EFFECT OF EAST AFRICAN COMMUNITY INTEGRATION ON INTRATRADE VOLUME OVER THE PERIOD 1980-2012

GITHAIGA ANTHONY KARIUKI

A Thesis Submitted to the Graduate School in Partial Fulfilment of the Requirements for the Award of the Master of Arts Degree in Economics of Egerton University

EGERTON UNIVERSITY

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DECLARATION AND RECOMMENDATION

DECLARATION

This thesis is my original work and it has not been presented for an award of a certificate, diploma or degree in this or any other university.

Signature---------- Date----------

GITHAIGA ANTHONY KARIUKI

AM16/2727/10

RECOMMENDATION

This thesis is submitted for examination with our approval as University Supervisors.

Signature: ---------- Date: ----------

Dr. LAWRENCE .K. KIBET

Department of Economics,

Egerton University.

Signature: ---------- Date: ----------

Dr. SYMON K. KIPROP

Department of Economics,

Egerton University.

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DEDICATION

This thesis is dedicated to my loving Mum Ms. Caroline Kariuki, my niece Nancy, my nephew Munene as well as my cousins John, Dickson, Benjamin, Jane and Nyakio.

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ABSTRACT

This study empirically explored the effect of East African Community (EAC) integration on intra-EAC trade, as reflected by the level of exports, of the East African Community member states over the period 1980- 2012. This time period captured the pre and post EAC eras. Most empirical studies on Regional Integration investigate whether the Gravity Model hold for trading partners. Others investigate the effect of tariffs and other trade barriers on trade but this study considered the influence of FDI. This study therefore sought to complement the existing evidence majorly focusing on developing nations. This is due to the fact that East Africa Community integration members are faced with; low levels of economic growth; minimal share of exports and world trade; low rates of development in human capital and infrastructure, as well as; excess challenges from external pressures. The research sought to: examine the Intra-regional trade patterns both before and after the revival of the EAC; to examine the effects of EAC integration on the performance of intra EAC trade and to determine the influence of FDI on EAC trade. This study was based on Gravity model.

The study used secondary data obtained from different sources that included Kenya National Bureau of Statistics (KNBS), EAC Offices, World Bank and respective countries' Ministries of Trade (1980-2012). The Levin-Lin-Chu and Engle-Granger approach were used to investigate the properties of the data with respect to Panel Unit roots and Cointegration respectively. The results show that EAC has significantly increased trade among the member countries. FDI inflow has a positive and significant impact on trade (exports). From a policy perspective based on the study findings, it can be concluded that EAC member states can increase their trade by improving their infrastructure so as to reduce transport costs and encourage FDI which the study found to promote trade. Policies aimed at increasing the GDP are also encouraged among the EAC member states.

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ACRONYMS AND ABBREVIATIONS

ACP – African Caribbean Pacific

CET - Common External Tariff

COMESA – Common Market for Eastern and Southern Africa

CU – Customs Union

EAC – East African Community

EALA – East African Legislative Assembly

ECSC – European Coal and Steel Mining Community

EEC – European Economic Community

EPA - Economic Partnership Agreements

EU – European Union

FDI – Foreign Direct Investments

FTA – Free Trade Area

GDP – Gross Domestic Product

GNP – Gross National Product

KNBS – Kenya National Bureau of Statistics

NAFTA - North America Free Trade Agreement

OECD- Organization for Economic Co-operation and Development

PTA – Preferential Trade Area

RCA - Revealed Comparative Advantage

RIA – Regional Integration Arrangements

RTA – Regional Trade Arrangements

SADC - Southern African Development Community

TOT – Terms of Trade

WDI - World Development Indicators

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Regional integration arrangements (RIAs) form a large part and channel through which world trade takes place. Africa and East Africa also form part of this channel. OECD (2005) estimated that close to more than half of total world trade happens through regional trade arrangements. Through RIAs, world trade was estimated to have grown on average of 10 percent and 13 percent between 2005 and 2010 respectively (OECD, 2011).

By December 2006, WTO (World Trade Organization) had been notified of 211 RIAs and 14 of them were from Africa. A key outstanding characteristic of these African RIAs is overlapping membership which has potential conflicting goals (UNECA, 2004).

