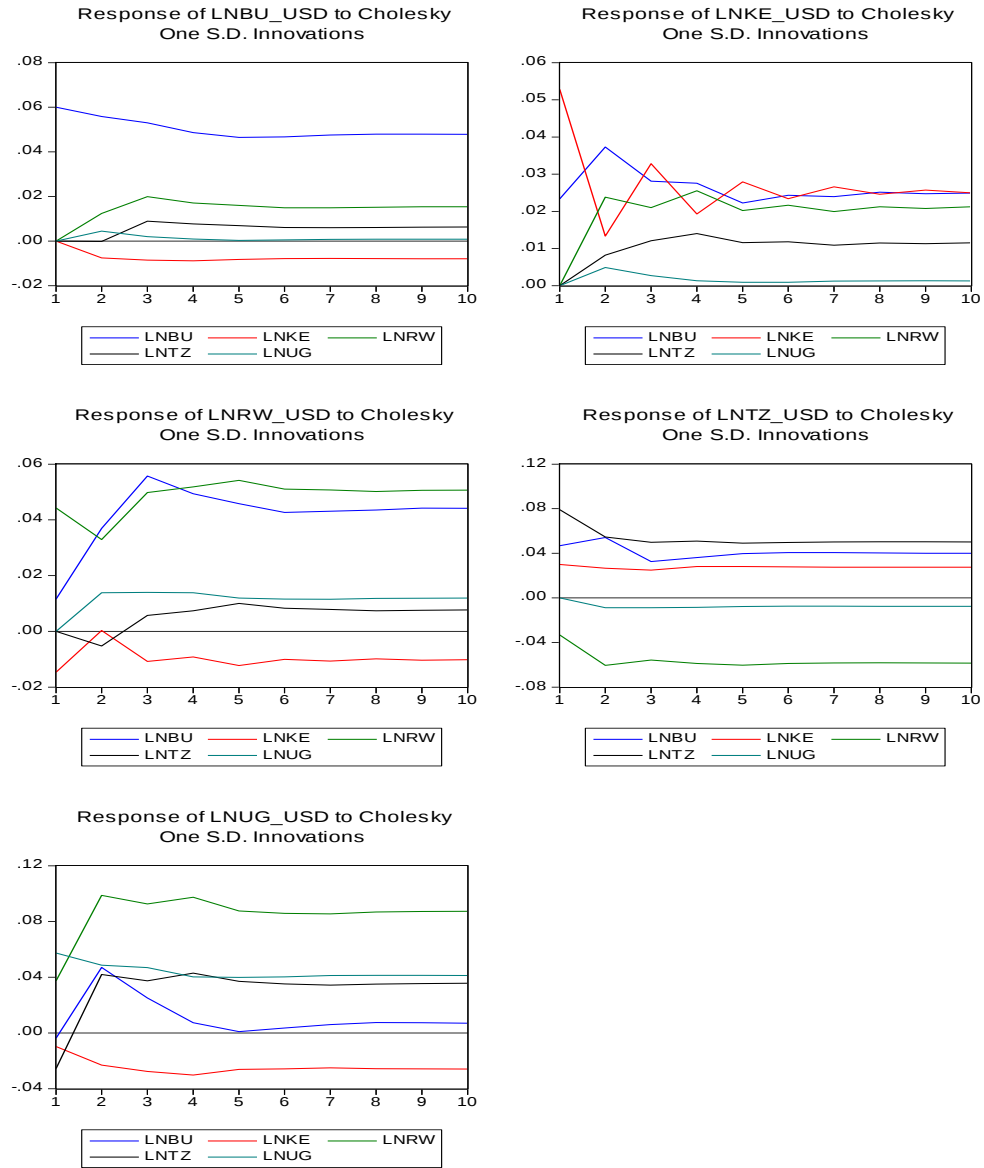


Figure 8: Impulse Response Functions for RBER_USD

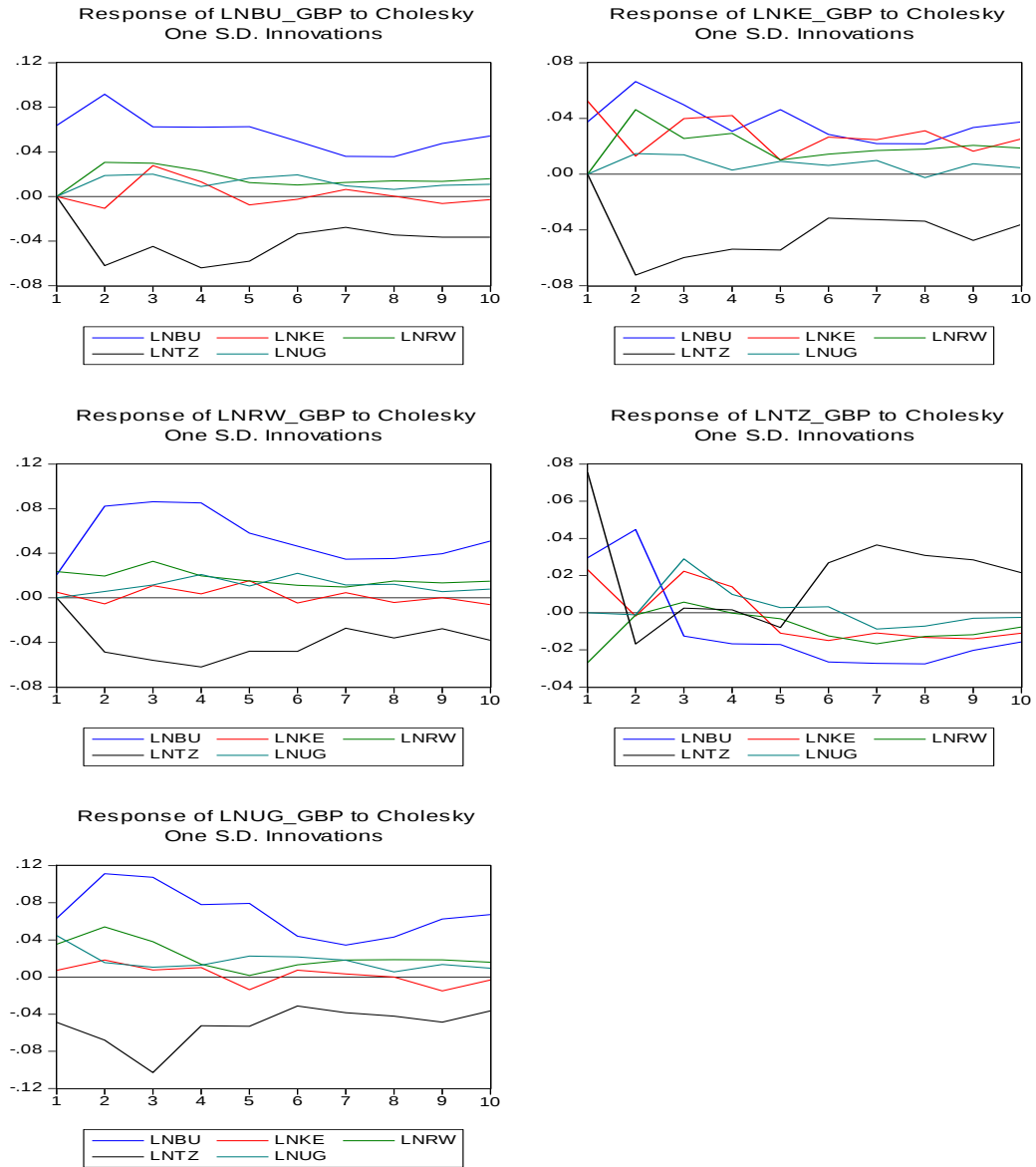


Figure 9: Impulse Response Functions for RBER_GBP

Figure 9 shows the impact resulting on real bilateral exchange rates (using the GBP as the base currency) should there be a shock to either one of the other countries exchange rates. This RBERs are rather volatile and we observe that a shock to any one of the partner countries explains the differences in the RBERs of other countries on a range

of negative 8% to positive 8%, this is the case for all through the periods, except in the case of shocks to the Ugandan EXR, where Tanzania is affected by more than 10%, suggesting that short term adjustments to equilibrium are not as fast as the case of using the USD as a base currency.

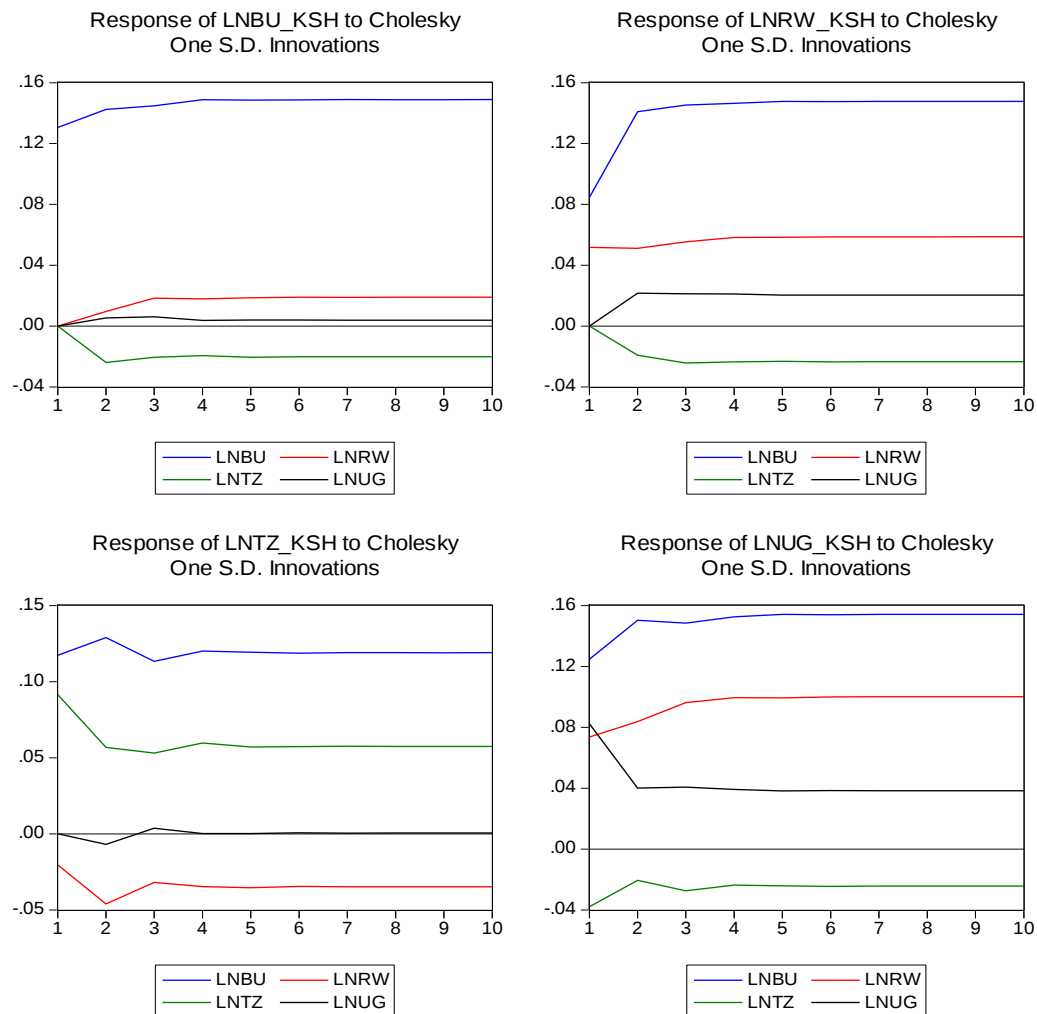


Figure 10: Impulse Response Functions for RBER_KSHS

Figure 10 on the other hand also in line with the other two, shows the impact resulting on real bilateral exchange rates (using the KSHs as the base currency) should there be

a shock to either one of the other countries exchange rates. In this instance, we notice a pretty quick return to equilibrium should there be a shock to any one of the partner country exchange rates. All adjustments level off by the second period and stay stable through the periods following.

3.9 Conclusions

This chapter has one main objective, to confirm whether or not, the EAC, prior to sufficiently fulfilling the requirements of forming a monetary union as stipulated in the OCA theory, still qualifies as a potentially successful OCA with the potential to fulfil these requirements *ex-post*, as suggested by Frankel and Rose (1998) in their endogenous OCA theory. We do this by applying the GPPP methodology, first put forth by Enders and Hurn (1994).

To effectively apply this test, we follow the Johansen's co-integration technique with both the Johansen trace and maximum Eigen value statistic test being used. The co-integration analysis is employed on three different models, each using a different base currency, (USD, GBP, and the KSHS) over a 39 year period, (1970 – 2009) and examines the joint behaviour of the exchange rates for the EAC countries. Both test results are encouraging and confirm evidence of long run equilibrium in the RBERs of the EAC, specifically rejecting the null hypothesis of no co-integration as required by the GPPP approach. This effectively implies that the EAC does indeed constitute an OCA; as the real bilateral exchange rates are found to have long run equilibrium relationships and can thus go on to fulfil the requirements of the OCA theory *ex-post*.

The study also applies a VECM and derives impulse response functions in order to see how fast the RBERs adjust back to equilibrium upon introduction of shocks to the system, and we find that the short-run readjustments are also very quick and remain stable, in both the cases where the USD and the KSHs are base currencies. The GBP is found to have rather more volatile cycles and deviations from equilibrium for a longer

time period, however, in the co-integration analysis, these exchange rates also find long run equilibrium suggesting that the deviations from GPPP do eventually converge to a long-run equilibrium, just takes longer.

This analysis sought to find out if there were any co-integrating relationships among the RBERs of the EAC countries. All three base currencies confirm that in deed, the EAC countries have these. Because the region is not open to dollarization, it is especially useful to note that by using the strongest currency in the region at the moment, if the system suffers macro-economic shocks, the reversion back to long-run equilibrium is fairly fast. However, if the region were open to adoption of a foreign currency, between the USD and the GBP, the results show that the USD provides for a smoother transition, and would thus be the preferred choice.

From the results obtained, and from the OCA endogeneity theory, we thus argue that by forming the monetary union, the EAC are setting up a platform for further enhancing integration within the region. As observed from previous results, further and deeper integration would help increase both the volume and value of trade amongst partner countries in the region. As trade has been proffered as a means to encourage both economic growth and development, especially in sub-Saharan and mostly agrarian Africa, then it goes to say that all the help provided will be essential towards the achievement of these goals and formation of feasible and potentially successful MUs is just but one of them. This is further supported by the OCA theory, where expansion of trade is among the results rather than the prerequisites of a MU.

It is however acknowledged that full convergence of economic systems will not automatically result from the formation of a stable MU, even as more sectors of the economies come together and integrate, such as the financial and monetary sectors, further and deeper integration would still require the merging of political and foreign processes, forming similar policies on all fronts which might take time. Still, finances are noted as a good place to start, (Cecchetti, 2010).

Within developing countries especially, most tend to significantly rely on exports to promote growth, via generation of much needed forex earnings especially for the financing of imports (as most intermediate goods and indeed final products too are imported). According to the AU, one of the key incentives for the formation of a monetary union within the continent is the benefits this will accrue to trade as not only will financial and exchange rate markets harmonise, but there will be a huge reduction in transaction costs that can also hamper. As shown extensively in literature, increasing trade has been noted to result in both direct and indirect economic growth and development via key macroeconomic variables such as domestic demand, investments and national income.

The research carried out in the next section seeks to verify whether these observations hold within the context of small and developing countries within the continent and applies a macro-econometric model to the Kenyan economy as a case study. That is, the next section investigates whether indeed trade can be considered a key driving force for the economic growth and development of a small and developing economy such as that used in the research - Kenya.

Chapter 4

KENYAN EXPORT DEMAND FUNCTION – IN LIGHT OF A MINI MACRO-MODEL

Kenya is one among many small and developing economies within Sub-Saharan Africa (SSA) that relies on export revenues for purposes of advancing economic growth and development. Senhadji et. al., (1992) shows that for the case of developing countries especially, the effect of exports towards facilitating economic growth is higher the greater the income elasticity of the export demand. In addition, the higher the price elasticity, the more competitive the international market for exports from that particular country is (Senhadji-Semlali, 1992). This suggests that such an economy would benefit from a real devaluation, towards promoting export revenues, and this section seeks to find out if Kenya is one such economy.

4.1 Kenya: Economics, Politics and Society – A Brief Progression

The economic demographics of Kenya show that although hardly the highest contributor to total GDP, almost 80 per-cent of the population is actively engaged in agriculture and agricultural activities, especially subsistence farming. Among the main products include: major cash crops such as coffee, tea, pyrethrum and a variety of horticultural produce including fruits and flowers; food products – maize, sorghum, rice and sugarcane; livestock and livestock products – beef, fish, poultry, dairy products, and eggs. Due to rapid population growth, food output is no longer limited to farmlands in highlands, today; crop production has been extended into marginal land. Given its low income and developing economy status, Kenyan industries are not nearly as advanced as those found in other developing countries outside Africa such as Asia only hosting small scale industries that process food such as cereals and dairy products in addition to tanneries, a fairly extensive clothing industry, construction and building

materials industry where steel, aluminium and other products such as bricks are produced and a well-established petroleum refinery.

The country also partakes of mining, producing minerals such as salt, fluorspar, limestone and soda ash. Like many SSA countries, keen to establish independent growth and development agendas, in an attempt to establish sustainable economic growth ensuring employment and general stability, the Kenyan government tried to promote diversification in the economy by encouraging both public and private investment opportunities especially in the creation of small and medium sized enterprises soon after independence, between 1965 and 1973, during which time, Kenya's GDP grew at an average annual rate of 6.6 per cent, a growth that also entailed low inflation rates. These attempts were however frustrated by the oil crisis in the mid-1970s and further worsened by periodic droughts, the worst of which was experienced between late 1983 through 1984, radically reversing the attained and envisioned growth prospects which at the time largely relied upon subsistence agricultural farming practised on small, mostly family-owned farms, divided up from the formerly European-owned large farms. This resulted in declined GDP growth rates and high and increasing inflation rates.

Following these, like many other SSAs, in the mid-1980s, Kenya embraced and applied structural adjustment programs (SAPs)⁴⁹ which also incidentally shaped up its initial stages of opening up to trade. The World Bank coming to the rescue, applied policy based lending to Kenya during this period. Swamy (1994), however notes that this process, although leading to great trade liberalization and even export development,

⁴⁹ See (Elbadawi, 1992) (Mosley, 1994) and (Lipumba, 1995) on 'The impact of Structural Adjustment Programs – SAPs on the performance of SSA.'

encouraged the postponement of adjustments and critical reforms within the economic structures, hence implying that any advancement would not have taken place without the steady Bank lending scheme (Swamy, 1994).

In 1997 however, the IMF suspended SAPs due to wide spread corruption that frustrated any efforts to move away from heavy reliance upon production, both for exports and domestic consumption, of primary commodities and apparent lack of government cooperation in advancing the proposed corrective policies. IMF resumed donor funding briefly between 2000 and 2001 to help the economy due to effects of prolonged and severe draughts beginning in 1999, but again stopped in 2001 as the government in place concentrated more efforts in preparing for the 2002 elections and did nothing to root out corruption, while also leading to decreased investor confidence due to political infighting. After the elections, a new regime in place, donor support and investor confidence was re-booted as progress towards reducing corruption was evidenced. This trend continued, reflecting in GDP growth rates of around 6 per cent in the years between 2004 and 2007, a significant increase from an average 1.1 per cent between 1999 and 2002.

4.2 The Working Institutions

Kenya is a significantly active economy within the EAC, in both trade and finance and in line with set plans, will be a participating member of a Monetary Union – (MU) by 2012. Joining a MU is only one among many decisions that can cause temporary and in some cases permanent shocks within the economic, social and political frameworks of an economy, resulting in ripples and far reaching waves that then go on to affect the system so significantly and specifically, that individual citizens may also be affected.

As previously mentioned Kenya's economy is susceptible to varying periodic shocks and is especially vulnerable due to its significant reliance upon a limited variety of

primary product export proceeds that often fetch frequently fluctuating world prices. Among these critical products that constitute Kenya's chief exports are tea and coffee. In addition, Kenya also relies upon the very seasonal, yet also very significant export earning tourism industry, implying also that even without fluctuating world prices, the economic welfare of the world outside would still impact on domestic well-being as the same shocks can be reflected indirectly on the economy as the rest of the world experiences booms and troughs in economic cycles, a notable example being the recent recessionary phase.

Today, in its development pursuits all the same, although still quite reliant and focused on agriculture and related activities, Kenya has managed to attract a significant amount of foreign and domestic investments that has led to creation of well-established enterprises in many sectors of the economy especially in the services sector and also in the manufacturing and research and development fields. In fact, by itself, the services sector accounts for a rather large proportion of total GDP (64 per cent in 2004), followed by industries with significantly low contribution by the agricultural sector, which as of 2004, contributed 16.3 per cent to total GDP. Unfortunately however, even with these kinds of developments, almost 50 years after independence, Kenya is still ranked as a developing country experiencing rampant poverty, escalated by high population growth rates that only serve to further exacerbate unemployment in addition to persistently coming up short in the balance of trade payments. For example, in 1980 Kenyan net exports of goods and services totalled USD 1.2 billion while imports totalled USD 2.3 billion, in 2007, net exports of goods and services totalled USD 22.8 billion while imports were USD 29.0 billion.

Following this, we note that, the main purpose of macro modelling is to provide the general framework via which policy makers are able to assess, predict and single out different impacts of alternative policies; fiscal or monetary, by simulating and monitoring possible shocks on the respective economies' key macro-economic

variables. In recognition, Shourie (1972) finds that the need to accurately forecast varying policy effects whether short term or long term, is especially important in under developed economies as national planning agencies would prefer to examine prevalent and possible problems of their economies in a long-term context, to achieve this, they must develop methods that will help predict long term outcomes given current developments. Thus far, this has been successfully accomplished via the compilation and solution of said macro-models. Shourie continues on to warn that for this to work the models must be correctly specified and there must also exist a sufficient sample size that is not encumbered with multi-co linearity (Shourie, 1972).