The first East African Community was founded in 1967. Kenya, Tanzania and Uganda were the initial member states who started the EAC. They had an agreement to cooperate on issues revolving around economic and social aspects. The most appropriate entry point to integration process was the Customs Union. Customs Union is an advanced stage of integration which requires stable and well functioning legal and institutional framework. The first East African Community Customs Union collapsed in 1977.

The failure of the first East African Community can be attributed to four main factors: firstly, its lack of steering functions; secondly, the unequal distribution of benefits; thirdly, the purely intergovernmental – i.e. interstates –structure; and, fourthly, the irreconcilable differences of opinion between leading players, especially between the former Ugandan president Idi Amin and the Tanzanian president Julius Nyerere. The geographical region encompassed by the EAC covers an area of 1.8 million square kilometers, with a combined population of about 132 million. The treaty establishing the current EAC was signed on 30 November 1999 and came into force on 7 July 2001 upon its ratification by the Republics of Kenya, Uganda and Tanzania. (EAC, 2009).

The main objective of the current EAC is to promote cooperation in "political, economic and social fields" by encouraging economic development (including trade liberalization, monetary and financial integration, the free movement of persons, capital, goods and services); science and technology (including infrastructure, health and education); as well as political and legal matters. It envisages deepening regional integration by establishing a customs union (CU), common market, a monetary union and, ultimately a political federation among the partner countries (EAC Treaty, 2001).

The EAC customs union protocol aims to liberalize inter and intra-regional trade. Products originating in third countries, that cover approximately 99 percent of all tariff lines, will be subject to a common external tariff (CET). This was be implemented in two phases with the first phase grouping all products into three bands, each having its own tariff rate. There is a zero rate for raw materials, a 10 percent rate for intermediate products and a 25 percent rate for finished goods (EAC, 2005). The second phase of CET implementation comes in 2010 when the 25 percent rate is reduced to 20 percent subject to consultation amongst and approval by the member states (EAC, 2005). Unfortunately, African Economies are still under represented among the league of exporters of manufactured goods. Kenya, Uganda and Tanzania recorded the lowest percentage of manufactured exports which stand at 22 percent, 18 percent and 14percent respectively (World Bank, 2012).

On January 1, 2010 East African Community had operated as a Customs Union for five years. East African Community decided to adopt and encapsulate a clear path aimed at expanding the integration. Customs Union, the Common Market, the Monetary Union and Political Federation were the four pillars that were encompassed in this path. Currently, EAC is at the level of a Common Market protocol as launched on July 1, 2010.

The regional integration process is at a high pitch at the moment as reflected by the encouraging progress of the East African Customs Union and the establishment in 2010 of the Common Market. The Protocol for the establishment of the East African Monetary Union was signed by the Heads of State in November 2013 and implementation is underway. The process towards an East African Federation is being fast tracked, underscoring the serious determination of the East

African leadership and citizens to construct a powerful and sustainable East African economic and political bloc.

1.2 Statement of the Problem

East African Community regional integration members have persistently been faced with low levels of economic growth, minimal share of exports and world trade(averaged at 19.6 percent in 2011), low rates of development in human capital and infrastructure as well as excess challenges from external pressures(World Bank, 2011). Member states have therefore resolved to integrate so as to reduce the trading costs and increase the gains necessary for accelerating economic growth and development. Moreover, even with new entrants (Burundi and Rwanda) in the integration little is known about the effect of integration on intra-EAC trade has improved. There have been studies on welfare and tariffs but none focused on the effect of EAC regional integration on intra-trade. It is therefore against this background that this study is carried out. The success of regional integration is crucial especially for policies that will ensure increased benefits from the process of globalization and integration. Regional integration in EAC is expected to help in enhancing economic development and growth in the continent.

1.3 Objectives of the Study

1.3.1 Broad Objective

The broad objective of this study is to investigate the effect of EAC integration on intra- EAC trade performance.

1.3.2 Specific Objectives

The specific objectives of the study were:-

i. To examine the Intra-regional trade patterns both before and after the revival of the EAC.
ii. To examine the effects of EAC integration on the volume of intra EAC trade.
iii. To determine the influence of FDI on intra - EAC trade volume.

1.4 Research Hypotheses

i. There is no change in trade patterns both before and after the revival of the EAC.
ii. The EAC integration has had no effect on the volume of intra EAC trade.
iii. FDI has no effects on intra - EAC trade volume.