4.3 Macro Models

'There is no alternative to the use of models of the full economy when seeking answers to policy questions. No non-model shortcuts are available, despite the appeal of back-of-the-envelope methods.' (Westaway, 1995)

'...the process of macro-econometric modelling is multidimensional, both an art and a science.' (Valadkhani, 2005)

Macroeconomic models are intrinsically and broadly also defined as a set of behavioural equations, as well as institutional and definitional relationships, representing the structure and operations of an economy and are in principle based on the observed as well as predicted behaviour of individual economic agents upon the introduction of shocks (such as introducing policy changes), to the system. Besides using macro-economic models for purposes of analysing the effects of policies, they are also useful for forecasting and have been in use since late 1930s,⁵⁰ with pioneering works such as that by Tinbergen (1972) standing out, with the formulation of a macroeconomic model for the Netherlands / Holland to assist the implementation of

⁵⁰ See (Diebold, 1998) and <http://cowles.econ.yale.edu> for more details on the evolution of macro modelling and Bodkin, Klein and (Bodkin, 1986a) (Bodkin, 1986b) and (Bodkin, 1991) for a comprehensive literature review of Macro Econometric Models

economic policies by the Dutch Central Planning Bureau (Valadkhani, 2005)⁵¹. From literature, we note that there exists an extensive review of macro-economic models, bringing to light the following major categories: Dynamic Stochastic General Equilibrium (DSGE) models; Macro-Econometric Models (MEMs) and Computable General Equilibrium Models (CGEs) (Khayum, 1991).

4.3.1 DSGEs, CGEs and MEMs

There is a very clear distinction between these types of modelling techniques. DSGE models first came to light in a bid to address the Lucas critique, by incorporation of forward looking agents whose decisions change in accordance to possible policy changes. DSGE models apply expected future values of exogenous variables for forecasting policy effects. They are especially useful for the analysis of cyclical events within the economy over short-time periods, such as on a quarterly basis making them ideal for business cycle studies. However, though preferred for business cycle studies, DSGE models are best employed within developed economies as not only are the business cycles less volatile, but also, there exists considerable significant output persistence compared to developing economies which exhibit shorter and more volatile business cycles. This together with the fact that they present difficulties in studying interactions between and across agents unless via price mechanisms, makes them tricky to apply in the developing world, as developing economies not only tend to have considerably lower magnitude of price persistence, but also both data and information asymmetries in intra-industry interactions.

⁵¹ Available at: http://www.treasury.gov.au/documents/1087/HTML/docshell.asp?URL=04_Productivity_trends.asp

Technically, both DSGEs and CGEs are micro-founded and developed by carrying assumptions about preferences and budget constraints. However, while DSGEs are more suited for short-term analysis over time, CGEs are especially useful for long-term policy analysis. Consequently, CGEs and MEMs differ in the sense that while MEMs estimate parameter values using econometric techniques, CGE modelling draws parameter values from a variety of sources such as prior econometric studies, other simulation models including author's intuition and judgment. In this respect, it is noted that while CGE modelling is aimed at incorporating micro behaviour into macroeconomic analysis for purposes of policy evaluation, giving them the upper hand of allowing for detailed and targeted analyses, it is this same advantage that makes them complex to compute and work with as they tend to be extremely data-demanding.

On the other hand, although MEMs can sometimes lack the ability to accurately capture effects of policy changes, their main strength lies in their ability to estimate robust parameters, enabling the analysis of both short-term and long-term forecasts and hence facilitate policy evaluation. Betwixt these two categories exists further classification of the different kinds of approaches to macro-economic modelling as explained and observed by Valadkhani (2005) among them, the traditional Keynesian demand oriented approach discussed later in the chapter. In his analysis and process of distinguishing between various types of macro-economic models, Valadkhani includes others such as; Bautista (1988), Capros, Karadeloglou and Mentzas (1990) and Challen and Hagger (1983), (Valadkhani, 2005).

4.3.2 Macroeconomic Modelling in Developing Countries

Macro-economic modelling work in Africa is not as extensive as that in developing countries in general, especially in Asian economies and smaller pre-European Union economies. Among the first macro-economic models to be developed for a developing country was that by Narasimham (1956), for the Indian economy under the expert

supervision of Tinbergen (Narasimham, 1956). These first models followed the Keynesian demand side approach that basically only captured the demand side properties of the economy. Since then, the list has grown as both individual scholars and research bodies have sought to create more comprehensive and more detailed macroeconomic models with the growing need for more precise and more accurate forecasts, especially so, for developing economies. Among these include:⁵² (Ichimura, 1994); (Uebe, 1995); (ECAFE, 1968); (Adams, 1991) and (Khayum, 1991).

However, research shows that with time, most macro-economic models of developing countries have become smaller in size and are not being thoroughly scrutinized. It is suggested that in the specification of these macro models, the authors should be careful to include the interplay between macro-economic policies of different countries via international trade and global financial markets (Valadkhani, 2005). The same case should apply not just when considering a macro model amongst many developing countries, but also when mapping one for a particular economy. This implies that just because an economy is small and relatively insignificant in impacting world markets, the effect that the rest of the world nonetheless has on the said economy can be enormous.

4.3.3 Case of Kenya

For purposes of this study, background knowledge on the application of Macro-economic models for developing countries is important as the chapter concentrates on the Kenyan economy; a small, open and developing economy. Macro modelling is relatively new in Sub Saharan Africa. Still, In Kenya, there are two government

⁵² <http://www.unibw-hamburg.de/uebe/modelle/titelseite.html>

recognised macro models: The Macro Economic Policy Model – MEPM, (GoK, 1982) and Kenya MELT3 - A macro model for Kenya, (Keyfitz, 1994), however, only the former was actually applied, until 1994, when it was discontinued due to an inadequate capacity to update it (Karingi, 2000). These two aside, the World Bank and IMF have developed three macro models that can be used by growing and developing economies such as Kenya for policy analysis and forecasting purposes, whilst focusing on different aspects of the economy.

They are: the Polak model applied by IMF, usually used to examine the effects of changes in domestic credit on balance of payments; the Revised Minimum Standard Model (RMSM), employed by the World Bank focuses on real output to fix the trade balance. Both models have certain restrictions, a predominant one being that they are both unsuitable for medium to long-term forecasting as they fail to comprehensively represent production in the real sector. As an improvement to both of these models, Serven (1990) combined the Polak and RMSM models to formulate the RMSM-X. This model is however criticised for its failure to comprehensively include and represent the financial sector by leaving out key determinants and the labour market while capturing the supply side using an inflexible production function⁵³ (Karingi, 2000).

It is noted that one of the main critiques presented by Karingi and Ndung'u (2000) for the inadequacy of the models above is their focus on demand and not enough on supply side factors in determining the course of respective policy options. Among other complaints include the failure to include stock building in the investments function, the exchange rate's role is ignored, the assumption of unlimited sources of finance in place of a budget constraint, and the fact that the model is specified for a controlled economy

⁵³ For an in-depth analysis and review of the specific limitations of the above Kenyan macro models, see: (Karingi, 2000)

especially in the case of the MEPM model. However, it is also noted that many countries in transition tend to focus on the demand side even when the models are intended for longer term forecasting (Kvedaras, 2005).

Among the reasons cited include: simplicity as one-sided models are easier to evaluate; availability of data especially for variables such as capital stock is poor and unreliable, and in many developing countries, simply unavailable. In addition, economic reasons support this kind of models for simulations as the alternatives, where factor inputs are the primary growth determinants and have shown little proof of significant influence in determining growth within countries in transition. Traditionally, transition economies are considered those moving from centrally planned to free markets; however, the key concept besides privatisation is economic liberalization, features similarly observed of Kenya; a small, open, developing and newly liberalized economy.

So far this study identifies five other published macro-econometric models of Kenya: (Howe, 1965); (UNCTAD, 1968); (Elliott, 1996) and (Musalia, 2002). The above mentioned mainly use models that apply the traditional Keynesian demand oriented approach with Musalia and Rao (2002) incorporating supply side by modelling around the production function. In addition, we also identify another model by Green and Murinde (1993), in which the authors investigate the effect of stabilization policies in the context of developing economies, employing a macro-econometric model for developing economies, using data from the East African countries, Kenya, Uganda and Tanzania to specifically enable the comparison of the effectiveness of the policy for the different economies. Their model, although estimated in a semi-reduced form, is also based on the traditional IS-LM structure, considering both the aggregate demand and supply side conditions. Among the key distinctions in this model is the inclusion of both official and unofficial market interest rates as well as taking into account the roles of interest rates on costs, along with that of imported inputs in the supply side (Green, 1993).

The above models each include different variables. According to the Keynesian approach, in the national income identity, the sum of consumption, investments, government expenditure and net exports should equal aggregate supply. Through key structural parameters such as marginal propensity to consume, save and sensitivity of imports to variations in national income, the behavioural dynamics of each of the demand variables gives a good frame work for analysing fiscal, monetary and exchange rate policies, which in turn determine fluctuations in aggregate output, investments activities and employment in an economy. This supports the Keynesian demand oriented approach we adopt for this study as still valid in matters of policy analysis.

Macro models are intended for purposes of analysing how an economy's key components vary with time, given different policy options. A macro model is built with this in mind and is determined primarily by the use for which it is required, taking into account both the economy for which it is being modelled and availability of data. Each economy has its own specific features. In Kenya, interest rates were liberalized in 1991, followed by the liberalization of exchange rates in 1993. According to the Central Bank of Kenya, monetary policy is conducted by varying Money supply to match money demand. This is done via: instituting a 6 per cent % Reserve Requirement, Open Market Operations (OMO), commercial bank lending, and Moral Suasion, where the Central Bank persuades commercial banks to make decisions or follow certain paths to achieve a desired result like changes in the level of credit to specific sectors of the economy (CBK, 2008). As such, it follows to show that the money market equilibrium behaves much like the goods market equilibrium, given an exogenously determined interest rate, money demand rises and falls accordingly, while supply is varied to match these fluctuations. In addition, although the economy operates on a floating exchange rate regime, it is still a small open economy with little to no influence in the world markets; as a result it is considered a price taker in this study.

4.3.4 Income – Expenditure Approach

Primarily used by this study, this approach comprehensively elaborates both the demand and supply side equations within an economy, following an argument similar to the concept of circular flow; what is spent by the general public and invested, then goes towards more production. It is assumed that aggregate supply is perfectly flexible in the short run while prices remain constant and parameters such as tax rates, marginal propensities to consume and import constitute the behavioural parameters that will determine the impact of policy changes in the real sectors of the economy.

This particular modelling approach also realizes that certain aspects are slow to adjust due to e.g. rigidities in the market systems such as sticky wages. However, the wage-price system then feeds back into total demand and supply via channels of income and wealth, the financial and external sectors and the government sectors, thus creating a cycle of events and reactions that in the basic structure of a macro-model are distinguishable and analysable as independent reactions to any shocks that might be introduced to the economy. While the labour sector would be particularly ideal for the analysis of these effects, we leave it out as the available data is too scattered, there are too many small scale businesses in the economy, most of which are unaccounted for, as a result, the data on unemployment and wages, tends to be largely inaccurate. This lack of sufficient data to comprehensively analyse the supply side, guides our decision to focus attention on the demand side with our target variable being exports for continued long run aggregate demand growth.

In line with this, we adapt the traditional Keynesian demand side modelling approach, while borrowing from the framework suggested specifically for a Kenyan macro-economic model by Karingi and Ndung'u (2000) and employ the use of the econometric software, Eviews for analysis.

4.4.5 Scope of Interest

Being a primarily agricultural economy that is only recently venturing out into other industries, the major objective of this chapter is to investigate the importance of the trade sector and especially exports in contributing to variations and fluctuations in national income and to verify and indirectly substantiate the assumption that; Increasing trade via creating economic integrations is substantially important for economic growth in Kenya.

The chapter further aims at giving policy makers the avenue via which they can assess, predict and single out different impacts of alternative policies to the economy.

To achieve the stated objectives, the study runs different simulation experiments that determine the effects of changes such as instituting different trade policies on key macro-economic variables. To do this, first, we determine the accuracy of the specified model, following which the interplay of both short-run and long run dynamics that enable the policy makers to infer key linkages and the possible outcomes of different shocks to the system, is analysed.

4.4 The Model

Although the study is mainly interested with the effects of the real sector, especially the external /trade sector, we also interlink it, with the monetary sector for a more realistic and comprehensive approach. In addition, even while we assert that Kenya is indeed a price taker in world markets, we acknowledge that domestic prices fluctuate, especially due to unanticipated monetary demand changes and even though there exists a long-run equilibrium of prices; sometimes there are deviations by actual prices from said long-run equilibrium price. We thus model; the fiscal, real, external, monetary and price sectors. For this investigation, the demand for money is given as a function of both income and interest rates. Incomes are positively related and interest rates are negatively related to money demand. The higher the level of interest, the higher the

opportunity cost of holding on to money. As discovered in most macro-economic cases and supported by the CBK brief, the supply of money is assumed to be exogenous and solely dependent on monetary authorities, an approach that is also applied by Rao and Musila (2002). The level of interest rate is adjusted in every period so that money demand equates to money supply, although we apply the Keynesian assumptions of price rigidity, we accept that with time, prices adjust and therefore adjust nominal interest rates for inflation to derive real interest rate.

In Kenya, the major contributing sectors for the economy include agriculture, manufacturing / industry, government and non-government services, all of which cater for both domestic and foreign consumer demand. Aggregate demand is however dependent on the relative prices of products (goods and services) in the independent sectors. However, because Kenya is a small developing country and a price taker in the world economy, major variations are as a result of shocks like variations in world prices inducing booms and slumps in the economy, introduction of regulations such as application of SAPs or natural catastrophes such as the 1984 draught period in Kenya.

These, among others, are just some of the structural breaks captured in the model. Additionally, while the manufacturing sector is relatively under developed, it caters for both domestic and a limited amount of foreign demand and is also assumed to be a function of both real consumption and total exports of goods. The government sector is not automatically assumed fixed, just the expenditures, instead, we introduce a budget constraint. Simply put, consumers (government or private) demand output, earned incomes are spent, re-supplying producers with capital, furthering production and output. As expressed in theory, equilibrium conditions require that total planned expenditures equal total incomes. With this insight, we build a macro-econometric model of the Kenyan economy that not just provides an understanding of these macro-economic variable linkages, but one that also helps elaborate the theoretical structure that supports the arguments put forth.

4.4.1 Macro-Econometric Model

By basing the Kenyan macro model – KMM around the concept of income-expenditure approach and given that macro-economic models are generally based on both the observed and predicted behaviour of individual economic agents, the study applies a set of equations that depict the behavioural, institutional and definitional relationships within a framework that provides the general structure and operations of an economy. In general equilibrium, the real sector equates to the monetary sectors. Because this is a simultaneous equation system, any change in one variable will cause changes in all other variables, thus estimating the variables in simultaneous form ensures that the joint relations are taken into account, thus avoiding any bias that a static equation might create. The major components in the system of equations are described briefly below:

4.4.1.1 The Real, Fiscal and External Sector

Here, the real sector is thus determined by the aggregate demand for goods and services in the economy, embodied in total consumption, net exports of goods and services, total investments and net government expenditures.

$$Y = C + I + G + SB + X - M \quad (4.1)$$

Where:

Y = Total Incomes/ Real Gross Domestic Product (GDP)

C = Real Private Consumption

I = Real Private Investments

G = Government Consumption and Expenditures

SB = Stock Building

X = Real Exports

M = Real Imports

Further;

Following the absolute income hypothesis as suggested in most macro models literature, total real private consumption (C) is determined by real disposable income

(Y_d) , given by the difference between national income and total domestic taxes (DT), and short-term interest rates, which are given by the Treasury bill rates in this case. Depending on data and model fit, we could also use inflation (π) to capture price changes. Real disposable income has a positive effect on consumption according to absolute income hypothesis, while interest rates have a negative effect. On the other hand, the life cycle hypothesis whilst agreeing that an increase in income increases consumption, does not give a priori expectations of effects of either interest rates or inflation. For our purposes, consumption is defined as;

$$C = F(Y_d, r_t)$$

$$Y_d = (Y_t, T_t)$$

$$\ln C_t = \alpha_0 + \alpha_1 \ln Y_d + \alpha_2 \ln \pi_t + \alpha_3 \text{ tbr } \varepsilon_t ; \alpha_1 > 0, \alpha_2, \alpha_3 < 0 \quad (4.2)$$

Total investments (TI) is represented in this model as the total sum of domestic (I_d), foreign investments (I_f) and change in inventories (SB); where domestic investments are represented by total investments in the major sectors of the economy including; agriculture, industry and non-governmental services and is simply modelled following the simple accelerator model as a function of real income (Y) (which suggests that there is a positive correlation between changes in income and Investments) and cost of capital captured by interest rates (r), which is expected to have a negative impact. Foreign investments, represented by foreign direct investments (FDI) are assumed exogenous in this equation. As observed by Ra and Rhee (2005), change in inventories is likely an exogenous variable especially in countries dependent on agriculture, as fluctuations are reliant on exogenous factors such as climate.

However we note that as a developing country with a growing industry in trade and manufacturing, this could also be determined by factors such as output and financial cost of holding stocks (Karingi, 2000). Because of the limited availability of reliable sector specific data, we leave this as an exogenous variable in our model. With the Keynesian approach, Investments is not a function of interest rates or income, it is

considered fixed, and instead, savings is a function of income. However, by using Karingi & Ndung'u's (2000) suggested approach where investment is specified as a function of output (GDP) and real interest rates, we get better results. This is represented thus:

$$TI_t = I_d + I_f + SB \quad (4.3)$$

$$I_d = F(Y_t, r_t)$$

$$I_f = FDI$$

$$\ln I_d = \partial_0 + \partial_1 \ln Y_t + \partial_2 \ln r_t + \varepsilon_t; \partial_1 > 0, \partial_2 < 0 \quad (4.4)$$

For this model, it is assumed that government expenditures (*GE*) are pre-determined as the sum total of all government consumption (*GC*) and government investments (*GI*). In equilibrium and in ideal conditions however, it is assumed that total *GE* equals government revenues (*GR*). Thus, government budget deficit (*BD*) would be (*GE* – *GR*). As a result, any government savings would be determined by the expenditures accumulated, following which any surplus or deficits then impact on the monetary base. *GR* are endogenous and determined primarily by net taxes (*T*) including non-tax revenues (*NT*).

It is expected that where the tax system is progressive, increases in nominal output would imply a rise in average direct tax rates as a result of increased revenues as income increases. However, according to Elliott, et. al., (1996), the tax system in Kenya is neither regressive nor progressive as the estimated elasticity of taxes with respect to changes in income is on average, unity, given that collection of taxes by the government is mainly determined by levels of nominal output (Y_n) and average tax rate, defined as the ratio of total taxes to nominal output.

Non-tax government revenues include charges such as fines, receipts from sales of commodities such as during privatisation, sale of fixed assets, royalties and principal and interest payments. Ra and Rhee (2005) find that these components of non-tax

revenue are likely to be influenced by national economic activities and therefore derive non-tax revenue as a function of nominal output (Y_n), upon which they find that the coefficient is statistically significant (Ra, 2005). This study however finds that although the coefficient is positive, it is not statistically significant for the period under study and takes non-tax revenue as an exogenous variable:

$$BD = GR - GE \quad (4.5)$$

$$GR = T + NT \quad (4.6)$$

$$T_t = f(Y_n, At_t)$$

$$\ln T_t = \theta_0 + \theta_1 \ln Y_n + \theta_2 \ln At_t + \varepsilon_t; \theta_1, \theta_2 > 0 \quad (4.7)$$

The next component is the trade balance, often summed as all international economic transactions within an economy inside a specified time frame and easily captured by Net exports (NX). Net exports constitute total exports of goods and services (X), less net imports (M). In this model, keeping in mind that Kenya is a small open economy, operating under a floating exchange rate system and a price taker in the world economy, total exports of goods and services (X) are determined by the partner country's real **GDP**, which is represented here by world income (Y_w), real effective exchange rate ($REER$) and relative export prices (P_x). (P_x) is given by export prices of domestic economy relative to the price of its competitors. Elliott. et. al., (1986) modify the export equation to include the stock of **FDI** relative to domestic demand. In our case, we include RER but exclude stock of FDI relative to domestic demand due to data inconsistencies. In addition, we disaggregate the total exports into sub categories: Services, Agriculture, Manufacturing and Merchandise.

On the other hand, total domestic demand for imports (M), are determined by total national incomes (Y) and relative price of imports (P_m). (P_m) is assumed exogenous in this model, as being a small economy; Kenya has no effect in the world market prices. Since Kenya is a price taker in global markets for its major commodity exports, if world prices change, the production levels of major export commodities, namely tea and

coffee reflect the changes too. Although most macro-models assume exports especially for small and developing economies to be exogenously determined, this is only applicable in cases where exchange rates are fixed or pegged, however, where exchange rates are flexible, then exports are treated as endogenous. In an economy such as this one that heavily relies on its export earnings, mainly in the agricultural sector, which also happens to be the main contributing sector to total employment levels, this results in affected export earnings as a result of changes in production, resulting in a chain reaction in total demand levels.

Thereby:

$$NX = X - M \quad (4.8)$$

$$X = f(P_x, Y_w, REER)$$

$$\ln X_t = \gamma_0 + \gamma_1 \ln P_x + \gamma_2 \ln Y_w + \gamma_3 \ln RER + \varepsilon_t; \gamma_1 < 0, \gamma_2 > 0, \gamma_3 < 0 \quad (4.9)$$

$$M = f(P_m, Y)$$

$$\ln M_t = \delta_0 + \delta_1 \ln P_m + \delta_2 \ln Y + \varepsilon_t; \delta_1 < 0, \delta_2 > 0 \quad (4.10)$$

4.4.1.2 The Monetary Sector

According to Keynes, total liquid wealth is in the form of either money or bonds. Individuals are thus assumed to accumulate wealth in relation to their personal incomes. Accordingly, an increase in incomes, resorts to increased demand for money both for transaction and precautionary purposes, while increased interest rates increase the cost of holding money, thus have a negative effect on money demand (*MD*). Interest rates are the policy instrument used to regulate money demand and money supply is pre-determined by the monetary authorities. Karinig and Ndung'u (2000) discourage solving a macro model with fixed nominal interest rates in a floating exchange rate regime and suggest the need to model interest rates whilst developing a Kenyan macro model.