1.5 Justification for the Study

The study sought to bring into a clear perspective the effect of EAC integration on intra EAC trade. The EAC member states have an aspiration of becoming a political federation. They are basically exporters of unprocessed products which fetch low foreign exchange. They also face numerous obstacles to economic growth. Since these countries share common features and their independence has brought numerous changes in economic composition and structures, there is need to investigate how EAC integration has affected trade volume.

The importance of integration on trade has become crucial since numerous analysts emphasize on trade as the key factor in reversing Africa's poor economic performance. The most commonly cited example is the Asian Tigers whose rapid growth after the Second World War was driven by manufacturing exports, in particular.

Therefore, this study will be important not only to researchers interested in economic development but also to people responsible for formulating development policies for instance employment, infrastructure, income and market costs (tariffs) and so on. This study will contribute to the existing literature by applying panel data methods in analyzing the effects EAC has had on the intra-trade of its member states. These results will be useful for the policy makers when designing policies to promote and improve the welfare of citizens (consumers) of the member countries. This study was also useful to future research on regional integration and its relevance to improving trade and to add to the body of existing knowledge.

1.6 Scope and Limitation of the Study

The key focus of this study was on how EAC regional integration has affected the intra trade performance of its member states. This study covered the period 1980 to 2012 where relevant data was available. The period was chosen because it allowed the examination of pre and post

EAC eras. However, there arises some limitation such that some instability like wars and some countries had data with gaps in some years. This made the study to adopt unbalanced panel data.

1.7 Definition of Terms

Common Market: A common market extends from a customs union to include the liberalization of factor movements among member countries and the application of a common external tariff to all third party countries.

Customs Union (CU): Defined as a free trade area that has the additional application by each member country of a common external tariff against all third countries. A CU does not call for free factor mobility and policy harmonization.

Economic Union: This is the most advanced stage of economic integration whereby the union involves free factor mobility, harmonization of economic policies and possibly the adoption of a common currency.

Free Trade Area (FTA): Defined as an area in which members remove barriers to trade among themselves but keep separate national barriers vis-à-vis third countries. FTA's can include more liberalized rules and harmonization of technical standards.
FTA's do not include the free movement of factors of production such as labour, nor do they require de jure harmonization of members' economic policies such as constraints on domestic policies towards unilateral actions.

Intra trade: Is defined as the simultaneous export and import of commodities of the same industry group. Intra-industry trade describes trade in similar, but slightly differentiated products based on imperfect competition, or trade in close substitutes demanded by consumers in different countries who may have distinct tastes or preferences.

Preferential Trade Area (PTA): This is the weakest form of integration. Defined as an area where preferential treatment is given to access of certain products from certain countries. Tariffs and other barriers to trade are reduced among members, but not completely abolished.

Trade creation: A case whereby increased territorial trade leads to the shifting of production from less efficient, high-cost producers to more efficient, low-cost producers within the union.

Trade diversion: A scenario whereby the effect of increased trade shifts production from low-cost producers outside the trading bloc to high-cost producers within the bloc.

Trade performance – This is defined as the volume (in value) of net exports of every country over time.

Heteroscedasticity: It is where the variance of the error terms differ across observations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides a critical review of related work and gives a summary of actual researches previously carried out by other scholars in the areas of regional economic integration and trade. It starts with related literature on economic integration and trade, empirical studies, theoretical framework and concludes with the conceptual framework.

2.2 Regional Integration: General Conceptual Background

Economic groupings that represent varying degrees of integration have been prevalent for a long time. Regional integration has come about as economic integration has involved countries that are geographically close, thus the term "regional". The forms of regional integration are as varied as the countries that exercise them; however, the most common forms of regional integration include, Preferential Trade Area (PTA), Free Trade Area (FTA), Customs Union (CU) Common Market, Economic Union, and Monetary union (OECD, 2005).

2.3 Theories of Regional Integration

European integration has been the major drive to the development of theories of integration. Regional integration started in Europe in 1950. European Coal and Steel Community (ECSC) started in 1952. The experience on The Uniting of Europe in 1958 was the main driver for Haas (1958) coming up with a theory on regional integration. . The spill-over Concept was the main theoretical contribution. This concept was then used by Lindberg (1963) to study the initial years of the European Economic Community (EEC) in 1958. These theories are known as neo-functionalist.

There were attempts to apply neo-functionalist theories to integration in Latin America (Haas, 1961; Haas and Schmitter, 1964; Haas, 1967).

Haas (1967) was of the view that EEC was a spill-over from ECSC. He discussed of "the expansive logic of sector integration" and made a prediction that this spill over process would also be experienced in the EEC. He argued that trade liberalization within the customs union

would drive the harmonization of general economic policies and hence spill-over into political areas paving way to creation of some kind of political community (Haas, 1958).

(Moravcsik, 1998) brought forward a theory liberal intergovernmentalism which marks a key point of reference for studies on integration. The three phases of his framework are: national preference formation, interstate bargaining and institutional choice. The first stage relates to formation of national preference. His main concern in this point is whether it is economic or geopolitical interests that take the huge share when national preferences of member states are being set. Based on the European integration process he concluded that economic interests take the first choice.

In the second stage of interstate bargaining, the focus was on giving explanations on the efficiency and distributional outcomes of European Union negotiations. Asymmetrical interdependence and supranational entrepreneurship are the two contrasted explanations of agreement. The theory concludes that asymmetrical interdependence explains the most. Some member states have more power than others and will therefore put more effort to influence outcomes.

Moravcsik (1998) also argues that three factors are likely to determine the outcomes of interstate bargaining. The first is the value of unilateral policy alternatives, relative to the status quo. Second is the value of alternative coalitions and lastly the opportunity for issue linkage or side-payments.

In summary of the first point he argues that those who desire the benefits cooperation the most will surrender more to get them. In the second point he summarizes that exclusion threat has a likelihood of creating a more powerful force on unwilling states than the non-agreement threat. Moravcsik observes that in relation to linkage strategies, the major hindrance is mainly found in their domestic distributional implications. Concessions are seen to create domestic losers which finally limit the use of package deals.

Customs union theory can be said to date from Viner's work in the 1950. He showed that a custom union can either result in trade creation or trade diversion. He goes on to point out that

trade creation raises home country's welfare and vice versa to trade diversion. Therefore, the above distinction forms the basis of majority of subsequent analysis of how customs union implicates on welfare.

His analysis was extended and modified by Lipsey (1957), Meade (1955), Gehrels (1958) and others so as to account for inter-commodity substitution, or "consumption effects." According to Lipsey (1957), when consumption effects are allowed for, the conclusions that trade creation is 'good' and trade diversion 'bad' are no longer valid. Although he does not make an attempt to establish that trade creation can lower welfare he clearly shows that trade diversion can raise welfare.

The literature reviewed in this chapter has so far presented the static effects from regional integration, that is: trade creation versus trade diversion. According to Schiff and Winters (2003), in purely trading terms, a regional bloc does not provide any benefits that the members cannot attain through nondiscriminatory tariff reductions.

Non-discriminatory tariff reductions would be superior in that they provide all the gains from trade creation without the costs of trade diversion. If it is possible for a country to be better off if it has bilateral tariff reductions (as opposed to tariff reductions within a RTA), why are RTAs so popular? Trade integration is not the only reason for regional integration in East Africa.

Regional trade blocs have been known to reduce the tensions between antagonistic neighbours (Schiff & Winters, 2003). The idea is that since an RTA will usually increase intra-regional trade, the pacific effects of trade will extend into the political realm. With greater economic interdependence, the stakes of going to war with a neighbour are higher and thereby negated. Among the objectives of the EAC is the promotion of peace and security in the region. This mandate is of particular importance to the EAC given its volatile history. In order to uphold this objective, the defense chiefs from each of the member states agreed on a Memorandum of Understanding for cooperation in defense matters in 1997. East African Legislative Assembly (EALA) is the main institution mandated to provide a democratic forum for debate. The East African Court of Justice is mandated to ensure that community law is adhered to.

Maintaining peace and security in the EAC is important in building the social infrastructure of the region. The social infrastructure of an economy can be defined as the government policies and institutions that maintain a coherent and meaningful structure in society (Jones, 2002). Social infrastructure is an important determinant of the level of investment in physical capital, the accumulation of skills, output, and consumption in a country. With the formation of the EAC, it is expected that the region will improve its social infrastructure so as to boost investment.

However, it is worth noting that forming an RTA does not necessarily imply an increase in investment especially if the RTA is between developing countries (South-South). Rather, general policy reforms in macroeconomic policies and financial systems are more likely to influence investment.