Given our former assumption however that prices are fixed in the short run, then it follows that nominal interest rates will equal real interest rates, implying a money

market equilibrium that has interest rates as a function of money supply and real income. In equilibrium, the money supply (MS) is equal to (MD). They further suggest the inclusion of nominal exchange rates to capture the currency substitution effect. These derivations are supported by among others, the Baumol-Tobin model of cash management, which also adds that rate of inflation has a negative effect on money demand, as it reduces the real interest rate on money, making it less attractive in comparison to real assets.

Here, inflation rate is defined as any deviations from target inflation and is informed upon by the price gap. We derive the price gap by applying the P-star approach from a long run money demand function, informed upon by the quantity theory of money demand. As a result, we derive the following money demand function:

$$MD = M2 \quad (4.11)$$

$$M2 = f(Y, r_t, \pi)$$

$$\ln M2 = \sigma_0 + \sigma_1 \ln Y + \sigma_2 \ln r_t + \sigma_3 \ln \pi + \varepsilon_t; \quad \sigma_1 > 0, \sigma_2, \sigma_3 < 0, \quad (4.12)$$

4.4.1.3 The Price Gap

As mentioned, the inflation rate is informed by the price gap. The Keynesian approach assumes constant prices over the short run, while acknowledging economic growth towards long-term equilibrium in the long-run. We employ the P-Star (P^*) model, which seeks to find out what the price level would be, pending no other disturbances, as the economy tends towards long-term equilibrium (Frait, 2000). This model, first developed by Hallman, et. al., (1991), borrows from the quantity theory of money suggesting a relationship between money and prices in the long-run, while holding the underlying assumption that there exists a long-run equilibrium price level (P^*) to which actual prices (P) adjust. It stipulates that long-run equilibrium prices (P^*) are determined by current money supply (MS), potential incomes (Y^*) and velocity of money circulation (V^*), following on to use the price-gap, defined as the deviations by

actual prices (P) from equilibrium prices (P^*) as an indicator of fluctuations of inflation (π) in the domestic economy (Hallman, 1991). From quantity theory of money:

$$P = M_s V / Y$$

Following the P^* model:

$$P^* = M_s V^* / Y^*$$

Calculation of P^* requires the estimation of both potential output Y^* and potential velocity V^* . There are different stated approaches in literature to do this, including the use of linear trends, structural modelling including the more widely used statistical method of applying the filter approach, for which two options exists, the Hodrick and Prescott (H-P) filter and the Kalman filter. Once P^* has been calculated, then domestic Price gap ($P^* - P$) is derived. For economics purposes, this can be shown as given by the sum of the output gap ($Y^* - Y$) and the liquidity gap ($V - V^*$) implying;

$$P - P^* = (V - V^*) + (Y^* - Y) \quad (4.13)$$

The model predicts that, should actual prices fall below equilibrium prices ($P < P^*$), then inflation rises and the reverse is true. Inflation remains constant and unchanged when actual prices equal equilibrium prices, following that at equilibrium, price gap is zero and inflation is unchanged.

$$\Delta\pi = 0 \quad \text{if} \quad (P^* = P)$$

According to the Institute for Economic Forecasting, the price gap is assumed to have a tendency to be closed in the long run so that periods with actual price levels over the equilibrium value are alternated with periods of lower than equilibrium prices, a concept that is captured using the error correction price gap model. For this to work, it is assumed that V , P and Y are all non-stationary and integrated of order 1, while the price gap is assumed to be stationary which is the case in our study. In addition, the error correction model is useful in relaying the dynamics of adjustment, such as speed of adjustment from P to P^* .

We thus estimate a general dynamic model as follows:

$$\Delta p_t = \delta_0 + \delta_1 \Sigma \Delta p_{t-1} + \delta_2 \Sigma \Delta (p_{t-1}^* - p_{t-1}) + \varepsilon \quad (4.14)$$

If $\Pi = (p_{t-1}^* - p_{t-1})$

We can rewrite the equation as:

$$\Delta p_t = \delta_0 + \delta_1 \Sigma \Delta p_{t-1} + \delta_2 \Sigma \Delta \Pi + \varepsilon \quad (4.15)$$

The inflation rate in time t is denoted by Δp_t and δ are the parameter estimates explaining the dynamics of the model. Meanwhile, δ_2 represents the speed of adjustment from P to P^* and should be positive depicting increase in inflation should the price gap increase and ε_t is a random error term. This model also acts as a tool to assess the effects of a monetary policy. Although we expect domestic prices to fluctuate whilst tending to long-run equilibrium levels, Kenya is still a price taker in world markets and as such, trade prices are exogenous in our model.

4.5 Data

For this chapter, we use annual Kenyan national accounts data {1979 – 2009}, including the disaggregated exports of major commodity exports: Agricultural, Merchandise, Manufactures and Services. All data used is secondary, real and in logarithms except interest rates, (unless otherwise stated)⁵⁴.

⁵⁴ Data is gathered from various sources: IMF, IFS and World Bank Statistics, Central Bank of Kenya – CBK annual statistical bulletins, ordered from Kenya and UN Com trade. We specify twenty equations of which ten are behavioural and estimated within the model while the rest are linking and identities equations.

4.6 Estimation Process

To build an efficient and representative model of the Kenyan economy, we begin by analysing the data at hand. We are using time series data with a sample ranging from 1960 – 2010. However, due to missing data points, our observations are limited to 30 annual observations, 1979 – 2009. We thus apply relevant techniques for dealing with non-stationary data, as is often the case for time series, such as differencing as discussed further on in the chapter, following which we estimate single equations per individual sector, with specific variations, such as inclusion of dummy variables to capture structural breaks in the system, examining them to determine the statistical significance of each variable, general fit and whether or not they conform to theory. Once we identify satisfactory equations, we then assemble them, solve the model and run these computations on Eviews.

4.6.1 Data Properties

The first stage of our modelling is to analyse the data followed by the individual variable time series properties.

4.6.1.1 General data

Kenya is essentially described as a small open economy that is primarily agro-based, only recently expanding its other sectors such as services and whose exports are mainly agricultural; tea, coffee, horticulture, cereal etcetera. Our data shows that goods exports dominate total exports, in addition, goods exports show a significant increase between 1988 and 1993, while service exports experience a significantly less increment peaking at 1991 and deteriorating thereafter. This change, especially in goods exports is thought to be attributed to the Structural Adjustment Programs (SAPs) initiated by IMF and the World Bank as a series of economic and political reforms in the late 80s, and early 90s. Thoughts on the effectiveness of these SAPs are divided (Rono, 2002).

Other programs put in place included various support schemes from the government to encourage and boost exports, such as the establishment of Export Promotion zones (EPZs) around the country. In addition, there was also an institution of import duty waivers such as Manufacturing under Bond (MUB), exempting manufacturers from duty when importing inputs used for production of exports in 1988. Following this, in 1990, there was a further import duty exemption for companies that were primarily export companies. As a result, we see a significant increase in volume of goods exports during this period with a peak at 1993. This however was immediately followed by the liberalization of exchange rates in 1993 which lead to a significant depreciation of the Kenya Shilling. This also coincided with the abolition of trade licensing and the withdrawal of export subsidies following a domestic scandal, resulting in deterioration of exports soon after that, only beginning to recover in 2001.

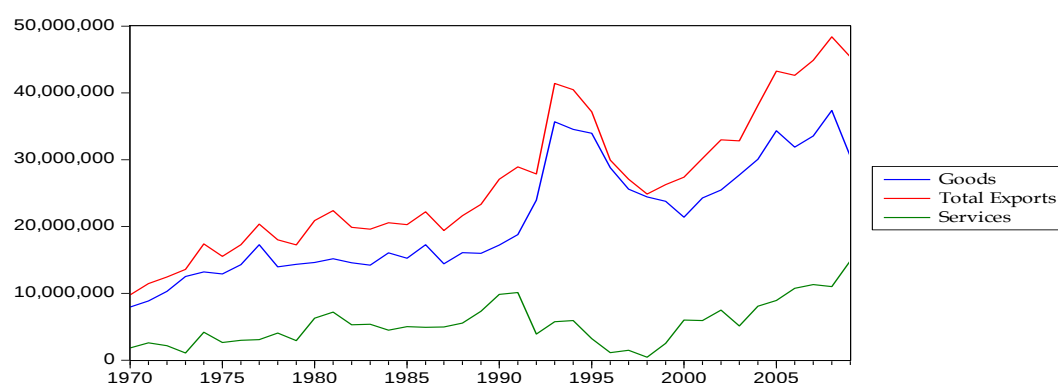


Figure 11: Exports of Goods and Services

4.6.1.2 Time Series Properties

We examine this by among other tests, applying the Augmented Dickey-Fuller (ADF) tests with/without trend, with which we conduct formal tests of the null hypothesis that the series is $I(1)$ against the alternative that it is $I(0)$. It is expected that all the variables are non-stationary and the ADF tests confirm that the series are all stationary at first difference, as presented in Appendix 5A. Just for clarity however, we also run correlograms and confirm that all series except Non-Tax revenue (*NT*) are non-

stationary. Following this, we estimate the individual equations as specified and analyse their appropriateness, various diagnostic tests are run for this purpose.

4.6.2 Individual Equations Results and Adequacy Testing

We run simple ordinary least squares (OLS) estimations on the individual equations and analyse their statistical appropriateness and individual forecasting abilities to help identify those to use in the model building exercise. It is noted that running OLS on non-stationary data, which is often the case with most macroeconomic times series as they tend to be trended, can be problematic, resulting in spurious results. However, in this case, we rest with the exception, where it is okay to run an OLS regression if the model in question eliminates the stochastic trends to give stationary residuals, implying existence of co-integrating relationships in the model. To verify further the fit of the regressions and model adequacy, we carry out diagnostic tests such as the Jarque-Bera (JB) statistic that test for the assumption of normally distributed residuals. The Lagrange multiplier which tests against autoregressive conditional heteroskedasticity (ARCH) of at most order one is applied as well as using the correlogram of residuals to check for serial correlation. Additionally, we perform the Ramsey RESET test to check for misspecification of the regressions while also applying the CUSUMSQ test to check for parameter stability.

After this, we continue on to assess the forecasting capabilities of the final individual equations checking for both the Mean Absolute Percentage Error (MAPE) and Theil's inequality Coefficient. Although MAPE is not normalized, it is preferred that it be as small as possible, with zero-indicating no errors whilst forecasting, while Theil's inequality coefficient lies between zero and one, where zero implies a perfect fit and one implies a fit no better than a random walk.

The individual plots of the main series are not shown; however, we observed in the real effective exchange rates – REER graph, there is a clear structural break. This is thought to have been the result of the shift to floating exchange rates in 1993. There is also a clear break observed in inflation (CPI calculated – *INFC*) and nominal interest rates, (proxied by deposit rates – *DER_R*) plots that can be explained by the liberalization of interest rates in 1991. As a result, we perform both the Chow and Quandt-Andrews breakpoint tests to see if there are indeed any significant structural breaks in the sample period. To capture and account for these structural breaks, we include dummy variables in the respective equations. Below are the series of single long-run equations that we estimated representing economic relationships necessary for model building. Bergstrom, et. al., (1992) emphasises the importance of plausible long-run behaviour in the model estimations, as their absence could imply omission of important feedback, which would hinder the successful predictive capacity of the model, implying inability to perform medium term forecasting for policy analysis (Bergstrom, 1992).

For each of these relationships, we report the *t*-statistics below each variable's coefficient in parentheses. Literature review reveals that, although statistical accuracy of individual equations doesn't guarantee good performance of the model, the chosen equations should never the less still be correctly specified, with relevant and significant variables (Ra, 2005). Accordingly, we also test for parameter stability by running the CUSUM SQ test and find that the null of stable parameters could not be rejected at 5 per cent significant levels for all the equations.

4.6.2.1 Consumption

The equation below reports the estimation output of the consumption function. In line with our expectations, we observe that disposable income has a significant and positive effect on consumption while inflation cpi-calculated – (*INFC*) has a significant and negative effect. Below, the coefficient on disposable income – (*YD*) gives us the short run income elasticity of consumption, which is observed to be 0.65 per cent, implying that a short-run income injection of 1 per cent would induce a 0.65 per cent increase in

consumption, implying that in Kenya, less than half of total incomes go towards savings. Calculating long-run elasticity however indicates a high sensitivity of consumption to variations in income, finding that the long run income elasticity of consumption is 1.19 per cent. This indicates that in the long run, consumption tends to increase slightly more than proportionately to income increases. This indicates the possibility of rampant poverty, with a significant portion of the population going without basic needs. A report by the World Bank (2010) indicates more than 60 per cent of the population currently lives below the poverty line on less than a 1.25 USD a day. The results also show that inflation has a negative and significant effect on consumption.

$$L_n C = -1.9132 - 0.0306 L_n (INFC) + 0.6458 L_n (YD) + 0.4557 L_n (C(-1)) \quad (4.16)$$

(-3.53) (-2.57) (5.24) (4.51)

$R^2 = 0.9902$; $Adj R^2 = 0.9894$; $DW = 1.8038$; $RSS = 0.1109$; $Qstat: (1) = 0.25(0.62), (2) = 0.44(0.8)$
 $LM = 0.21(0.81)$; $JB = 0.38(0.83)$; $ARCH = 0.84(0.37)$; $RESET = 4.79(0.03)$; $MAPE = 0.272$
 $Theil = 0.00$; $QA \max LR F (1995) = 8.26(0.57)$

4.6.2.2 Investments

We capture total investments (I) as the sum total of domestic (*DINV*) and foreign investments (*FDI*) and change in inventories (*SB*). In this equation, both (*SB*) and *FDI* are considered exogenous. We thus follow on to estimate *DINV*. We found that upon using real interest rates, the estimation produced unsatisfactory results, while inflation gave better results. The results showed that while incomes had a positive and significant impact on domestic investments, inflation had the exact opposite effect although it was not significant. As a result, we introduced, deposit rates (*DEP_R*) in place of real interest rates and found that there was a general improvement on fit.

However, as observed by various scholars, work on developing countries shows mixed results on the effect of interest rates on private investments. Example, we find a negative relationship between deposit rates and investments in Kenya, while

Athukorala (1998), found a positive relationship for India (Athukorala, 1998). In the end we use inflation GDP-deflator calculated (*INFG*), as its effect is not ambiguous and find that although it holds the expected sign, the effect is not significant. Additionally, we find previous period's investments are a positive and highly significant contributor to current investments, as is income growth, captured by GDP growth (*YGR*).

$$L_n DINV = -0.4535 + 0.5066 L_n (Y) + 0.4695 L_n (DINV(-1)) - 0.0147 L_n (INFG) + 0.0123 YGR \quad (4.17)$$

(-0.64) (3.64) (3.19) (-0.74) (2.51)

$R^2 = 0.9560$; $Adj R^2 = 0.9508$; $DW = 1.7358$; $RSS = 0.2276$; $Qstat: (1) = 0.50(0.48), (2) = 0.84(0.66)$
 $LM = 0.51(0.61)$; $JB = 0.11(0.95)$; $ARCH = 4.76(0.36)$; $RESET = 2.73(0.11)$; $MAPE = 0.416.87$
 $Theil = 0.002$; $QA \max LR F (1995) = 8.26(0.57)$

4.6.2.3 Fiscal

As discussed before, the government budget deficit (*BD*) is defined as the difference between total government expenditure and total government revenues. We determine that although government expenditure is predetermined, government revenues depend on net tax (*NTAX*) and Non-Tax-Revenues (*NT*). *NTAX* is the sum of direct (*DTAX*) and indirect taxes (*INDAX*). Of these, both *INDTAX* and Non-tax revenues are considered exogenous to the system, thus we estimate *DTAX*. From our tests, we find that while the results support theory in that nominal incomes (*YN*) have a positive impact on direct taxes, they are not significant in our case. On the other hand, previous period's taxes are positive and significant in determining direct taxes; we also include previous period's inflation (*INFC (-1)*) and find it too to have a significant positive effect on direct taxes. This is shown in the equation below:

$$L_n DT = -0.6265 + 0.0917 L_n (YN) + 0.8991 L_n (DT(-1)) + 0.0626 L_n (INFC(-1)) \quad (4.18)$$

(-0.65) (1.29) (8.86) (2.38)

$R^2 = 0.931$; $Adj R^2 = 0.9230$; $DW = 1.127$ $RSS = 0.1972$; $Qstat: (1) = 5.30(0.02), (2) = 5.30 (0.07)$
 $LM = 3.11(0.06)$; $JB = 0.99(0.60)$; $ARCH = 0.87(0.36)$; $RESET = 0.05(0.81)$; $MAPE = 0.804$
 $Theil = 0.004$; $QA \max LR F (1996) = 8.68(0.52)$

4.6.2.4 Imports

We estimate imports of goods and services as a function of real domestic income (Y), relative import prices (MPI), real effective exchange rates ($REER$) and previous period's imports. Additionally, we add a dummy variable (D_{exr}) to capture the effects of exchange rate liberalization in 1993. The estimation results indicate that both Y and $REER$ have very significant effects on imports, as incomes increase, imports increase while as exchange rates go up, (hence a depreciation in local currency), imports decrease. Import prices are seen to be consistent with theory in that they have a negative influence on imports, but we find in our case to not be significant. Although, liberalization of exchange rates as captured by the dummy variable shows a negative effect on total imports, it is not significant and thus, we drop it from the estimation.

$$L_n M = -0.8071 + 0.1251 L_n (M(-1)) + 0.9288 L_n (Y) - 0.0094 L_n (MPI) - 0.2543 L_n (REER) \quad (4.19)$$

(-1.04) (0.98) (7.42) (-0.24) (-3.10)

$R^2 = 0.9843$; $Adj R^2 = 0.9829$; $DW = 2.07$; $RSS = 0.3639$; $Qstat: (1) = 0.08(0.77)$, $(2) = 0.92 (0.63)$
 $LM = 0.55(0.58)$; $JB = 12.46(0.00)$; $ARCH = 0.06(0.80)$; $RESET = 0.42(0.51)$; $MAPE = 0.411$
 $Theil = 0.002$; $Chow Breakpoint test (1993) F (5, 40) = 0.91(0.48)$

4.6.2.5 Exports

From our derivations and in line with theory, exports are determined by relative price of exports (XPI), real effective exchange rates ($REER$) and real world incomes (YW). We define our total exports as the sum of goods exports (XG) and service exports (XS). XG is further disaggregated into the main export producing sectors of the economy. These include:

Agriculture (XA); this is the main sector as 80 per cent of the population relies on this sector as a source of both income and sustenance (Kenya Sugar Board, 2009).

Manufacturing (XMA); although Kenya is one of the most industrially advanced nation in East Africa, this sector is still young and primarily agro-based with gradual improvements in value addition, still, it contributes about 14 per cent to total national income and is thus considered significant in this study.

Merchandise (*XME*); again, although primarily agro based, there is a long standing history of small and medium sized businesses in the economy that have continued to contribute increasingly to total export volumes and national incomes, especially as noted in the last couple of years. World Bank, (2011) reports an increase of Merchandise trade as a per cent of GDP from 49.92 per cent in 2009 to 54.89 per cent in 2010⁵⁵.

Service Exports (*XS*); in truth, there is more rapid expansion of service exports, including tourism and telecommunications, however, the lack of suitable data consistently reported over our interest period implies we cluster all service exports into one category and estimate as such.

As illustrated in our equations below, we observe that theory holds, world incomes are seen to have a positive and significant effect on exports in all four categories, while real effective exchange rates and relative export prices are seen to have a negative effect, in all the categories, except for *XME*, where REER is observed to have a positive influence on merchandise exports, this effect is however not significant. In addition, we observe that introduction of the dummy variable (D_{exr}) which captures liberalization of exchange rates in 1993 improves the results significantly. D_{exr} has a negative effect in all the categories but only exhibits a significant effect in *XS*. In addition, according to Senhadji et. al., (1992), Kenyan exports stand a high chance in facilitating economic growth as results indicate they have a high income elasticity of export demand (Senhadji-Semlali, 1992).