Economic integration (and openness in general) allows small countries to overcome the disadvantages associated with smallness, such as small markets or insufficient quantities of specialized inputs, which impede their ability to reach their full trading potential. Schiff and Winters (2003) argue that since an RTA combines markets, there will be several benefits which include; increased competition, economies of scale due to enlargement of market, increased choice of products and reductions in internal inefficiencies of firms which would increase productivity. As the EAC members are small developing countries, the potential for exploiting economies of scale are present and would likely play an important role in accelerating industrialization in the region.

Regional cooperation such as on infrastructure (roads, railways), water basins (Lake Victoria project), conservation and environment protection, energy sources are all areas where the EAC can contribute. The EAC acts as a regional body that oversees developments in activities that will indirectly or directly increase trade and economic development. Agencies such as World Bank have already designated funds for regional development of roads and border facilities in the EAC through the East African Trade and Transport Facilitation project. The EAC has had a long history of cooperation. This history has made EAC to take steps towards integration domestic policies in the areas of labour and environmental standards.

Regional cooperation on domestic policies can increase the gains from the trade bloc as barriers in national markets are lifted to deliver economic benefits. In an attempt to harmonize labor and employment policies, the EAC has appointed a Ministerial Council that focused on bolstering the role of the organized private sector in job creation. It is hoped that by harmonizing domestic policies, the EAC can boost regional competition through reducing transaction costs and allowing for the movement of labor.

The EAC is seen as providing impetus to the COMESA customs union (McIntyre, 2005). Even though Tanzania is not a member of COMESA, the EAC hopes to obtain bargaining power in future COMESA negotiations. COMESA customs union formation is attractive since it would provide a larger market to the EAC countries and encourage the expansion of non-traditional exports to the region.

Becoming an integral player in the Economic Partnership Agreements (EPAs) that are negotiated between European and sub-Saharan Africa countries is yet another dynamic gain that EAC can bring. If the EAC can drive negotiations within COMESA, then it could potentially be an important partner in the EPA process. This would allow for the EAC to enjoy integration into the global economy.

2.3.1 Theories of Trade Openness and Foreign Direct Investment

Economic transformation and modernization are widely hypothesized to spur growth and development process. The fundamental focus of traditional theories of economic development is on how developing countries would succeed in getting the right quantum and quality of savings, investment, and various forms of foreign assistance required to put these economies along a sustainable growth path in a stable political environment. As far as developing countries are concerned, the challenge is to implement economic policies that will result in a sustainable increase in real per capita terms through rapid industrial growth such that a low-income traditional economy is metamorphosed into a high-income industrialized economy as suggested by Lewis (1954), Rostow (1960), Harrod (1948) and Domar (1947).

The fundamental theoretical framework of FDI as suggested by MacDougall (1960), Hymer (1976), Buckley and Casson (1976), Agarwal (1980), Casson (1982), Helleiner (1989), Dunning (1983) and Vos (1994) have led to four distinct schools of thought on FDI namely the *neoclassical*, *industrial organization*, *eclectic*, and *portfolio choice* paradigms.

The conventional *neoclassical paradigm* on international capital flows was formulated on the premise that capital flows among nations is driven by interest rate differentials under conditions of perfect competition. The model postulates that under unconstrained capital mobility condition, there are positive welfare effects for both capital exporting and capital importing countries given the unique state of factor endowment, political environment, expected rate of return, information asymmetries, government economic policies on taxation and other incentives. In addition, the model embraces the flexible-accelerator type of private investment theory which is set out by outlining a framework of capital requirements of profit-maximization and multiple-product monopolist. Given the existence of some degree of monopoly power in its product market, a multinational firm is assumed to determine the profit-maximizing level of production and, hence, the capital requirements in each host country.

The *industrial organization theor*y assumes that foreign enterprises have oligopoly power in host country markets where these markets are imperfect with barriers to entry and unique firm specific attributes such as product technology, managerial skills and economies of scale as a result of which foreign firms have advantages over their local counterparts. The *eclectic theory*, on other hand, is formulated in line with the traditional Herscher-Ohlin-Samuelson trade model that seeks to explain the spatial distribution of some varieties of output that further explain trade in manufactured and skilled labour-intensive commodities across countries with factor endowment differentials.