55 See: <http://search.worldbank.org/data?qterm=trade%20in%20kenya&language=EN>

$$L_n XS = -37.12 + 0.38 L_n(XS(-1)) + 1.61 L_n(YW) - 0.59 L_n(REER) - 0.97 D_{exr} - 0.01 L_n(XPI) \quad (4.20)$$

(-2.20) (2.40) (2.51) (-1.35) (-2.50) (-0.01)

$R^2 = 0.5848$; Adj $R^2 = 0.5219$ DW = 2.02; RSS = 8.300; Qstat: (1) = 0.03(0.85), (2) = 1.35 (0.51)
LM = 0.62(0.54); JB = 31(0.00); ARCH = 0.00(0.96); RESET = 0.11(0.74); MAPE = 2.490
Theil = 0.016; QA max LR F (1998) = 8.88(0.67)

$$L_n XA = -19.43 + 0.62 L_n(XA(-1)) - 0.39 L_n(XPI) + 0.89 L_n(YW) - 0.23 D_{exr} - 0.12 L_n(REER) \quad (4.21)$$

(-2.59) (4.18) (-2.08) (3.07) (-1.35) (-0.54)

$R^2 = 0.7866$; Adj $R^2 = 0.7533$; DW = 2.32; RSS = 1.59; Qstat: (1) = 1.35(0.24), (2) = 1.38 (0.50)
LM = 2.41(0.11); JB = 0.83(0.65); ARCH = 2.90(0.09); RESET = 5.93 (0.02); MAPE = 1.158
Theil = 0.007; QA max LR F (1992) = 6.38(0.80)

$$L_n XMA = -38.31 - 0.99 L_n(REER(-1)) - 0.87 L_n(XPI) - 0.36 D_{exr} + 0.28 L_n(XMANU(-1)) + 1.84 L_n(YW) + 0.06 DEP_R \quad (4.22)$$

(-3.90) (-2.77) (-3.18) (-1.92) (1.77) (4.46) (3.44)

$R^2 = 0.8671$; Adj $R^2 = 0.8421$ DW = 1.85; RSS = 2.34; Qstat: (1) = 0.03(0.86), (2) = 0.59 (0.74)
LM = 2.45(0.78); JB = 12.1(0.00); ARCH = 2.43(0.13); RESET = 0.52 (0.47); MAPE = 1.378
Theil = 0.008; QA max LR F (1977) = 5.32(0.98)

$$L_n XME = -10.72 + 0.69 L_n(XMERCH(-1)) + 0.58 L_n(YW) - 0.14 D_{exr} - 0.28 L_n(XPI(-1)) - 0.14 L_n(REER(-1)) \quad (4.23)$$

(-2.66) (5.47) (3.36) (-1.64) (-2.64) (-1.19)

$R^2 = 0.9000$; Adj $R^2 = 0.8839$ DW = 2.06; RSS = 0.42; Qstat: (1) = 0.06(0.80), (2) = 0.06 (0.97)
LM = 0.06(0.94); JB = 3.31(0.19); ARCH = 0.04(0.83); RESET = 0.51 (0.48); MAPE = 0.615
Theil = 0.003; QA max LR F (1979) = 2.33(1.00)

4.6.2.6 Money

According to literature, an increase in incomes, resorts to increased demand for money both for transaction and precautionary purposes, while increased interest rates increase the cost of holding money, thus have a negative effect on money demand. Following this, we estimate money demand function expecting that money demand will have a positive relationship with income and a negative one for nominal interest rates and inflation rate as the opportunity cost of holding money rises with increases in interest rates. Our results confirm our expectations, indicating significant effects of both incomes and nominal interest rates.

However, although we have the expected sign for inflation, we find that its effect on money demand is not significant. Following Karingi and Ndung'u's (2000) suggestion to include nominal exchange rates to capture the currency substitution effect, we find that this gives a poor fit equation; we thus leave this out of our model. In addition, when we include a dummy variable to capture the interest rates liberalization in 1991, the estimation does not improve, thus we leave it out too.

$$L_n MD = -1.27 + 0.33 L_n(Y) + 0.72 L_n MD(-1) - 0.02 DEP_R - 0.002 L_n(INFC) \quad (4.24)$$

(-1.85) (3.13) (7.61) (-4.17) (-0.12)

$R^2 = 0.9671$; $Adj R^2 = 0.9633$; $DW = 1.98$; $RSS = 0.29$; $Qstat: (2) = 1.20(0.55), (3) = 5.51 (0.14)$
 $LM = 0.55(0.58)$; $JB = 1.40(0.49)$; $ARCH = 1.59(0.22)$; $RESET = 2.83 (0.10)$; $MAPE = 0.523$
 $Theil = 0.003$; $QA \max LR F (1992) = 3.15(1.00)$

4.6.2.7 Price Gap

As mentioned earlier, the inflation rate is informed by the price gap. By estimating a dynamic model, we note that, should actual prices fall below equilibrium prices ($P < P^*$), then inflation rises and vice versa confirming our previous predictions. The results below indicate this, which is given by the positive coefficient of Π , which also represents the speed of adjustment of actual prices P to P^* . In this case, approximately 15 per cent of inflation adjusts to long-run equilibrium within a year.

$$\Pi = (p_{t-1}^* - p_{t-1})$$

$$\Delta L_n P_t = 0.08 + 0.41 \Delta L_n (P_{t-1}) + 0.15 L_n (P_{t-1}^* - P_{t-1}) \quad (4.25)$$

$R^2 = 0.3767$; $Adj R^2 = 0.3389$; $DW = 1.82$; $RSS = 0.11$; $Qstat: (1) = 0.04(0.84), (2) = 0.59 (0.75)$
 $LM = 0.29(0.74)$; $JB = 3.89(0.14)$; $ARCH = 0.002(0.96)$; $RESET = 3.21 (0.08)$; $MAPE = 9.44$
 $Theil = 0.236$; $Chow Breakpoint test (1993) F (3,30) = 1.69 (0.19)$

4.6.3 Model Estimation

After establishing the single equations necessary and satisfying their individual forecasting properties, we then estimate the model. By solving the model simultaneously, we are able to identify the linkages between the behavioural

relationships as supported by theory. The model has overall 38 variables with 21 endogenous and 17 exogenous variables. The set of equations is further given in Appendix 5B. The main identity that is used is the national income accounting identity as given by Equation (4.1).

$$Y = C + I + G + X - M \quad (4.1)$$

To further establish that the model is appropriate and functional, we analyse the in-sample static and dynamic forecasts as shown in Appendix 5E. The most important aspect of this model will be to investigate the role of the external sector especially in varying income, which we do by constructing different scenarios. Hence, we focus on the exports function and below we show the baseline solution using historic data in graphs of both the static and dynamic solutions for the disaggregate exports: XAGRI – Exports of agriculture, XMANU – Exports of manufactures, XMERCH – Exports of merchandise and XS – Exports of services. We note from the graphs that the model behaves reasonably well and tracks the data closely, making it ideal for our analysis. The static solution shows that our model performs well in forecasting the endogenous variable, albeit one period ahead, especially for total exports – X, with slight deviations between 1993 and 1997 for manufacturing exports and also slightly in service exports after 1993.

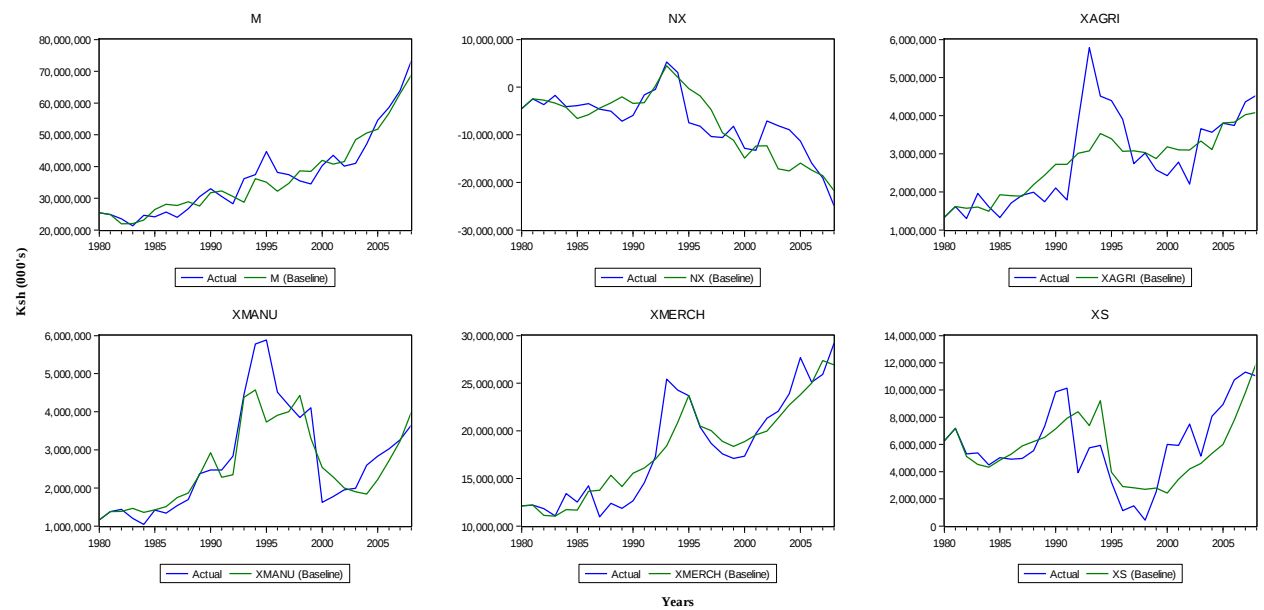


Figure 12: Static solution for disaggregate exports; 1980 – 2009

Further, we perform a dynamic solution to see how the model performs when forecasting future periods. This is especially useful for policy analysis as it enables the analysts to tell how different variables will react in the future upon application of various policies. The results indicate that although not perfectly aligning with the actual outcomes, the model provides a reasonably true trend in the movements of both total and disaggregate exports and would have performed reasonably well had it been used in 1990 to make forecasts for the next 17 years, (Appendix 5E).

4.6.4 Simulating for Policy Analysis

The main objective of this study is to capture the essence of the effect of exports on the general economy, whose proxy is national income. In effect, we seek to find out if and to what magnitude, a variation in exports has on the economy, to better equip trade policy analysts providing information towards better and more effective policies being instituted. To do this, we analyse our model under different scenarios. In the first

scenario, we introduce the effects of a shock to the disaggregate export functions. In our case, the shock variable (10 per cent growth) is introduced into the different export categories in 1995 and 1996. We then analyse the resulting solutions and determine how the shock to the different export categories transfers to the rest of the economy, and precisely via which export category the shock is most significantly affective. We then re-examine the changes in the endogenous variables, of particular interest are national income, private consumption as well as the other exports.

The effect on the other export categories is essential as the country is traditionally agro-based, with many of the sectors being co-dependent. In the second and third scenarios, we vary quantities of net exports, which we characterize by manipulating the export prices represented by the export price index, as well as real effective exchange rate – REER. From our single equation estimations, we found that the export prices have negative effects on all exports, albeit not all are significant on demand for exports, while REER showed negative but not significant effects on export demand.

The assumptions made earlier of Kenya being a small open country and preserving world prices are otherwise retained. For comparison, we first solve the model and establish a baseline solution without any shocks to the disaggregate exports function, following which we introduce the shock, one sector at a time.

4.6.4.1 Scenario I – Disaggregate Exports Shock

The traditional view is that Kenya's exports are primarily goods exports (this is supported by our data). Although traditionally assumed that agricultural exports are predominant, our data shows this not to be the case, especially not in the traditional sense of agricultural primary products. Instead, we note that merchandise exports form the bulk of total goods exports for the economy, with agriculture and manufactures following respectively. The World Trade Organization (WTO) defines merchandise as tangible goods / while products are categorized as either merchandise or services.

For purposes of our classification, Merchandise exports refer to all other goods / products exported that are not directly agricultural or manufactures. For example, exports of cultural artefacts, while these are made from materials such as sisal and wood, and mostly by small scale businesses enterprises, they do not fall under the category of agricultural / manufactures products and by products as per the WTO SITC categorization. Hence for this study, after we disaggregated exports into services, agriculture and manufactures, we included other merchandise to capture this group of commodities that while not officially identified into their own bulk, seem to contribute substantially to the economy as a whole. Still, given the nature of the economy, it is expected that the sectors intertwine and are co-dependent.

As such, we expected that a shock to agricultural exports would have the most significant impact on the economy. Our analysis however shows this not be the case, instead, it is a shock to merchandise exports that enlists a noticeable change. Immediately after the shock, National income, proxied by real GDP is seen to change by 2.5 per cent in 1995 with the highest estimated increase in 1996 of 5.2 per cent. Of the other variables, service exports show an initial change due to the shock in merchandise exports of 3.1 per cent, but then soon after, it reverts back to its initial estimated levels.

Table 10: Solution after introducing a Shock to Merchandise Exports

Percentage change after shock					
Variable	1995	1996	2000	2004	2007
Y	2.5	5.2	3.3	2.3	1.3
XS	3.1	0.0	0.0	0.0	0.0
XMERCH	10.5	18.5	4.1	0.9	0.4
XMANU	0.0	0.0	0.0	0.0	0.0
XAGRI	0.0	0.0	0.0	0.0	0.0
MD	0.6	2.5	3.9	2.5	1.8
M	2.7	5.1	3.8	1.9	0.9
INV	1.4	3.1	3.5	2.0	0.9
C	1.7	4.1	4.3	2.4	0.9

4.6.4.2 Scenario II – Price and Exchange Rate Effects

Our analysis indicates a negative and highly significant effect of relative export prices on demand for export, in all the disaggregate categories except in service exports. On the other hand REER, assumed exogenous in this case, also indicates a negative effect, albeit not significant except in manufactured exports. In our study, relative export prices (P_x), are given by export prices of domestic economy relative to the price of its competitors. As such, for our purposes, we vary export prices by increasing / decreasing P_x , this is the dollar price of the exports, achieved by introducing a 20 per cent mark-up on the domestic export price as well as a mark-down of the same percentage and solve our model expecting that; should export prices increase, this would result in an improvement of terms of trade as more can actually be imported for the same amount of exports, however, law of demand and supply stipulates that increasing prices results in decreased demand, and depending on the responsiveness of export demand to prices, this then can translate to fewer exports and as a result, a deterioration of terms of trade.

It is important to note that this change is also influenced by product quality and both the income effect and the elasticity of substitution of the export goods, implying the final outcome depends on the dominant effect. If elasticity of substitution is less than one, then the income effect dominates the substitution effect. For example, assuming import prices remain unchanged, a decrease in Kenyan exports price would imply an increase in real world incomes, in the event that Kenyan exports are inferior, importers of Kenyan goods might then choose to consume less, resulting in a worsening of terms of trade.

However, assuming normal goods and holding everything constant, a decrease in export prices would also imply increased export volumes. The increased income from the increased volume of traded exports then spills over to both increased demand for domestic goods and imports and the economy in general would achieve a different equilibrium, characterized in the long run by higher private consumption. In the long run, as incomes continue to increase, and because of the flexible exchange rate regime

held, this would lead to an appreciation of the exchange rate resulting in reduced demand for exports pushing the economy towards a new equilibrium, characterized by higher real GDP and private consumption.

The graph below shows some projected values for select macroeconomic variables after contracting export prices by 20 per cent beginning 1995, and the projected growth of key variables.

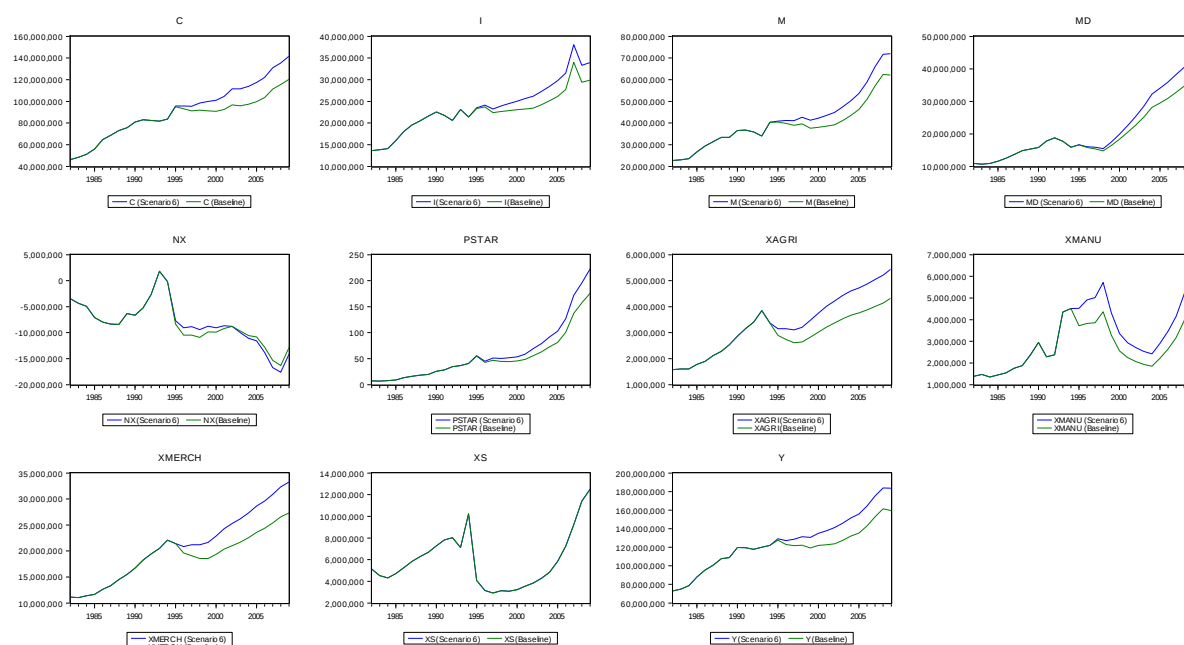


Figure 13: Solution after 20 Percent Decrease in Export Prices: 1982 – 2009

From the results, we confirm our expectations as discussed earlier. It is interesting to note that all export categories, except service exports, show a significant increase after the price reduction, while manufactures exports show the highest change. Private consumption and money demand also show a positive change after the price drop. We also note that immediately after the price reduction, net exports increase, however, this only lasts for a couple of years and by 2002, the net exports aren't as favourable, which is not surprising as the results indicate a gradual and continued increase in imports. Our results tally with those found by Musalia and Rao (2002) in that; for Kenya, imports

are affected in a similar manner to exports (Musalia, 2002). Despite this however, total national incomes are seen to increase by an average of 10 per cent and continue increasing after the price reduction. However, our results differ from theirs in that we find export prices have a significant impact on both the different categories of exports and total GDP. In addition, Figure 13 above indicates a positive change in money demand, as well as a positive and continuous change in investments, which can be attributed to the also noticeably positive change in private consumption as total income increases. The change in Investments is encouraging, leading economic development, better research and development as well as also infrastructural development, which would give rise to a more astute industrial sector, which is vital towards encouraging not just value addition, but also product diversification for the export sector of the economy. Increased investments also generate spill-overs into the labour markets, generating wealth and increasing private consumption, all of which push the economy towards high equilibrium levels. However, as the model is limited in its evaluation investments, as the disaggregation is not definitive of private and foreign investments, and as such, results are indicative of the sum total of investments in the economy.

We perform a similar simulation and increase export prices and find that Service exports remain unchanged in this case too. This is not surprising as previously, we found that prices, though exhibiting a negative relationship with service exports, were not a significant contributor to their demand, neither were exchange rates. Additionally, we note that while the change in price is varied by the same magnitude on either side, that is decrease and increase by 20 per cent, the price decrease produces slightly more pronounced effects than the increase. For example, private consumption increases to a high of 17.7 per cent in 2005 after the price drop, compared to an 11.4 per cent drop in the same year when there is a price increase. In general however, the changes noted within the different categories of exports and imports, including both net exports and real GDP are opposite with almost proportionate magnitudes observed after the export price changes.

Although we are primarily concerned with export prices here, these slight variations can be attributed to the fact that while export prices are exogenous and flexible, for purposes of production, prices such as labour costs tend to be sticky downwards, as a result, an increase in export prices might not necessarily induce the same trickle down effects as a decrease in export prices for the domestic economy.

Our results indicate that in line with demand and supply theory, as prices increase, demand for exports decreases. As demand decreases, to minimize loss, one of the options available to producers is to cut production costs by either finding more efficient ways of production including employing less labour especially as wages tend to be sticky downwards, implying a decrease in private consumption as personal incomes reduce, resulting in a vicious cycle represented in a downward trend of total income generation. In addition, the country tends to rely on many intermediate goods imports for production, as well as importing processed final use commodities including basic items for everyday use such as food items; for example cereals and grains. Even though Kenya grows its own rice, the country still imports Pakistani rice. Because of this, even while export earnings reduce due to reduced demand for exports following a price increase, it is possible that the bulk of the import budget remains unchanged, resulting in a balance of trade deficit, especially in the immediate short run. However, providing the elasticity of substitution of Kenyan exports is less than 1, it is possible that increased prices do not necessarily result in decreased export earnings, instead increased earnings for Kenya, which would have the same impact as that observed after a decrease in export prices. The figures below summarize the percentage deviations noted in the main macro-economic variables after both a price decrease and a price increase.

4.6.4.3 Price Decrease

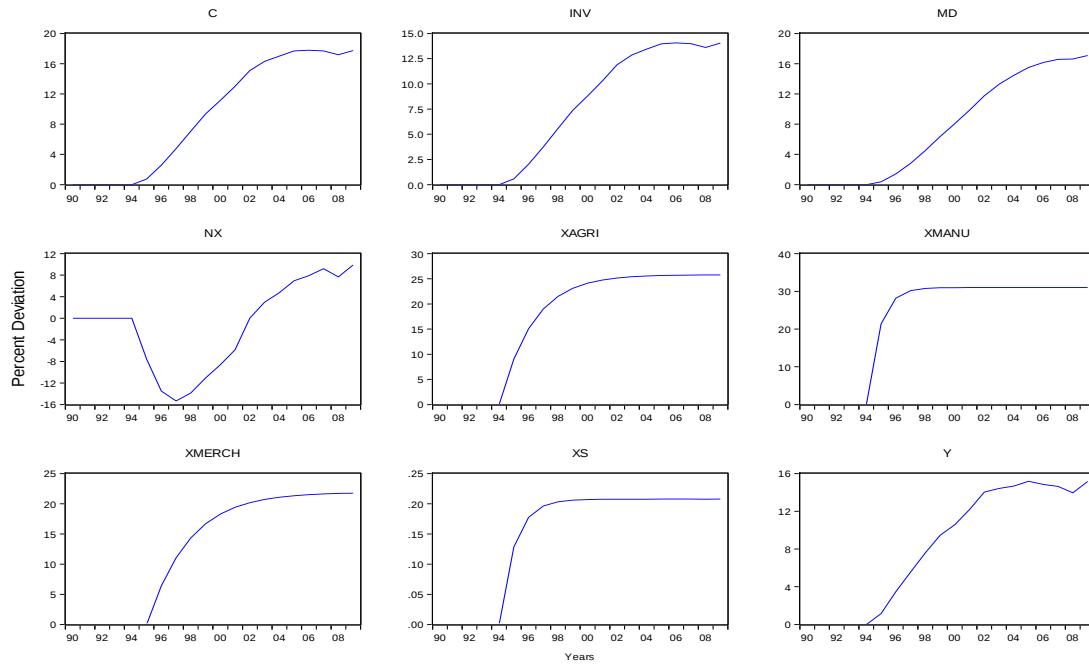


Figure 14: Solution after 20 Percent decrease in Export Prices: 1990 – 2009

4.6.4.4 Price Increase

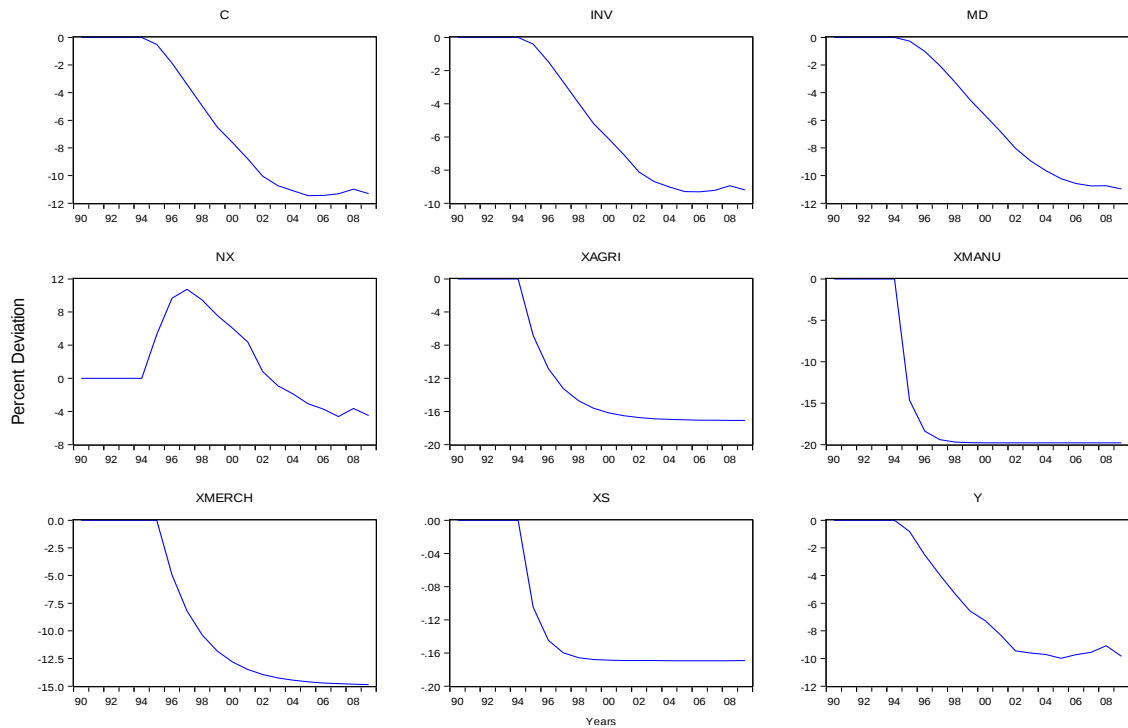


Figure 15: Solution after 20 Percent increase in Export Prices: 1990 – 2009

4.7 Conclusions

We construct a Kenyan macro-econometric model, with the primary aim of analysing the extent to which export variations affect the Kenyan economy via key macroeconomic variables and particularly, real GDP. Although we specify a theoretically sound demand oriented small macro model, identifying the fiscal, monetary, private and external sectors, this model is created solely for the purpose of examining the external sector and for this reason, we do not claim the model to be sufficient for the analysis of all other sectors.

For our purposes, the model performs satisfactorily and provides plausible results, finding that expectations, as informed by economic theory hold. We evaluate the performance of the model and its tracking capacity using both the MAPE and Theils inequality coefficient test and find that the results support the model's adequacy in tracking endogenous variables.

We also find that variations in exports caused significant variations in real GDP and other key macroeconomic variables such as private consumption and investments. In particular, an export price reduction causes a more substantial variation in real GDP compared to an increase. In addition, we also noted that neither a decrease nor an increase in export prices caused a change in the fiscal sector.

In summary, we found that for exports, the key significant determinants are world income and export prices. Real effective exchange rates have a negative relationship with exports but bear no significant effect. In addition, though the data shows an obvious shift between 1988 and 1993, included dummy variables do not improve estimations and are in most cases not significant, thus we leave them out, except one capturing the exchange rates liberalization in 1993.

Chapter 5

IN SUMMARY

This section summarizes the research carried out throughout the thesis, further concluding by laying out the important findings of the individual subsections in part two – Chapters two, three and four, of this thesis, based on the analysis carried out and results presented. The chapter also highlights some of the limitations of the study carried out, further giving insight into recommendations for future work.

5.1 FINDINGS

The main findings of the research carried out in this thesis can be summarised as follow: This thesis has made a number of original contributions with respect to Intra-Africa trade.

1. By applying the Gravity model to a select number of countries within Africa and comparing their trade patterns, within the context of economic integrations, research found that though registered and acknowledged as pre-existing, EIs are mostly yet at their formative stages, most still operating as Free Trade Areas (FTAs). The research found here goes on to show that while EIs have a positive impact on bilateral intra-African trade, their effect is not significant. However, the study finds that previously, in the 1980s, being part of the same EI was a significant contributing factor towards encouraging trade between and amongst member countries, while after 1990s, though noted to have positive effects; belonging to an EI does not show a significant effect towards promoting intra-African trade. However, a complete integration process, which is what African nations are moving towards, culminating in the formation of a fully integrated African Union operating one currency implies that there will be streamlining of among others, trade and industry policies.

2. In chapter three, the study seeks to find whether the continent is ready to successfully implement a currency union, by taking one of the EIs - EAC and using it as a representative agent for the continent. Research shows that while Africa barely meets the requirements according to OCA theory for the successful implementation of a currency union, there is hope for the continent to fulfil these requirements *ex-post*. The study, applying the G-PPP test approach finds that there is a co-integrating relationship amongst the real effective exchange rates for the EAC economies and that after experiencing shocks to the system, readjustments back to equilibrium is rather quick. The results indicate that a currency union can succeed in the region, concluding that by forming one, EAC is effectively setting up a platform for further and deeper integration, which as observed previously, will lead to not just increased volume of trade, but also a greater incidence of bilateral African trade. This section however acknowledges that although finances are a good place to start to bring everyone to the table, full convergence of economic systems will not automatically be easy and result in the formation of a stable EU, it might take a while and will require the streamlining of all other sectors of the individual economies, including foreign, industry and political sectors.
3. While carrying out the research presented in this thesis, we note that for Africa, in the quest to forming a unified African Union, a lot of emphasis has been placed on trade as the key vehicle in driving economic growth and development. Given this, the study sought to investigate and verify the significance of trade in economic growth and development. To achieve this, a small macro-econometric model was developed and applied to the Kenyan economy with the main objective of investigating how variations in trade translated to the general economy, by analysing various key macro-economic variables such as national income proxied by real GDP in our study, investments and consumption. By running various policy simulations, the results indicate that trade does have a significant effect on national income as variations in exports are shown to result

in significant variations of real national income as well as other macroeconomic variables.

4. The results presented in the research, in this thesis especially in chapter four, conclude thus that while effort must be made to advance the other sectors of the individual economies within Africa to promote rapid development, measures being taken to enhance and encourage intra-Africa trade are not just very important, but they must also not be restricted to methods that have minimum effects. For example, while formation of an EI is geared towards increasing trade amongst member economies, without advancing and promoting technology and industry, a lack of product differentiation will hinder bilateral trade. On the other hand, drastic measures, even such as the formation of a monetary union, prior to attaining all requirements for the formation of one, will provide the incentive and hasten the process of streamlining African economies, a process that will perhaps quicken overall development as countries are encouraged to share not just the market, but also research and development, benefiting from the vast array of resources available in the continent.

5.2 Policy Implications

The policy implications of the results obtained here are that although elimination of trade barriers and structural rigidities in any form of EI is especially useful, it is not enough by itself to encourage and promote bilateral trade within Africa. Instead, measures to stimulate investment flows from intra-regional and also extra-regional sources should be sought as trade entails the interaction of many sectors of the economy and advancing all is necessary to promote trade. With respect especially to intra-Africa trade, it is suggested that the process of integration should proceed at a faster rate and encourage more openness. As seen by efforts made by EAC, it is quite possible to go the extra mile and form stronger inter-dependent integrations such as a monetary union, and use that as a spring board towards full integration. Additionally, the significance of

trade in driving growth and development is evidenced in that variations in the external sector have significant effects on key macro-economic variables such as consumption and national income. For this reason, attempts must be undertaken to increase total intra-African bilateral trade, which can be achieved in various ways, including, diversification of products for export and improvement of production processes and quality produced.

5.3 Contributions, Limitations and Future Work

This study has made various significant contributions, among them, an original contribution to literature. While many studies are keen to investigate African trade, few have shown a focus on trade within the continent, the research presented here has sought to address this issue by investigating the significance of effects of trade in driving the African economies in general, including the significance of measures taken thus far, i.e. EIs, to promote and encourage trade within the region, as well as an investigation to see how feasible future plans to this end are. Further, the research here, though limited by availability of data in certain respects, has been carried out with a keen interest on including recent observations, allowing for an extended timeline in which to carry out the analysis. Further to this, the findings of this form the basis for coherent policy formulations with specific attention to Africa, EAC and Kenya respectively.

Among the limitations faced by this study include the fact that we consider trade only as far as the exchange of final commodities, while in reality, Africa is endowed with a wealth of raw materials that are especially crucial for the production of the vast majority of commodities. Given this, it is possible that while EIs are the vital to the enhancement of trade and by extension promote economic development, perhaps the concern does not just lie with the finished products but also the other intermediate goods, especially given the level and state of industrial development in the continent. As a result, the study has not sufficiently disaggregated trade to capture the different levels of trade in

raw material, intermediate products and finished commodities. In addition, the method applied, the gravity model, is limited in that although it analyses the impact of EIs on trade, sometimes EIs are endogenous, i.e. determined by trade. Also, it could be that EIs (as noted of many African relations) could be motivated by reasons and for reasons other than simply trade, e.g. the management of common resources, as is noted of the SADC group of countries. This study fails to distinguish the purpose of each EI and thus cannot effectively comment on the success of each.

In carrying out the research presented here, it was apparent that there are yet many questions that need to be answered. As a result, the study recognizes various other aspects that need further investigation, such as forming a better disaggregation categorization, to be more dynamic and accurate as mentioned above as well as:

Exploring how the service industry, telecommunications and transport networks can be enhanced to promote intra-Africa trade, while also, exploring the role of intermediate goods imports and production where possible, in overall development of trade as well as an analysis of spill over effects of bilateral trade on participating economies' development, sector by sector.

In addition, a more elaborate macro-model could be developed, one with the capacity to analyse the different sectors more comprehensively.

BIBLIOGRAPHY

- Achy, L. 2006. "Assessing Regional Integration Potential in North Africa." *MUNICH MPRA*.
- Adams, F. G. and Vial, J. 1991. "Comparisons of Macroeconometric Models of Developing." In *Countries. In Comparative Performance of US econometric Models*, by L. R. Klein, 260 - 285. Oxford: Oxford University Press.
- Aitken, N. D. 1973. "The Effect of the EEC and EFTA on European Trade: A Temporal Cross-Section Analysis." *American Economic Review* 63 (5): 881- 892.
- Alesina, A. and Barro, R. 2001. "Dollarization." *American Economic Review* 91 (2): 381 – 385.
- Alesina, A., Barro, R. and Tenreyro, S. 2002. *Optimum currency areas*. Working Paper, National Bureau of Economic Research.
- Alesina, A., Barro, R. and Tenreyro, S. 2002. *Optimum currency areas*. Working Paper, National Bureau of Economic Research, National Bureau of Economic Research.
- Anderson, J. E. 1979. "A Theoretical Foundation for the Gravity Equation." *American Economic Review* 69 (1): 106-116.
- Anderson, J. E. and Wincoop Van E. 2003. "Gravity with Gravitas: A Solution to the Border Puzzle." *American Economic Review* 91 (1): 170-192.
- Antonucci, D. and Girardi, A. 2006. "Structural Changes and Deviations from the PPP within the Euro Area." *Applied Financial Economics* 16: 185- 198.
- Asteriou, D. and Stephen, G. H. 2007. *Applied Econometrics A Modern Approach using E-Views and Microfit*. New York: Palgrave MacMillan.
- Athukorala, P. C. 1998. "Interest Rates, Saving and Investment: Evidence from India." *Journal of Oxford Development Studies* 26 (2).
- Balassa, B. 1987. *Economic Integration*. Vol. 2, in *A Dictionary of Economics*, by J., Milgate, M., and Newman, P. Eatwell, 43-47. London and Basingstoke: Macmillan.
- Balassa, B. 1964. "The Purchasing Power Parity Doctrine: A Reappraisal." *Journal of Political Economy* 72: 584-596.

- Baldwin, R. E. and Venables, A. 1995. *Regional Economic Integration*. Vol. 3, in *Handbook of International Economics*, by G. M. and Rogoff, K. Grossmn. Amsterdam: North-Holland.
- Baldwin, R. 1997. *Review of theoretical developments on regional integration*. Vol. 1, in *Regional Integration and Trade Liberalization in Sub-Saharan Africa: Framework, Issues and Methodological Perspectives*, by A., Elbadawi, I. and Collier, P. Oyejide, 24–88. London:: Macmillan .
- Baltagi, B. H. and Chang Y. J. 1994. “Incomplete panels: a comparative study of alternative estimators for the unbalanced one-way error component regression model.” *Journal of Econometrics* 62 (2): 67–89.
- Barro, Robert J. 1991. “Economic Growth in a Cross Section of Countries.” *Quarterly Journal of Economics* 106 (2): 407 - 443.
- Bautista, R. M. 1988. “Macroeconomic Models for East Asian Developing Countries.” *Asian-Pacific Economic Literature* 2 (2): 1- 25.
- Bayoumi, T. and Eichengreen, B. 1997. “Ever closer to heaven? An optimum-currency-area index for European countries.” *European Economic Review* 41: 761 – 770.
- Bayoumi, T. and Ostry, J. D. 1997. “Macroeconomic shocks and trade flows within sub-Saharan Africa: Implications for optimum currency arrangements.” *Journal of African Economies* 6 (3): 412 – 444.
- Bayoumi, T., Eichengreen, B. and Mauro, P. 2000. *On regional monetary arrangements for ASEAN*. Discussion Paper, CEPR , CEPR .
- Bergstrand, J. H. 1989. “The Generalized Gravity Equation, Monopolistic Competition, and the Factor-Proportions Theory of International Trade.” *Review of Economics and Statistics* 23: 143-153.
- Bergstrand, J. H. 1985. “The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence.” *Review of Economics and Statistics* 67 (3): 474-481.
- Bergstrom, A. R., Nowman, K. B. and Wymer, C. R. 1992. “ Gaussian Estimation of a Second Order Continous Time Macro-economic Model of the UK.” *Economic Modelling* (9): 313 - 351.

- Bhagwati, J. and Arvind P. 1996. "Preferential Trading Areas and Multilateralism: Strangers, Friends or Foes?" In *The Economics of Preferential*, by J. and Arvind, P. Bhagwati, 1-78. Washington D.C: AEI Press.
- Bhagwati, J. 1988. "Poverty and Public Policy." Chap. 25 in *Political Economy and International Economics*, edited by Douglas Irwin, Chp 25. Cambridge, , Mass: MIT Press.
- Bhagwati, J. 1968. "Trade liberalization among LDCs, Trade theory and GATT rules." Chap. 2 in *Value, Capital and Growth: Papers in honor of Sir John Hicks*, edited by J.N. Wolfe, 21-43. Edinburgh: Edinburgh University Press.
- Bhagwati, J. 1995. "U.S. Trade Policy: The Infatuation with Free Trade Areas." In *The Dangerous Drift to Preferential Trade Agreements*, by J. and Krueger, A. Bhagwati. Washington, D.C.: AEI Press.
- Bhagwati, J. 1971. "The Generalized Theory of Distortions and Welfare." Working papers, Department of Economics, Massachusetts Institute of Technology (MIT), Amsterdam.
- Bierens, H. J. 2000. "Nonparametric Nonlinear Cotrending Analysis, with an Application to Interest and Inflation in the United States." *Journal of Business and Economic Statistics* 18 (3): 323 - 337.
- Blomqvist, H. 1992. "Some Experiences from Regional Cooperation between Third World Countries- A South African perspective." Swedish school of Economics and Business Administration, Helsinki.
- Bodkin, R. G., Klein, L. R. and Marwah, K. 1986a. "Macroeconometric modelling as a background to development planning." *International Journal of Development Planning Literature*, 1 (1): 39-56.
- Bodkin, R. G., Klein, L. R. and Marwah, K. 1991. *A History of Macroeconometric Model- Building*, Edward Elgar, Aldershot. Brookfield, VT: Edward Elgar Publishing Co.
- Bodkin, R. G., Klein, L. R. and Marwah, K. 1986b. "Keynes and the origins of macroeconometric modelling." *Eastern Economic Journal* 7 (4): 442 - 450.
- Bonham, C., Gangnes, B. and Zhou, T. 2009. "Modeling Tourism: A Fully Identified VECM Approach." *International Journal of Forecasting* 25: 531 - 549.

- Brash, D. T. 2000. "The pros and cons of currency union - a Reserve Bank perspective." *Central Bank Articles and Speeches*, 22 May.
- Buigut, S. K. and Valev, N. T. 2004. "Eastern and Southern Africa Monetary Integration: A Structural Vector Autoregression Analysis." *Review of Development Economics* 10 (4): 586 – 603.
- Camarero, M. and Tamarit, C. 1996. "Cointegration and the PPP and the UIP Hypotheses: An Application to the Spanish Integration in the EC." *Open Economies Review* 7: 61 – 76.
- Capros, P., Karadeloglou, P. and Mentzas, G. 1990. "An Empirical Assessment of Macroeconometric and CGE Approaches in Policy Modelling." *Journal of Policy Modelling* 12 (3): 557 - 585 .
- Carrillo, C. and Li, C. A. 2002. *Trade Blocks and the Gravity Model: Evidence from Latin American Countries*. Working Paper, Department of Economics, Essex: University of Essex, UK.
- Cecchetti, S. G. 2010. "Strengthening the financial system: comparing costs and benefits." *Korea-FSB Financial Reform Conference*. Seoul.
- Challen, D. W. and Hagger, A. J. 1983. *Macroeconometric Systems: Construction, Validation and Applications*. London: Macmillan.
- Chigora, P. 2008. "An Analysis of The European Union (EU) Foreign Policy Towards Zimbabwe in the 21st Century International Relations." *CFP: 3rd Annual Conference of the ECSA-C Young Researcher's Network*. Edmonton, Alberta, Canada.
- . 2008. "The Eight Years of Interaction: Lessons from Zimbabwe's Look East Policy and the Future of African Countries and Asia-Pacific Region." *3rd Oceanic Conference on International Studies – OCIS*. Queensland: University of Queensland.
- Choudry, T. 2005. "Asian Currency Crisis and the Generalised PPP: Evidence from the Far East." *Asian Economic Journal* 19: 137-157.
- Corbo, V. and Cox, V. 1995. "Exchange Rate Volatility, Investment and Growth: Some New Evidence." In *Exchange Rates, Capital Flows and Monetary Policy in a*

- Changing World Economy*, by W., Gould, D. and Zarazaga, C. Gruben. Boston: Kluwer Academic Press.
- Coulibaly S., and Fontagné L. 2004. *South-South Trade: Geography Matters*. Working Paper, CEPII Research Center, Journal of African Economies .
- Deardorff, A. 1998. “Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical.” In *The Regionalization of the World Economy*, edited by J. Frankel, 7 - 22. Chicago: University of Chicago Press.
- Deardorff, A. V. 1984. *Handbook of International Economics*. 1. Edited by R. W. and Kenen, P. B. Jones. Vol. 1. Elsevier.
- Dennis, A. 2006. “The Impact of Regional Trade The Impact of Regional Trade North Africa Region.” *World Bank Policy Research*.
- Deraniyagala, S. and Fine, B. 2001. “New trade theory versus old trade policy: a continuing enigma.” *Cambridge Journal of Economics* 25 (6): 809 - 827.
- Diebold, F. X. 1998. “The Past, Present and Future of Macroeconomic Forecasting.” *Journal of Economic Perspectives* 12: 175-192.
- Dollar, D. and Kraay, A. 2002. “Growth Is Good For The Poor.” *Journal of Economic Growth* 7: 195 - 225.
- Dollar, D. and Kraay, A. 2001 . *Trade, Growth, and Poverty*. Washington D.C.: World Bank Working Paper Series, No. 2615. The World Bank.
- Eaton, J. and Kortum, S. 2001. “Technology, Trade, and Growth: A Unified Framework.” *European Economic Review: Papers and Proceedings* 45: 742-755.
- ECAFE. 1968. *Feasible Growth and Trade Gap Projections in the ECAFE Region*. Bangkok: Economic Commission for Asia and the Far East.
- Edwards, S. 1998. “Openness, productivity and growth: what do we really know?” *Economic Journal* 108: 383 – 398.
- Edwards, S. 1992. “Trade orientation, distortions, and growth in developing countries.” *Journal of Development Economics* 39 (1): 31 - 57.