The *portfolio choice theory* takes into account the element of uncertainty in connection with capital flows such that investors are assumed to consider not only rates of return, but also risks associated with selecting a portfolio of foreign investment. This theory is based on the observation that fluctuations in rates of return on capital within, and more so between countries are not perfectly correlated. Hence risks might be reduced by a diversification of investment

portfolios. This implies that the destination of new foreign capital is driven by the composition and location of current investment portfolio held.

In sum, the theories of FDI suggest that broadly the interplay of social, geopolitical, economic, and uncertainty and risk factors are essential in determining the direction of international capital flows as influenced by supply and demand forces. In general, FDI flows to countries with higher prospects of net gain on investment which is an indication that the associated benefits exceed the costs of foreign investment. Growth in real gross domestic product can be used to proxy for the net gain on investment.

2.4 Empirical Literature

Various studies as discussed below have been undertaken in regard to regional integration. The results obtained reveals contradictory conclusions depending on the approach used.

The literature on Regional Integration dates back to the work of Viner (1950). The theoretical literature is often concerned with whether regional integration is welfare enhancing. Therefore, there will be no attempt for in depth discussion of this theoretical literature, but generally a brief review, with more emphasis on empirics.

Viner (1950) argued that regional integration has two effects on trade. It can either be trade creating when trade replaces domestic production, or trade diverting when another partner country production replaces trade from the rest of the world. This implies that Integration can advance trade but may not always be welfare enhancing. This means that regional integration is not always revenue creating and could in fact reduce national welfare in the event of trade diverting and loss of tax revenues.

Kweka and Mboya (2004), who examined the flow of trade and investment in pre and post regional integration on Regional Integration in Tanzania found that integration has increased intra-regional trade.

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McIntyre (2005) analyzed the potential impact of trade in the EAC customs union. The study used a static partial equilibrium model using a simulation known as SMART and found that trade creation is the dominant effect of EAC CET. The results indicated a positive trade benefits for Kenya. This maybe because EAC customs allowed increased flows of cheaper extra- regional imports likely to lower consumer prices with positive welfare effects.

Soloaga and Winters (2001) evaluated the effect of NAFTA on bilateral trade. The study controlled the usual gravity variables (GDP, distance, common language and so on). The results revealed that regionalism did not have a significant increase in member countries' trade.

In a study to analyze trade creation and trade diversion impacts of North America Free Trade Agreement (NAFTA) on six agri- food products (1985-2000), Jayasinghe and Sarker (2004) employed an extended gravity model. The model incorporated pooled cross-sectional time – series regression and generalized least squares methods. The study findings revealed that there is growth of intra- regional trade within NAFTA and this has displaced trade relations with the rest of the world.

Milner and Sledziewska (2005), using panel data econometric models applied to highly disaggregated trade data, found that the European Agreement had trade diverting effects for Poland's imports; trade diversion dominates the trade creation.

Chauvin and Gaulier (2002), in an attempt to examine the potential of increasing intra-SADC trade, used three approaches. SADC member countries have concentrated and their comparative advantages are similar. Using static analysis study results revealed that there were limited chances for further intra- SADC trade.

Using conventional gravity model, Alemayehu and Haile (2002), found that bilateral trade flows among regional groupings could be explained by standard variables in COMESA. On the other hand, the study showed that regional groupings have no significant effects on bilateral trade flows.

Keck and Piermartini (2005), using general equilibrium model on 15 regions and 9 sectors, analyzed the impact of EPAs for SADC countries. The study results showed that EPAs within the EU enhance welfare which transforms to potential increase in GDP. Results indicate that further gains could be experienced if intra-SADC trade is liberalized.

2.5 Theoretical Framework

The gravity model is a well-known formulation for statistical analysis of bilateral flows between different geographical entities. Initially, in 1687, Newton proposed the "Law of Universal Gravitation." This model states that the force of gravity between two objects is proportional to the product of their masses divided by the square of the distance between them, given as:

$$F_{ij} = G.\frac{M_i.M_j}{D^2 ij} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots. (1)$$

Where the notation are defined as follows;

F_{ij} is the attractive force.

M_i and M_j are the masses.

D_{ij} is the distance between the two objects.

G is the gravitational constant depending on the units of measurement for mass and force.

Since its inception, it has been put into application to a whole range of what we may call "social interactions" including migration, tourism, and foreign direct investment. A number of economists proposed that the same functional form could be applied in international trade. These include Tinbergen (1962) and Poyhonen (1963).

Consequently, a large number of empirical works applied this model to investigate the trade creation and trade diversion effects of the RTAs. In this model, flows of export between two countries are explained by their economic sizes (GDP or GNP), population and geographical distances between the countries. The gravity model predicts that the flow of people, ideas or commodities between two locations is positively related to their size and negatively

related to the distance. In its original form, they specified the following gravity model equation:

$$Trade_{ij} = A\frac{GDP_i GDP_j}{Distance_{ij}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(2)$$

Where notation is defined as follows; $trade_{ij}$is the value of bilateral trade between country i and j,GDP_i and GDP_j are country $i's$ and j's respective national incomes. $Distance_{ij}$is a measure of the distance between the two countries and A is a constant of proportionality.

2.6 Conceptual Framework

The relationship between the variables of interest is expected to be as demonstrated in Figure 2.6. On the left hand side are the independent variables: GDP (Gross Domestic Product), Per capita income, Distance, FDI, Boarder (Dummy Variable) and Integration (Dummy variable). These variables affect the dependent variable (Intra-EAC Trade) which in this study is the value of Exports.GDP, FDI, Boarder, and Integration positively impacts on the dependent variable. Distance negatively impacts on the value of Exports. However, some intervening variables (Resources, Government policies, corruption and Politics) do affect trade though they cannot be controlled.

Independent Variables

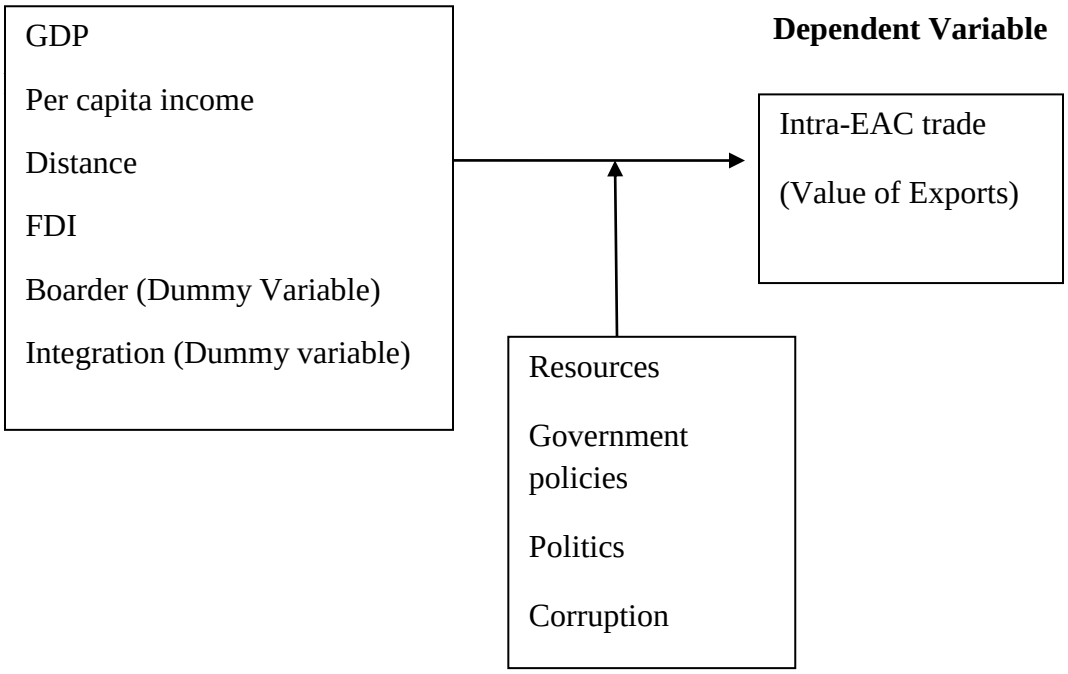

Fig. 2.6: Conceptual Framework

(Source: Author, 2014)

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter deals with methodological issues that appertain to the study. It describes the study design, the model upon which the study was based on, study variables, variables and data sources.

3.2Research Design

This study used a historical research design to investigate the effect EAC has had on the intra trade performance of its member states. The sample period is 1980-2012 where relevant quantitative data was available. The research design was chosen since it will enable intra trade performance trend to be captured appropriately among member states.