- Eichengreen, B. and Irwin, D. D. 1997. "The role of history in bilateral trade flows." In *The Regionalization of the World Economy*, by Frankel J. Chicago: University of Chicago Press.
- Eichengreen, B. and von Hagen, J. 1996. *Fiscal Policy and Monetary Union: is there a Trade-off between Federalism and Budgetary Restrictions?* . Working Paper , NBER , NBER .
- Eicher, T. S. and Henn, C. 2008. *Preferential Trade Agreements Promote Trade Strongly, But Unevenly*. working paper, Washington: University of Washington.
- Elbadawi, I. 1992. *Have World Bank-supported Adjustment Programs Improved Economic Performance in Sub-Saharan Africa?* Working Paper, World Bank.
- Elbadawi, I. 1997. *The impact of Regional Trade and Monetary Schemes on Intra- Sub – Saharan African Trade*. Vol. 1, in *Regional Integration and Trade Liberalization in Sub – Saharan Africa*, by Oyejide A. et al (eds). London: Macmillan London.
- El-Erian, M. A. and Salomon, S. B. 1996. *Is MENA a Region? The Scope for Regional Integration*. Working Paper, IMF , IMF, 1-26.
- Elliott, J., Kwack, S. Y. and Tavlas, G. S. 1996. "An econometric model of the Kenyan economy." *Economic Modelling* 3: 2 – 30.
- Enders, W. and Hurn, S. 1994. "The Theory of Generalised Purchasing Power Parity: Tests in the Pacific Rim." *Review of International Economics* 2: 179-190.
- Enders, W. and Hurn, S. 1994. "Theory and tests of generalized purchasing-power parity. Common trends and real exchange rates in the Pacific Rim." *Review of International Economics* 2: 179 - 190.
- Enders, W. 1995. *Applied Econometric Time Series*. New York: Wiley.
- Engle, R. F. and Granger, C. W. J. 1987. "Co-integration and Error Correction: Representation, Estimation and Testing." *Econometrica* 55 (2): 257 - 276.
- Evans, G and Newham, J. 1998. *The Penguin Dictionary of International Relations*. Penguin Group.
- Evans, G. and Newnham, J. 1990. Herdfordshire, Harvester: The Dictionary of World Politics.

- Evenett, S. and Keller, W. 2002. "On Theories Explaining the Gravity Equation." *Journal of Political Economy* 110: 281-316.
- Evenett, S. J. and Keller, W. 1998. *On Theories Explaining the Success of the Gravity Equation*. Working pape, National Bureau of Economic Research.
- Feenstra, R. C., Markusen J. R. and Rose. A. K. 2001. "Using the Gravity Equation to Differentiate among Alternative Theories of Trade." *Canadian Journal of Economics* 34 (2): 430 – 447.
- Feenstra, R. C. 1990. *Distributing the Gains from Trade with Incomplete Information*,. Working Paper Series, National Bureau of Economic Research, Cambridge, Mass.: National Bureau of Economic Research.
- Feenstra, R. C. 2004. "Advanced International Trade: Theory and Evidence." In *Advanced International Trade: Theory and Evidence*. Princeton: Princeton and Oxford Press, Princeton University.
- Fine, J. and Yeo, S. 1997. *Regional integration in Sub-Saharan Africa: dead end or a fresh start' in* . Vol. 1, in *Regional Integration and Trade Liberalization in Sub-Saharan Africa: Framework, Issues and Methodological Perspectives*, by A., Elbadawi, I. and Collier, P. Oyejide, 429–74. London : Macmillan.
- Foroutan, F. and Pritchett, L. 1993. "Intra-Sub-Saharan African Trade: is it too little?" *Journal of African Economies* 2 (1): 74 - 105 .
- Frait, J., Komárek, L. and Kulhánek, L. 2000. *P-star-model based analysis of inflation dynamics in the Czech Republic*. Working Paper, Economics, University of Warwick, Coventry: University of Warwick.
- Frankel, J. A. and Rose, A. K. 2001. "An Estimate of the Effect of Common Currencies on Trade and Income." *Quarterly Journal of Economic* 117 (2): 437- 466.
- Frankel, J. A. and Rose, A. K. 1998. "The Endogeneity of the Optimum Currency Area Criteria." *Economic Journal* 108: 1009 - 1025.
- Frankel, J. A. and Rose, A. K. 1996. *Economic Structure and the Decision to Adopt a Common Currency*. Seminar Paper 611, Stockholm: Institute for International Economic Studies.
- Frankel, J. 1997. "Regional Trading Blocs." Working Paper, Institute for International Economics, Washington Dc.

- Frankel, J. and Romer, D. 1999. "Does trade cause growth? ." *American Economic Review* 89 (3): 379-399.
- Frankel, J., Stein, E. and Wei, S. J. 1995. "Trading Blocs and the Americas: The Natural, the Unnatural, and the Super-Natural." *Journal of Development Economics* 47: 61-95.
- Geda, A. 1999. *Preferential Reductions Of Trade Barriers: Some Theoretical Issues*. Working Paper, OAU - Economic Integration in Africa., OAU, Policy Analysis Support Unit , Addis Ababa: OAU.
- Ghosh, S. and Yamarik, S. 2004. "Are preferential trade agreements trade creating? An application of extreme bounds analysis." *Journal of International Economics* 63: 369-395.
- Glick, R. and Rose, A. 2001. "Does a Currency Union affect Trade? The Time Series Evidence." *NBER Working paper*.
- Green, C. J and Murinde, V. 1993. "The Potency of Stabilization Policy in Developing Economies: Kenya, Tanzania and Uganda." *Journal of Policy Modelling* 15 (4): 427-462.
- Greenaway, D. and Milner, C. 2002. *Intra-industry Trade: Current Perspectives and Unresolved Issues*. Weltwirtschaftliches Archiv, 39-48.
- Gros D. and Gonciarz, A. 1996. "A Note on the Trade Potential of Central and Eastern Europe." *European Journal of Political Economy* 12: 709-721.
- Grossman, G. M. and Helpman, E. 1991. *Innovation and Growth in the Global Economy*. MIT press, Cambridge, Massachusetts.
- Gujarati, N. D. 1995. *Basic Econometrics*. 3rd. New York: McGraw-Hill.
- Gunter, Frank R. 1989. "Customs Unions Theory: Retrospect and Prospect." In *Economic Aspects of Regional Trading Arrangements*, by D., Hyclack, T. and Thornton, R. Greenaway. New York: New York University Press.
- Haas, E. 1964. "Technocracy, Pluralism and the New Europe." In *A New Europe?*, by S.R. Graubard, 62–88. Boston: Houghton Mifflin.
- Hallaert, Jean-Jacques. 2007. "Can Regional Integration Accelerate Development in Africa? CGE Model Simulations of the Impact of the SADC FTA on the

- Republic of Madagascar.” IMF Working Paper, International Monetary Fund, w/p 07/66.
- Hallman, J. J., Porter, R. D. and Small, D. H. 1991. “Is the Price Level Tied to the M2 Monetary Aggregate in the Long Run?” *American Economic Review* 81 (4): 841 - 858.
- Harrigan, J. 1996. “ Openness to Trade in Manufactures in the OECD.” *Journal of International Economics* 40 ((1/2)): 23-39.
- Harrison, G., Rutherford, T. and Wooton, I. 1993. “An Alternative Welfare Decomposition for Customs Unions.” *Canadian Journal of Economics* 26: 961-968.
- Hazelwood. 1975. *Economic Integration: The East African Experience*. Nairobi: Heineman Publishers.
- Helpman, E. and Krugman, P. 1985. *Market Structure and Foreign Trade. Increasing Returns, Imperfect Competition, and the International Economy*. Cambridge, MA: MIT Press.
- Honohan, P. and Lane, P. 2000. *Will the Euro Trigger More Monetary Unions in Africa?* World Bank, Mimeo.
- Horvath, R. 2007. “Ready for Euro? Evidence on EU new member states.” *Applied Economics Letters* 14: 1083 – 1086.
- Howe, C. W. and Karani, H. 1965. “A Projection Model for the Kenyan Economy: A Study in Development Planning and Comparative Economic Structures.” *The East African Economic Review* 1 (2): 21 - 31.
- Hummels, D. and Levinsohn, J. 1995. “Monopolistic Competition and International Trade: Reconsidering the Evidence.” *Quarterly Journal of Economics* 110 (3): 799 - 836.
- Ichimura, S. and Matsumoto, Y. 1994. *Econometric Models of Asian-Pacific Countries*. New York: Springer-Verlag.
- Isard, W. 1975. “A simple Rationale for Gravity Model Type Behavior. .” *Papers of the Regional Science Association* 35: 25-30.

- Ishiyama, Y. 1975. "The Theory of Optimum Currency Areas: A Survey." *IMF Staff papers*, 344 - 383.
- Iversen, S. P. 1998. "The Czech Republic's Reintegration in the European Division of Labor: A Gravity Model Analysis." *Proceedings of Business and Economic Development in Central and Eastern Europe*. 257 - 280.
- Jaroslav, V. 1965. *General Equilibrium of International Discrimination: The Case of Customs Union*. Cambridge , MA: Havard University Press.
- Johansen, S. and Juselius, K. 1990. "Maximum Likelihood Estimation and Inference on Cointegration – with Applications to the Demand for Money." *Oxford Bulletin of Economics and Statistics* 52: 169-210.
- Johansen, S. 1988. "Statistical Analysis of Cointegrating Vectors." *Journal of Economic Dynamics and Control* 231 - 254.
- Johnson, D. 1990. "Co-integration, Error Correction, and Purchasing Power Parity between Canada and the United States." *Canadian Journal of Economics* 23: 839 – 855.
- Johnson, O. E. G. 1995. "Regional Integration in Sub-Saharan Africa." *Journal of European Integration* 18 (2 & 3): 201–34.
- Jonung, L. and Sjöholm, F. 1998. "Should Finland and Sweden form a monetary union?" Working Paper Series in Economics and Finance,.
- Karingi, S. N. and Ndung'u, N. S. 2000. *Macro Models of the Kenyan Economy: A Review*. Discussion Paper No. 2, , KIPPRA, KIPPRA.
- Kawasaki, K. and Ogawa, E. 2006. "What Should the Weights of the Three Major Currencies be in a Common Currency Basket in East Asia? ." *Asian Economic Journal* 20: 75–94.
- Kemp, Murray C. and Henry Wan, Jr. 1976. "An Elementary Proposition Concerning the Formation of Customs Unions." *Journal of International Economics* 6: 95-97.
- Kemp, Murray C. and Negishi, T. 1969. "Domestic Distortions, Tariffs, and the Theory of Optimum Subsidy." *Journal of Political Economy* 77 (6): 1011 - 1013.

- Kenen, P. B. 1969. "The Theory of Optimum Currency Areas: An Eclectic View." In *Monetary Problems of the International Economy*, by eds. R.A. Mundell and A. K. Swoboda. Chicago: University of Chicago Press.
- Kenen, P. B. and Rodrik, D. 1986. "Measuring and analysing the effects of short-term volatility in real exchange rates." *Review of Economics and Statistics* 68: 311 – 315.
- Kenya Sugar Board. 2009.
http://marsgroupkenya.org/pdfs/2011/01/Ministry_PDFS/Agriculture/Parastatals/Kenya_Sugar_Board/KSB_Investment_Guide.pdf.
- Keyfitz, R. 1994. "Kenya MELT3: A Macro Model for Kenya." *KIPPRA Discussion Paper*.
- Khayum, M. F. 1991. *Macroeconomic Modelling and Policy Analysis for Less Developed Countries*. Boulder: Westview Press.
- Kishor, N. K. and Ssozi, J. 2009. "Is the East African Community an Optimum Currency Area." Unpublished. – MPRA Paper.
- Kowalczyk, C. 2001. *The Theory of Trade Policy Reform*. Cheltenham, U.K: Edward Elgar Publishing Ltd.
- Kowalczyk, C. 2000. "Welfare and Integration." *International Economic Review* 41: 483-494.
- Krauss, M. B. 1972. "Recent Developments in Customs Union Theory: An Interpretive Survey ." *Journal of Economic Literature* 10: 413-436.
- Krueger, A. O. 1999. "Free Trade Agreements as Protectionist devices: Rules of Origin." In *Trade Theory and Econometrics : Essays in Honour of John S. Chipman.*, by J. R., Moore, J. C. and Riezman, R. Melvin. New York: Routledge.
- Krugman, P. 1991. *Geography and Trade*. Cambridge, MA: The MIT Press.
- Krugman, P. 1995. "Growing World Trade: Causes & Consequences." *Brookings Papers on Economic Activity* (1): 327.
- Krugman, P. 1987. "Is Free Trade Passé?" *The Journal of Economic Perspectives*. 1 (2): 131-44.

- Krugman, P. R. 1993. "The Narrow and Broad Arguments for Free Trade." *American Economic Review* 83: 362-366.
- Kvedaras, V. and Rudzkis, R. 2005. "A Small Macro-econometric Model of the Lithuanian Economy." *Australian Journal of Statistics* 34 (2): 185 - 197.
- Kwan, C. H. 1998. "The theory of optimum currency areas and the possibility of forming a yen bloc in Asia." *Journal of Asian Economics*, 9 (4): 555–580.
- Laabas, B. and Liman, I. 2002. *Are GCC countries ready for currency union*. Kuwait: Arab Planning Institute.
- Leamer, E. E. and Stern, R. M. 1970. *Quantitative International Economics*. Chicago: Aldine Press.
- Linder, S. B. 1961. *An Essay on Trade and Transformation*. Stockholm: Almqvist and Wiksell.
- Linnemann, H. 1966. *An Econometric Study of International Trade Flows*. Amsterdam: North: Holland Publishing Company.
- Lipsey, R. G. and Chrystal, K. A.,. 1995. "An Introduction to Positive Economics." *New York, United States Of America: Oxford University Press*.
- Lipsey, R. 1957. "The Theory of Customs Unions: Trade Diversion and Welfare." *Economica* 24 (93): 40-46.
- Lipsey, R. 1957. "The Theory of Customs Unions: Trade Diversion and Welfare." *Economica* 40-46.
- Lipsey, R. 1987. "The Theory of Customs Unions: A General Survey." In *International Trade: Selected Readings*. , by J.N .Bhagawati (ed.). Cambridge: The MIT Press.
- Lipumba, N. H. I. 1995. *Structural Adjustment Policies and Economic Performance of African Countries*. UNCTAD, Geneva: International Monetary and Financial Issues.
- Longo, R. and Sekkat, K. 2004. "Economic Obstacles to Expanding Intra-African Trade." *World Development* 32 (8): 1309 – 1321.

- Lyakurwa, W., McKay, A., Ng'eno, N. and Kennes, W. 1997. *Regional Integration in Sub-Saharan Africa: A Review of Experiences and Issues*. Vol. 1, in *Regional Integration and Trade Liberalization in Sub-Sahara*, by A., Elbadawi, I., and Collier, P. Oyejide. London: Macmillan .
- Maddala, G. S. and Mount, T. D. 1973. "A comparative study of alternative estimators for variance components models used in econometric applications." *Journal of the American Statistical Association* 68 : 324–328.
- Madhur, S. 2002. *Cost and Benefit of a Common Currency for ASEAN*. Working Paper, ERD, Asian Development Bank.
- Mankiw, G. 1997. *Principals of Economics - Theory and Problems of International Economics*. The Dryden Press Salvatore, McGraw-Hill.
- Martínez-Zarzoso, F. I. and Nowak-Lehmann, D. 2003. "Augmented gravity model: An empirical application to MERCOSUR-European Union trade flows." *Journal of Applied Economics* 2: 291-316.
- Masson, P. and Pattillo, C. 2004. "Monetary Union in West Africa – ECOWAS. Is it Desirable and How could it be Achieved?" *IMF Occasional Paper*.
- Masson, P. R. 2008. "Currency Unions in Africa: Is the Trade Effect Substantial Enough to Justify their Formation." *The World Economy, Wiley Blackwell* 31 (4): 533-547.
- McKinnon, R. I. 1963. "Optimum Currency Areas." *American Economic Review* 53: 717 – 725.
- Meade, J. E. 1955. "The Theory of Customs Unions." Amsterdam, North-Holland.
- Micco, A., Stein, E. and Ordóñez, G. 2003. "The Currency Union Effect on Trade: Early Evidence from EMU." *Economic Policy* 37: 313 - 356.
- Mkenda, B. K. 2001. *Is East Africa an Optimum Currency Area?* Working Paper, Economics, Goteborg: Goteborg University.
- Morgan, R. M. and Shelby D. H. 1996. "Relationship-Based Competitive Advantage: The Role of Relationship Marketing in Marketing Strategy." *working paper, The University of Alabama*.

- Mosley, P. 1994. "Decomposing the Effects of Structural Adjustment: The Case of Sub-Saharan Africa." In *Structural Adjustment and Beyond in Sub-Saharan Africa*, by R. and van der Kraaii, F. van der Hoeven. London: James Curry.
- Mundell, R. A. 1961. "A Theory of Optimum Currency Areas." *American Economic Review* 51: 657 – 665.
- Mundell, R. A. 1997. "Currency Areas, Common Currencies, and EMU,." *American Economic Review* 87 (2): 214-216.
- Musalia, J. W. and Rao, U. L. G. 2002. "A Forecasting model of the Kenyan Economy." *Economic Modelling* 19 (5): 801–814.
- Narasimham, N. V. A. 1956. *A Short-Term Planning Model for India*. Amsterdam: North-Holland.
- Ndulu, B. J. and O'Connell, S. A. 2007. *The Political Economy of Economic Growth in Africa, 1960-2000*, . Cambridge : Cambridge University Press.
- Neves, J. A., Stocco, L. and Da Silva, S. 2007. *Is Mercosur an Optimum Currency Area?* MPRA.
- Nitsch, V. 2001. *Honey I just shrunk the currency union effect on trade*. Berlin: Mimeo.
- Novy, D. 2007. *Gravity Redux: Measuring International Trade Costs with Panel Data*. Warwick: Warwick Economic Research Papers.
- Nyuydine, E. N. and Rank, S. 2007. *European Union - African Union Strategy: A youth Perspective*. Paper, International relations Institute of Cameroon, IRIC. <http://europafrika.files.wordpress.com/2007/08/cameroon-national-youth-consultaiton-report.pdf>.
- Ogunkola, E. O. 1994. *An Empirical Evaluation of Trade Potential in the Economic Community of West African States*. Final Research Report, Nairobi: African Economic research Consortium – AERC.
- Oliver, R. and Atmore, A. 1994. *Africa Since 1800*. Cambridge: Cambridge University Press.
- Oyejide, T. A. 2000. "Interests and Options of Developing countries and LDCs in a New Round of Multilateral Trade Negotiations." Discussion Paper, G-24, New York.

- Paas, T. 2000. "The Gravity Approach for Modelling International Trade Patterns for Economies in Transition." *International Advances in Economic Research* 6 (4): 633 - 648.
- Pakko, M. R. and Wall, H. J. 2001. "Reconsidering the Trade-Effects of a Currency Union." *Review of the Federal Reserve Bank of St. Louis*, Sep / Oct: 37 - 46.
- Persson, T. 2001. "Currency Unions and Trade: How Large is the Treatment Effect?" *Economic Policy* 33: 433- 448.
- Pindyck, R. S. and Rubinfeld, D. L. 1991. *Econometric models and economic forecasts*. 3rd. New York: McGraw-Hill, Inc.
- Porter, M. E. 1990. *The Competitive Advantage of Nations*. New York: The Free Press.
- Poyhonen, P. 1963. "A Tentative Model for the Volume of Trade Between Countries." *Weltwirtschaftliches Archiv* 90 (1): 93 - 99.
- Puga, D. and Venables, A. 1998. "Trading Arrangements and Industrial Development." *The World Bank Economic Review* 12: 251--270.
- Ra, S. and Rhee, C. Y. 2005. *Nepal Macro-econometric Model*. Working Paper, Nepal Resident Mission, Mimeo / Asian Development Bank.
- Rauch, J. E. 1999. "Networks versus markets in international trade." *Journal of International Economics* 48 (1): 7– 35. .
- Robinson, P. 1996. "Potential Gains from Infrastructural and Natural Resource Investment Coordination in Africa." In *Regionalism and the Global Economy: The Case of Africa*, by Teunissen J.J. The Hague: FONDAD.
- Romer, P. M. 1986. "Increasing Returns and Long-Run Growth." *Journal of Political Economy* 94 (5).
- Rono, J. K. 2002. *The Impact of the Structural Adjustment Programmes on Kenyan Society*. Article , *Journal of Social Development in Africa*. <http://archive.lib.msu.edu/DMC/African%20Journals/pdfs/social%20development/vol17no1/jsda017001007.pdf>.
- Rose, A. 1994. "Are Exchange Rates Macroeconomic Phenomena?" *Federal Reserve Bank of San Francisco Economic Review*, 19-30.

- Rose, A. K. and van Wincoop, E. 2001. "National Money as a Barrier to International Trade: The Real Case for Currency Union." *American Economic Review* 91 (2): 386 - 390.
- Rose, A. K. 2000. "One Money, One Market: The Effect of Common Currencies on Trade." *Economic Policy* 15 (30): 7 - 46.
- Rose, A. K. 2002. "One Reason Countries Pay Their Debts: Renegotiation and International Trade." *NBER Working Paper*.
- Sachs, J. D. and Warner, A. M. 1995. "Economic Reform and the Process of Global Integration Papers on Economic Activity." *Brookings* 1-118.
- Salvatore, D. 1999. "Could the Financial Crisis in Asia Have Been Predicted?" *Journal of Policy Modelling* 31 (3): 341– 348.
- Savvides, A. 1998. "Inflation and Monetary Policy in Selected West and Central African Countries." *World Development* 26 (5): 809- 827.
- Senhadji-Semlali, A., Faini, R., and Clavijo, F. 1992. "The fallacy of composition argument: Is it relevant for LDCs' manufactures exports?" *European Economic Review* 36 (4): 865–882.
- Shaaeldin, E. 1991. "African Alternative Framework to Structural Adjustment Programmes for Socio-Economic Recovery and Transformation." *The Journal of Modern African Studies*, 29: 328-332.
- Shourie, A. 1972. "The use of macro-economic models of developing countries for forecasts and policy prescription: some reflections on current practice." *Oxford Economic Papers* 24 (1): 1- 35.
- Sideris, D. 2009. *Optimum Currency Areas, structural changes and the endogeneity of the OCA criteria: evidence from six new EU member states*. working paper, Bank of Greece.
- Smith, A. 1776. *An Inquiry into the Nature and Causes of the Wealth of Nations*. 5TH. Edited by Edwin Cannan. Methuen and Co. Ltd, London. Accessed 1904.
- Smith, A. and Venables, A. J. 1988. "Completing the Internal Market in the European Community: Some Industry Simulations." *European Economic Review* 32: 1501 – 1525.

- Spencer, C. 2011. "Development: Global Needs, Goals, Issues and Concepts." 08 OCT. <http://www.global-challenges.org/06development-issues.html>.
- Summers, L. H. 1991. "Regionalism and the World Trading System." *Policy Implications of Trade and Currency Zones*, 295 – 301.
- Swamy, G. 1994. "Kenya: Patchy, intermittent commitment." In *Adjustment in Africa: lessons from Country case studies*, by I. and Faruquee, R. Husain. Washington DC: World Bank.
- Tavlas, G. S. 2008. "The Benefits and Costs of Monetary Union in Southern Africa: A Critical Survey of the Literature." *Journal of Economic Surveys* 23 (1): 1 – 43.
- Tavlas, G. S. 2009. "Optimum-Currency-Area Paradoxes." *Review of International Economics* 17 (3): 536 – 551.
- Tenreyro, S. 2001. *On the Causes and Consequences of Currency Unions*. Paper, Department of Economics, Harvard University.
- Teshome, M. 1998. "Multilateralism and Africa's Regional Economic Communities." *Journal of World Trade* 32 (4): 115-138.
- Thom, R. and Walsh, B. 2002. "The effect of a common currency on trade: Ireland before and after the sterling link." *European Economic Review* 46: 1111–1123.
- Tinbergen, J. 1962. *Shaping the World Economy*. New York: The Twentieth Century Fund.
- Turner, P. M. 2009. "Testing for Cointegration using the Johansen Method: Are we using the correct critical values?" *Journal of Applied Econometrics* 24: 825-831.
- Uebe, G. 1995. *World of Economic Models: A Catalogue of Typical Specifications of Economic Models*. Aldershot: Avebury.
- UNCTAD. 1968. *Trade Prospects and Capital Needs of Developing Countries*. United Nations Conference on Trade and Development, New York: UN - United Nations.
- UNECA. n.d. "Assessing Regional Integration in Africa (ARIA III) - Monetary Integration in Africa." <http://www.uneca.org/aria3/Chap6.pdf>.

- United Nations Conference on Trade and Development. 1968. *Trade Prospects and Capital Needs of Developing Countries*. New York: UN - United Nations.
- Valadkhani, A. 2005. *Macro-econometric Modelling: Approaches and Experiences in Developing Countries*. Department of Economics, University of Wollongong.
- Valadkhani, A. 2005. "Macroeconomic Modelling: Approaches and Experiences in Development Countries." *Applied Econometrics and International Development* 5 (1).
- Vamvakidis, A. 1998. *Regional Trade Agreements Versus Broad Liberalization: Which Path Leads to Faster Growth? Time-Series Evidence*. IMF Working paper WP/98/40 , IMF , Washington DC: International Monetary Fund, WP/98/40 .
- Venables, A. J. 2000. *Winners and Losers from Regional Integration Agreements*. LONDON: London School of Economics and CEPR. <http://www.cepr.org/meets/wkcn/2/2306/papers/venables.pdf>.
- Venables, A. 1999. *Regional Integration Agreements: a Force for Convergence or Divergence?* Working Paper, World Bank , World Bank .
- Viner, Jacob. 1955. "International Trade Theory and Its Present Day Relevance." In *Economics and Public Policy*, edited by A. Smithies. Washington DC,: Brookings Institution.
- . 1950. "The Customs Union Issue." *Carnegie Endowment for International Peace*. New York.
- Walz, U. 1997. "Dynamic Effects of Economic Integration: A Survey." *Open Economies Review* 8: 309 – 326.
- . 1999. *Dynamics of Regional Integration*. Heidelberg, Germany: Heidelberg and New York.
- Westaway, P. F. 1995. "The Role of Macroeconomic Models in the Policy Design Process." *National Institute Economic Review* (151): 53- 64.
- Westerlund, J. and Wilhelmsson, F. 2006. "Estimating the gravity model without gravity using panel data." *Applied Economics* 43: 641-649.

- Williamson, J. 1999. "The Case for a Common Basket Peg for East Asian Currencies." In *Exchange Rate Policies in Emerging Asian Countries*, by S., Pisani-Ferry, J. and Park, Y. Collignon. London: Routledge.
- Wilson, P. and Choy, K. M. 2007. "Prospects for Enhanced Exchange Rate Cooperation in East Asia: Some Preliminary Findings from Generalized PPP Theory." *Applied Economics* 39: 981–995.
- Winters, A. L., McCulloch, N. and Andrew McKay, A. 2002. "Trade Liberalisation and Poverty: The Empirical Evidence." Discussion Papers, Economics, University of Sussex.
- Winters, A., McCulloch, N. and McKay, A. 2004. "Trade Liberalization and Poverty: The Evidence So Far." *Journal of Economic Literature* 42: 72-115.
- Winters, L. A. and Won Chang, W. 2000. "Regional Integration and Import Prices: An Empirical Investigation." *Journal of International Economics* 51: 363-377.
- Wonnacott, P. and Mark L. 1989. "Is There a Case for Free Trade Areas?" In *Free Trade Areas and U.S. Trade Policy*, by In Jeffrey Schott, 59 - 84. Washington, DC: Institute for International Economics.
- WTO. n.d. *World trade Organization*.
http://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm9_e.htm#origin.
- Yu, E. S. H. and Scully, W. G. 1975. "Domestic Distortions and the Theory of Customs Unions." *Southern Economic Journal* 42: 218 -224.

APPENDICES – I

Appendix I

Hausman (1978) Test

Test Summary		Chi-Sq. Stat	Chi-Sq. d.f.	Prob.
Cross-section random		2798.246	9.000	0.000
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
LN _{YI}	0.465	1.076	0.002	0.000
LN _{YJ}	0.376	0.743	0.001	0.000
LN _{POPI}	0.254	0.610	0.001	0.000
LN _{POPJ}	2.882	0.887	0.002	0.000
YI _{YJ}	-0.183	0.046	0.000	0.000
L _{ND}	-3.375	-2.806	0.010	0.000
L	0.301	0.596	0.012	0.008
EI	0.255	0.142	0.016	0.365
Z	0.566	0.496	0.007	0.420

Simple Correlations – Multi-collinearity Test

Correlation	LN _{XIJ}	LN _{YI}	LN _{YJ}	LN _{POPI}	LN _{POPJ}	L _{ND}	YI _{YJ}	L	EI	Z
LN _{XIJ}	1.000									
LN _{YI}	0.045	1.000								
LN _{YJ}	0.020	-0.019	1.000							
LN _{POPI}	0.193	-0.458	0.014	1.000						
LN _{POPJ}	0.165	0.017	-0.268	-0.008	1.000					
L _{ND}	-0.379	0.142	0.145	-0.102	-0.031	1.000				
YI _{YJ}	-0.061	0.329	0.318	-0.143	-0.100	0.101	1.000			
L	0.335	-0.089	-0.103	0.077	0.065	-0.574	-0.144	1.000		
EI	-0.029	-0.015	-0.116	0.005	-0.030	-0.014	-0.092	0.010	1.000	
Z	0.232	-0.103	-0.085	0.054	0.019	-0.452	-0.083	0.291	0.108	1.000

Appendix 2

Basic Gravity Model before adjustments

Dependent Variable: LNXIJ

Sample – 1980 2008; Periods included – 29;

Method: Panel Least Squares

Table 1	Coeff	Std. Error	t-Stat	Prob
C	11.61307	0.149431	77.71531	0
LNUI	0.619878	0.025617	24.19812	0
LNUIJ	0.481006	0.025709	18.70944	0
LND	-3.576074	0.038433	-93.04622	0
R-sq.	0.159644	Mean dependent var		2.120049
Adj R-sq.	0.15959	S.D. dependent var		2.769188
S.E. of regression	2.538622	Akaike info criterion		4.701206
RSS	298301.3	Schwarz criterion		4.701962
Log likelihood	-108807.8	Hannan-Quinn criter.		4.701444
F-stat	2931.081	Durbin-Watson stat		0.406777
Prob(F-stat)	0			

Adjusted Basic Gravity Model

Dependent Variable: LNXIJ

Method: Panel Least Squares

White cross-section standard errors & covariance (no d.f. correction)

Sample – 1980 2008; Periods included – 29; Cross-sections included – 1802;

Total panel (unbalanced) observations – 46291

Table 2	Coeff	Std. Error	t-Stat	Prob
C	12.46791	0.890677	13.99823	0
LNUI	0.332207	0.120968	2.746245	0.006
LNUIJ	0.271285	0.060202	4.506252	0
LND	-3.440261	0.218839	-15.72052	0
Effects Specification				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
Weighted Statistics				
R-sq.	0.636398	Mean dependent var		2.120049
Adj R-sq.	0.621415	S.D. dependent var		2.769188
S.E. of regression	1.70386	Akaike info criterion		3.942462
F-stat	42.47445	Schwarz criterion		4.288649
Prob(F-stat)	0	Hannan-Quinn criter.		
Mean dependent var	2.120049	Durbin-Watson stat		0.934722

APPENDICES – II

Appendix 3

VECM Model Estimation Output

RBBER_USD					
Error Correction:	D(LNBU)	D(LNKE)	D(LNRW)	D(LNTZ)	D(LNUG)
R-squared	0.134704	0.495644	0.527108	0.165854	0.728239
Adj. R-squared	-0.138547	0.336373	0.377774	-0.09756	0.642419
Sum sq. resids	0.068374	0.063386	0.043798	0.198671	0.10368
F-statistic	0.492968	3.111964	3.529721	0.62963	8.48572
Log likelihood	40.33877	41.3236	46.12911	26.47222	34.92666
Akaike AIC	-2.564521	-2.640277	-3.00993	-1.49786	-2.14821
Schwarz SC	-2.225802	-2.301559	-2.67121	-1.15915	-1.80949
Mean dependent	0.012967	-0.009201	0.006271	0.020445	0.025375
S.D. dependent	0.05622	0.070902	0.060866	0.097606	0.123533
Determinant resid covariance (dof adj.)		4.05E-13	Akaike information criterion		-12.8371
Determinant resid covariance		8.44E-14	Schwarz criterion		-10.9016
			Log likelihood		206.8825
RBBER_GBP					
Error Correction:	D(LNBU)	D(LNKE)	D(LNRW)	D(LNTZ)	D(LNUG)
R-squared	0.757158	0.821814	0.936726	0.775531	0.759287
Adj. R-squared	0.470164	0.611231	0.861949	0.510249	0.474807
Sum sq. resids	0.044566	0.045766	0.011018	0.086239	0.106344
F-statistic	2.638233	3.902559	12.52679	2.92342	2.669038
Log likelihood	43.6474	43.31509	61.11516	35.39535	32.77597
Akaike AIC	-2.371792	-2.345207	-3.76921	-1.71163	-1.50208
Schwarz SC	-1.689221	-1.662637	-3.08664	-1.02906	-0.81951
Mean dependent	0.012317	-0.007009	0.008812	0.022926	0.017997
S.D. dependent	0.087445	0.10345	0.08518	0.126523	0.135675
Determinant resid covariance (dof adj.)		7.03E-14	Log likelihood		252.5251
Determinant resid covariance		1.16E-15	Akaike information criterion		-13.402
			Schwarz criterion		-9.25783
RBBER_KSHS					
Error Correction:	D(LNBU)	D(LNRW)	D(LNTZ)	D(LNUG)	
R-squared	0.055118	0.304571	0.110625	0.186665	
Adj. R-squared	-0.181102	0.130713	-0.11172	-0.01667	
Sum sq. resids	0.340717	0.196833	0.450988	0.583258	
F-statistic	0.233335	1.751842	0.497541	0.918022	
Log likelihood	19.46	26.59302	15.81494	12.47149	
Akaike AIC	-1.035385	-1.584078	-0.755	-0.49781	
Schwarz SC	-0.745055	-1.293748	-0.46467	-0.20748	
Mean dependent	0.082616	0.07592	0.090094	0.095024	
S.D. dependent	0.120099	0.106403	0.14242	0.169366	
Determinant resid covariance (dof adj.)		2.58E-09	Log likelihood		123.1724
Determinant resid covariance		9.02E-10	Schwarz criterion		-5.96608
Akaike information criterion		-7.32095			

Residual Unit Root Tests

Group unit root test: Summary				
Automatic selection of lags based on SIC: 0				
Newey-West bandwidth selection using Bartlett kernel				
Balanced observations for each test				
RBER_USD				
Series: RESID06, RESID07, RESID08, RESID09, RESID10				
Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-7.81546	0.0000	5	125
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-7.56513	0.0000	5	125
ADF - Fisher Chi-square	65.8627	0.0000	5	125
PP - Fisher Chi-square	66.0362	0.0000	5	125
RBER_GBP				
Series: RESID01, RESID02, RESID03, RESID04, RESID05				
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-9.49319	0.0000	5	120
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-10.8139	0.0000	5	120
ADF - Fisher Chi-square	96.3208	0.0000	5	120
PP - Fisher Chi-square	104.453	0.0000	5	120
RBER_KSH				
Series: RESID01, RESID02, RESID03, RESID04				
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.66129	0.0000	4	100
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-7.6528	0.0000	4	100
ADF - Fisher Chi-square	60.3784	0.0000	4	100
PP - Fisher Chi-square	60.4279	0.0000	4	100
** Probabilities for Fisher tests are computed using an asymptotic Chi				

APPENDICES – III

Appendix 4

A. The Kenyan Macro-econometric Model – Unit Roots

Table 1: Unit Root Testing - Method: ADF					
Series	Levels (prob.)	1st – Diff (prob.)	Series	Levels (prob.)	1st – Diff (prob.)
C01	0.9989	0.0002	NX	0.9214	0.0000
CPI	1.0000	0.0349	REER	0.6582	0.0000
DEFICIT	0.9049	0.0005	RR	0.0083	0.0000
DT	0.9436	0.0443	SB	0.0023	0.0000
EXR	0.9812	0.0000	TREV	0.8981	0.0000
FDI	0.0000	0.0000	X	0.9430	0.0000
G	0.8295	0.0003	XAGRI	0.1219	0.0001
GNI	0.9998	0.0022	XG	0.1822	0.0029 (T&I)
GOV_REV	0.9236	0.0004	XMANU	0.5243	0.0000
INDT	0.9489	0.0002	XMERCH	0.8268	0.0000
INV	0.9883	0.0000	XPI	0.9113	0.0000
M2	0.6976	0.0001	XS	1.0000	0.0000 (T&I)
M	0.9978	0.0000	Y	0.9998	0.0023
MPI	0.7783	0.0000	YD	0.9998	0.0023
NTAX	0.9604	0.0003	YW	0.9976	0.0260
NON TAX REV (NT)				0.0000	0.0018

B. Equations

$$Y = C + I + G + X - M$$

$$C = F(Y_d, r_t)$$

$$Y_d = (Y_t, T_t)$$

$$\ln C_t = \alpha_0 + \alpha_1 \ln Y_d + \alpha_2 \ln \pi_t + \alpha_3 \ln r_t + \varepsilon_t; \alpha_1 > 0, \alpha_2, \alpha_3 < 0$$

$$TI_t = I_d + I_f + SB$$

$$I_d = F(Y_t, r_t)$$

$$I_f = FDI$$

$$\ln I_d = \partial_0 + \partial_1 \ln Y_t + \partial_2 \ln r_t + \varepsilon_t; \partial_1 > 0, \partial_2 < 0$$

$$BD = GR - GE$$

$$GR = T + NT$$

$$T_t = f(Y_n, At_t)$$

$$\ln T_t = \theta_0 + \theta_1 \ln Y_n + \theta_2 \ln At_t + \varepsilon_t; \theta_1 > 0, \theta_2 > 0$$

$$NX = X - M$$

$$X = f(P_x, Y_w, RER)$$

$$\ln X_t = \gamma_0 + \gamma_1 \ln P_x + \gamma_2 \ln Y_w + \gamma_3 \ln RER + \varepsilon_t; \gamma_1 < 0, \gamma_2 > 0, \gamma_3 < 0$$

$$M = f(P_m, Y)$$

$$\ln M_t = \delta_0 + \delta_1 \ln P_m + \delta_2 \ln Y + \varepsilon_t; \delta_1 < 0, \delta_2 > 0$$

$$MD = M2$$

$$M2 = f(Y, r_t, \pi)$$

$$\ln M2 = \sigma_0 + \sigma_1 \ln Y + \sigma_2 \ln r_t + \sigma_3 \ln \pi + \varepsilon_t; \sigma_1 > 0, \sigma_2, \sigma_3 < 0,$$

$$P = M_s V / Y$$

$$P^* = M_s V^* / Y^*$$

$$P - P^* = (V - V^*) + (Y^* - Y)$$

$$\Delta \pi = 0 \quad \text{if} \quad (P^* = P)$$

$$\Delta p_t = \delta_0 + \delta_1 \Sigma \Delta p_{t-1} + \delta_2 \Sigma \Delta (p_{t-1}^* - p_{t-1}) + \varepsilon$$

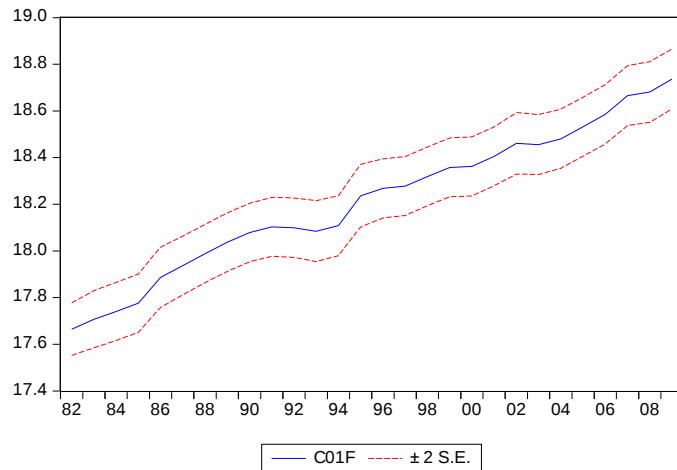
$$\text{If } \Pi = (p_{t-1}^* - p_{t-1})$$

$$\Delta p_t = \delta_0 + \delta_1 \Sigma \Delta p_{t-1} + \delta_2 \Sigma \Delta \Pi + \varepsilon$$

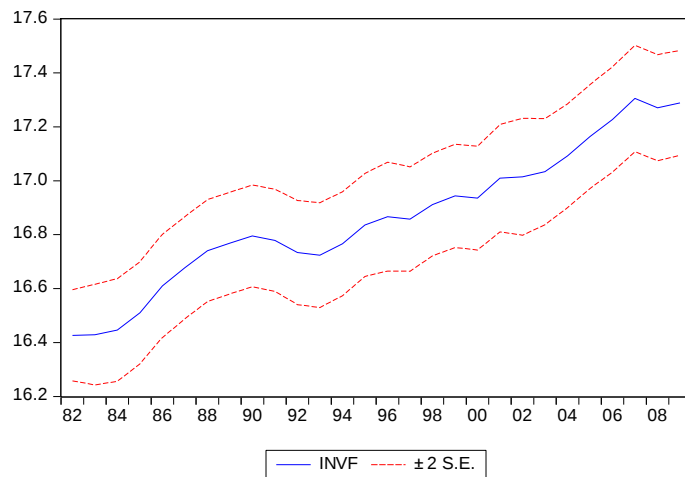
C. Variables Included in the Model

	Variables	Description
id	Y	Real Gross Domestic Product (GDP)
en	C	Real Private Consumption
en	I	Real Private Investments
ex	G	Government Consumption and Expenditures
en	M	Real Imports
en	X	Real Exports
ex	Y_n	nominal output
ex	Y_w	world income
ex	Y_d	disposable income
en	TI	Total investments
en	I_d	domestic investments
en	I_f	foreign investments
en	FDI	Foreign direct investments
ex	R	interest rates
ex	REER	real effective exchange rate
id	BD	government budget deficit
id	GE	government expenditures
id	GR	government revenues
id	SB	change in inventories
en	T	sum of direct and indirect total taxes
en	NT	non-tax revenues
id	NX	net exports
en	X	total exports of goods and services
en	M	net imports
ex	X_{pi}	relative export prices
ex	M_{pi}	relative price of imports
id	$MD = M2$	demand for real money
ex	MS	money supply
ex = Exogenous; en = Endogenous; id = identity		

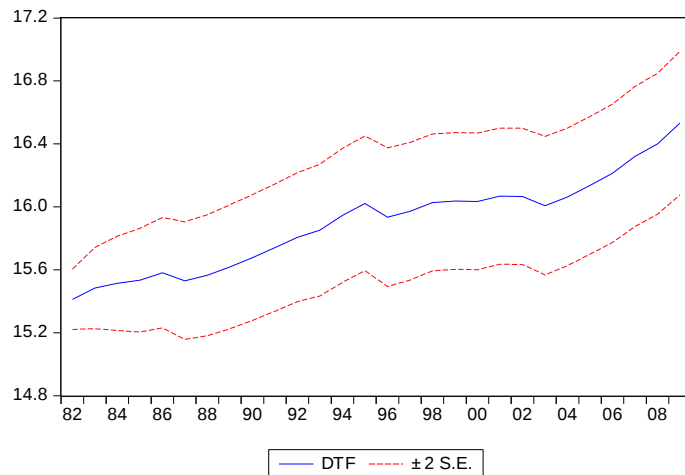
D. Individual Equation forecasts



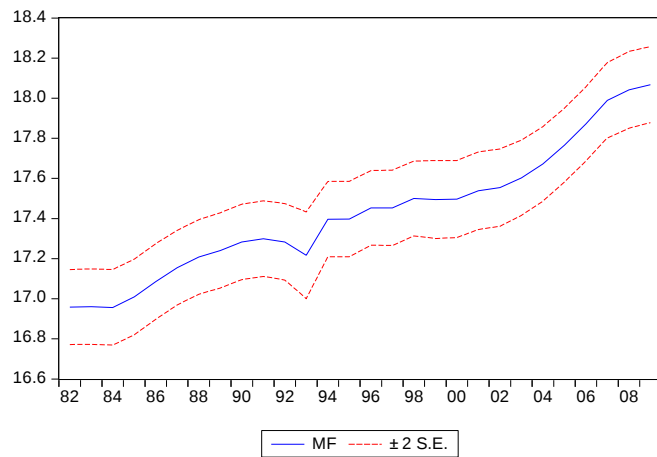
Forecast: C01F
 Actual: LOG(C01)
 Forecast sample: 1982 2009
 Included observations: 28
 Root Mean Squared Error 0.058989
 Mean Absolute Error 0.050047
 Mean Abs. Percent Error 0.276531
 Theil Inequality Coefficient 0.001619
 Bias Proportion 0.031974
 Variance Proportion 0.476251
 Covariance Proportion 0.491775



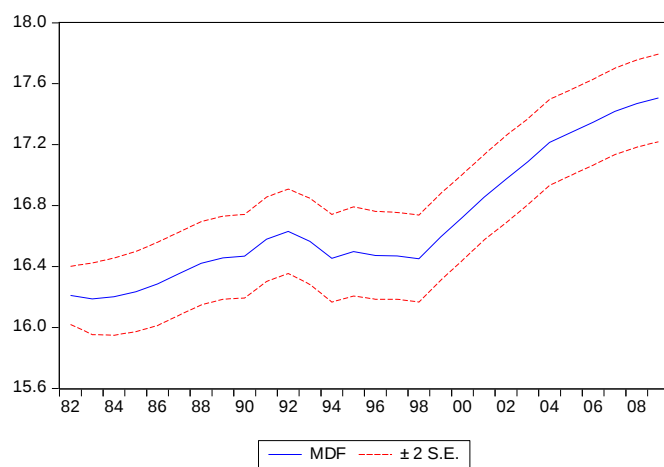
Forecast: INV
 Actual: LOG(INV)
 Forecast sample: 1982 2009
 Included observations: 28
 Root Mean Squared Error 0.085251
 Mean Absolute Error 0.070012
 Mean Abs. Percent Error 0.414943
 Theil Inequality Coefficient 0.002528
 Bias Proportion 0.017777
 Variance Proportion 0.025400
 Covariance Proportion 0.956823



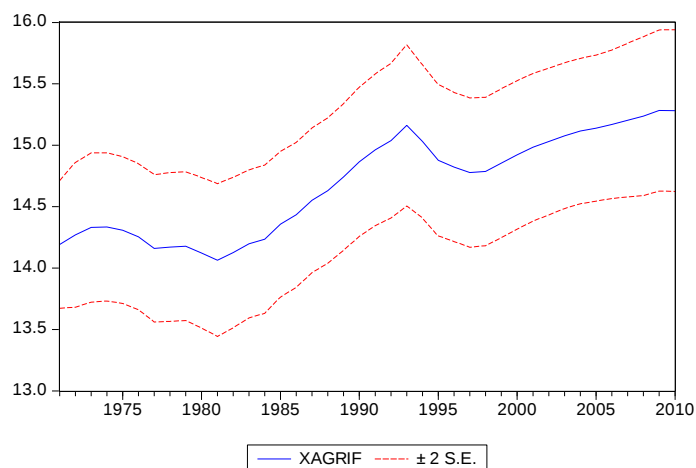
Forecast: DTF
 Actual: LOG(DT)
 Forecast sample: 1982 2009
 Included observations: 28
 Root Mean Squared Error 0.139700
 Mean Absolute Error 0.120302
 Mean Abs. Percent Error 0.757063
 Theil Inequality Coefficient 0.004393
 Bias Proportion 0.000221
 Variance Proportion 0.098909
 Covariance Proportion 0.900870



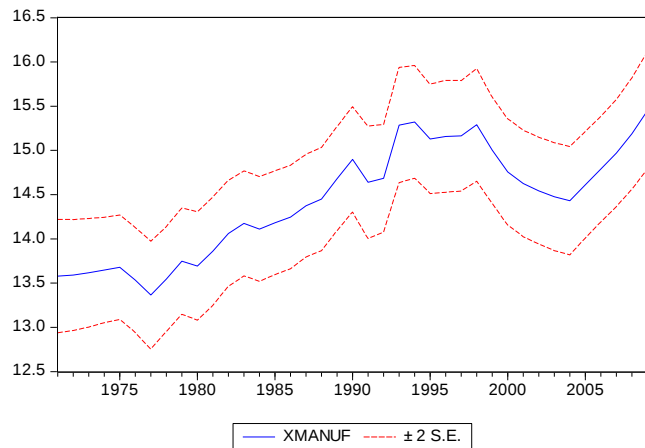
Forecast: MF
 Actual: LOG(M)
 Forecast sample: 1982 2009
 Included observations: 28
 Root Mean Squared Error 0.085726
 Mean Absolute Error 0.063252
 Mean Abs. Percent Error 0.364378
 Theil Inequality Coefficient 0.002460
 Bias Proportion 0.012160
 Variance Proportion 0.049346
 Covariance Proportion 0.938494



Forecast: MDF
 Actual: LOG(MD)
 Forecast sample: 1982 2009
 Included observations: 28
 Root Mean Squared Error 0.091477
 Mean Absolute Error 0.075724
 Mean Abs. Percent Error 0.452609
 Theil Inequality Coefficient 0.002738
 Bias Proportion 0.006248
 Variance Proportion 0.025812
 Covariance Proportion 0.967940

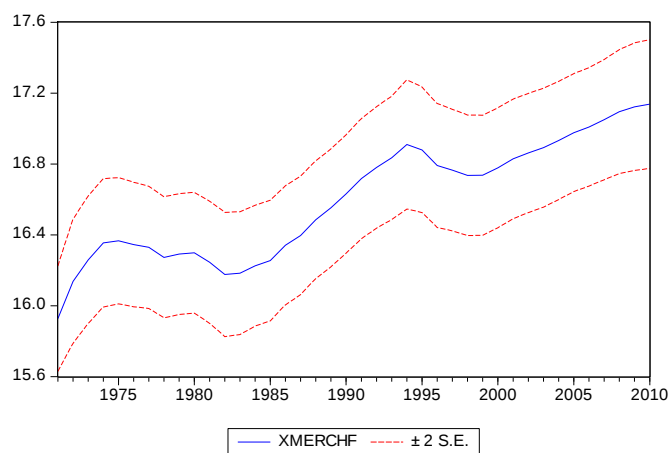


Forecast: XAGRIF
 Actual: LOG(XAGRI)
 Forecast sample: 1960 2010
 Adjusted sample: 1971 2010
 Included observations: 39
 Root Mean Squared Error 0.531405
 Mean Absolute Error 0.242953
 Mean Abs. Percent Error 1.760054
 Theil Inequality Coefficient 0.018156
 Bias Proportion 0.023463
 Variance Proportion 0.117730
 Covariance Proportion 0.858807



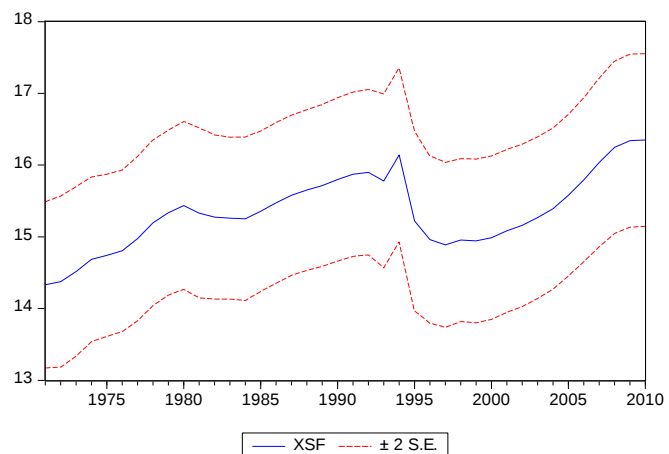
Forecast: XMANUF
 Actual: LOG(XMANU)
 Forecast sample: 1960 2010
 Adjusted sample: 1971 2009
 Included observations: 39

Root Mean Squared Error	0.253363
Mean Absolute Error	0.199844
Mean Abs. Percent Error	1.400359
Theil Inequality Coefficient	0.008772
Bias Proportion	0.000342
Variance Proportion	0.062536
Covariance Proportion	0.937122



Forecast: XMERCHF
 Actual: LOG(XMERCH)
 Forecast sample: 1960 2010
 Adjusted sample: 1971 2010
 Included observations: 39

Root Mean Squared Error	0.139810
Mean Absolute Error	0.111994
Mean Abs. Percent Error	0.681423
Theil Inequality Coefficient	0.004217
Bias Proportion	0.027731
Variance Proportion	0.139904
Covariance Proportion	0.832365

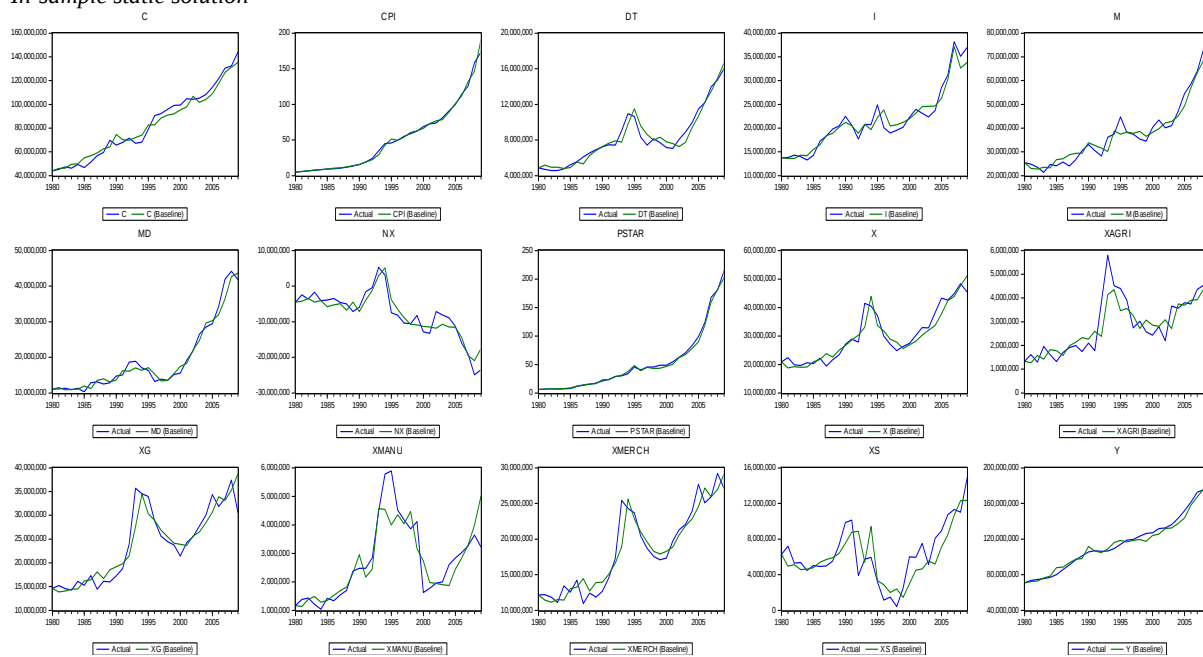


Forecast: XSF
 Actual: LOG(XS)
 Forecast sample: 1960 2010
 Adjusted sample: 1971 2010
 Included observations: 40

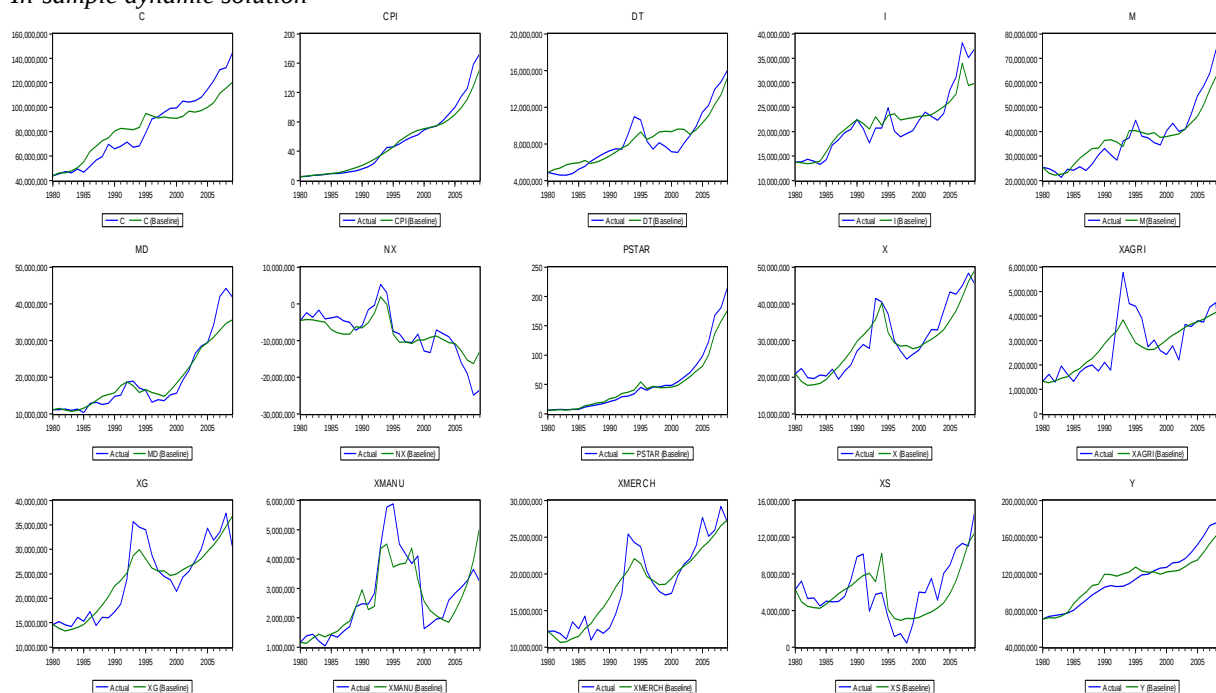
Root Mean Squared Error	0.542420
Mean Absolute Error	0.386164
Mean Abs. Percent Error	2.563398
Theil Inequality Coefficient	0.017634
Bias Proportion	0.003338
Variance Proportion	0.288570
Covariance Proportion	0.708092

E. Model Solutions

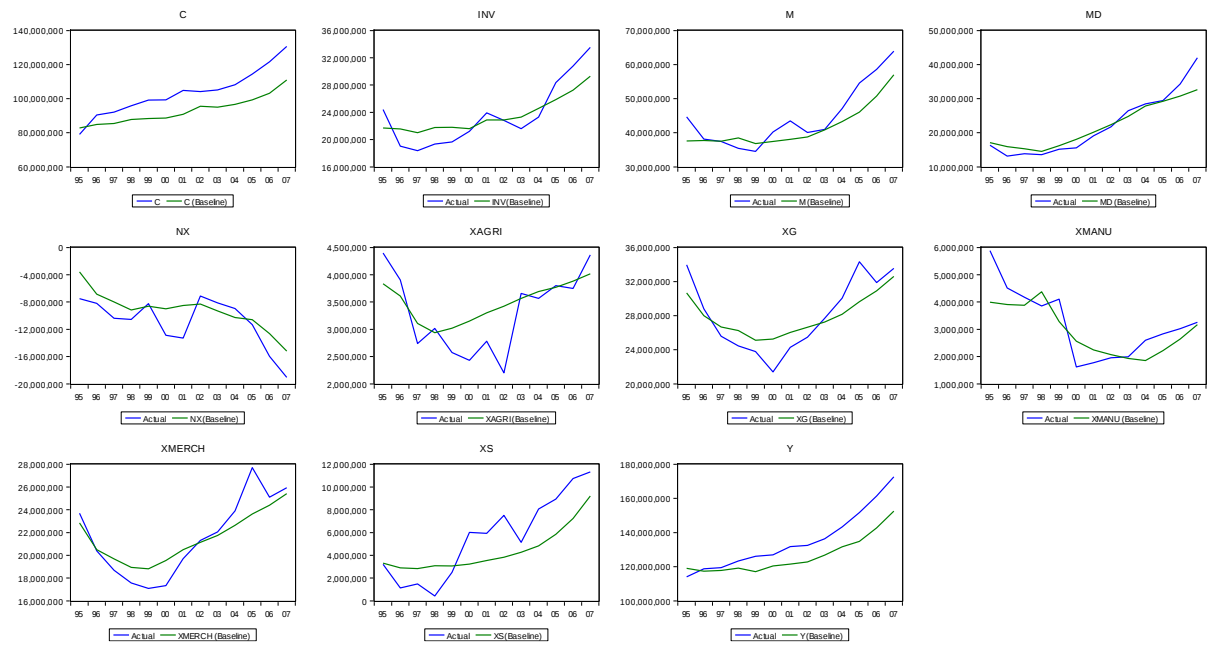
In-sample static solution



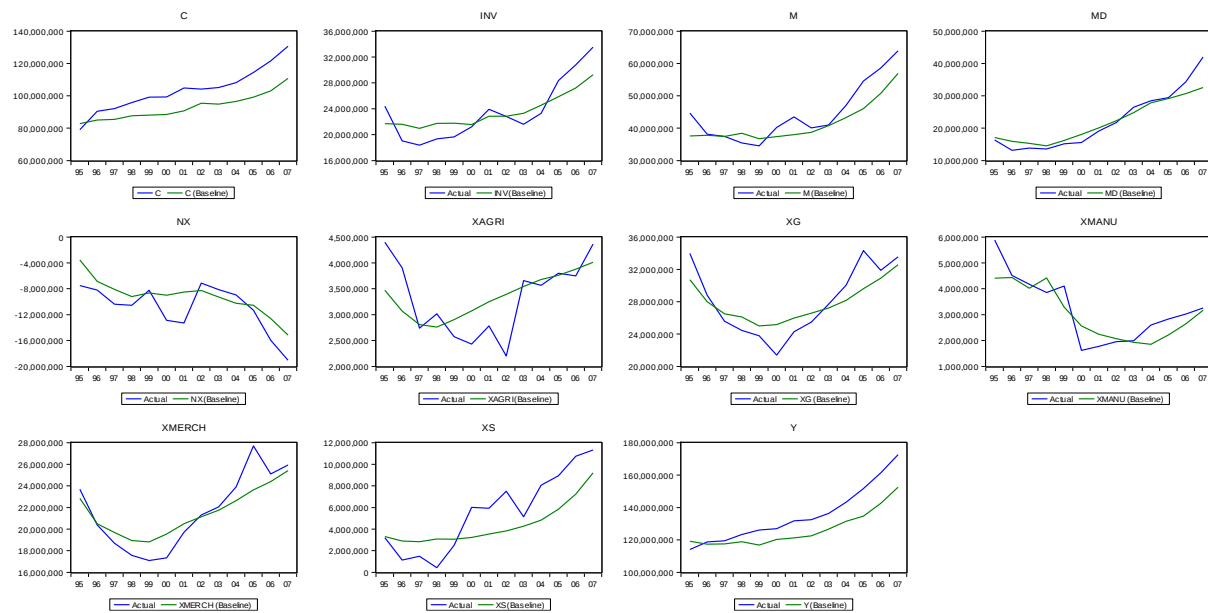
In-sample dynamic solution



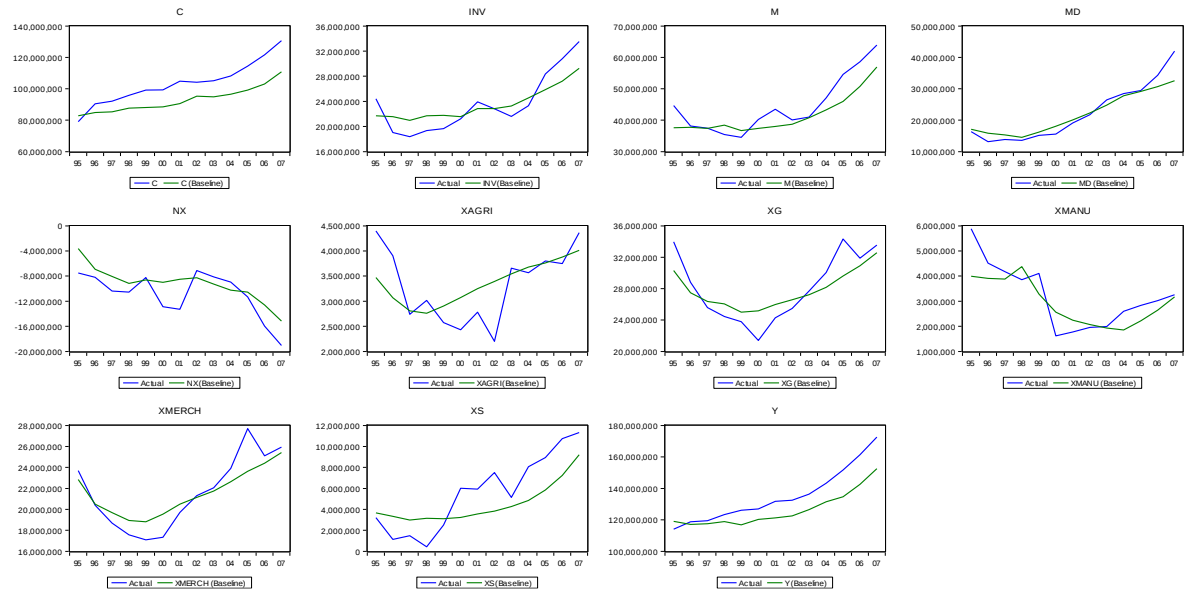
Agricultural Exports Shock



Manufactures Exports Shock



Services Exports Shock



Simulation Results after Export Price Increment