3.3 Study Area

The East African Community (EAC) is the regional intergovernmental organization of the Republics of Burundi, Kenya, Rwanda, the United Republic of Tanzania, and the Republic of Uganda, with its headquarters in Arusha, Tanzania.

The Treaty for Establishment of the East African Community was signed on 30th November 1999 and entered into force on 7th July 2000 following its ratification by the original three Partner States – Kenya, Tanzania and Uganda. The Republic of Rwanda and the Republic of Burundi acceded to the EAC Treaty on 18th June 2007 and became full Members of the Community with effect from 1stJuly 2007.

Figure 3.1 Map of Study Area

Source: NystromHorff Jones Education Division (2012)

3.4 Data Analysis and Presentation

In analyzing data, descriptive and inferential methods were used. Tables were used to present the analysis results. Panel data methods were used. This can be justified on four grounds. First, the main usefulness of the panel approach lies in its ability to allow for differences in the aggregate production function across economies. Panel data usually give the researcher a large of data

points, increasing the degrees of freedom and reducing collinearity among explanatory variables – hence improving the efficiency of econometric estimates.

Panel data also reduces and sometimes even eliminates estimation bias. This is particularly the case of estimation of aggregates. Thirdly, identification is easier, when compared to pure cross-section or pure time series data. Through the combination of both, time series data reflecting short run effects and cross-section databases emphasizing long run behavior, it is possible to identify the individual dynamics. Lastly, panel data analysis can account for omitted variables due to individual and or time effects (Hsiao, 2005).

There exist two basic models for panel data analysis, the fixed effects model and random effects model. In the fixed effects model, the individual-specific effect is a random variable that is allowed to be correlated with the exogenous variables. However, in the random effects model, the individual-specific effect is a random variable that is uncorrelated with the exogenous variables.

Fixed effects model explore the relationship between predictor and outcome variables within an entity. Each entity has its own individual features that may or may not influence the predictor variables (for the political system of a particular country could have some effect on trade or GDP or the business practices of a company may influence its stock price).

When using fixed effects model, it is assumed that something within the individual may impact or bias the predictor or outcome variables and there is need to control for this. This is the rationale behind the assumption of the correlation between entity's error term and predictor variables. Fixed effects remove the effect of those time-invariant characteristics from the predictor variables so we can assess the predictors' net effect.

Another key assumption of the fixed effects model is that those time-invariant features are unique to the individual and should not be correlated with other individual characteristics. Each entity is different therefore the entity's error term and the constant should not be correlated with others.

Random effects estimator has an assumption that the entity's error term is not correlated with the predictors which allows for time-invariant variables to play a role as explanatory variables. The random effects model, unlike the fixed effects model, assumes the variations across the entities are random and uncorrelated with the independent variables in the model. In the random effects model the time invariant variables can be included. The individual characteristics that may or may not influence the predictor variables should be specified. The problem here is that, omitted variable bias may arise in the model if some variables are not available.

3.5 Specification of the Model.

The model of the study is Standard Gravity Model. The Standard Gravity Model premises that the volume of trade between any two countries i and j is a function of each country's trade potential and their mutual attraction to trade. In this study, we follow the model used by (Kirkpatrick &Wantabe, 2005). However, we modified the model to include FDI.

$$lnX_{ij} = ln\beta_0 + \beta_1 lnY_{it} + \beta_2 lnY_{jt} + \beta_3 lnGDPpc_{it} + \beta_4 lnGDPpc_{jt} + \beta_5 lnD_{ij} + \beta_6 Boarder_{ij} + \beta_7 EAC_{ij} + \beta_8 lnFDI_t + \varepsilon_{ij} \dots\dots\dots\dots (6)$$

Where,

Y_i, Y_j Represents the GDP of country *i* and *j* respectively;

D_{ij} Represents the distance between two trading countries;

$GDPpc_{it}$= Income per capita income of exporters at time$t$.

$GDPpc_{it}$= Income per capita income of importers at time$t$

$Border$ = shared border between country i and j

EAC = integration dummy, takes the value one when countries belong to a common integration, zero otherwise.

FDI = Foreign Direct Investment inflow

ε_j^i = Represents the residual/ error term

3.5.1 Justification and Measurement of Variables

As per the theory, the following explanatory variables were chosen:

GDPpc: is the average of income per capita. Most studies utilize this proxy so as to examine the possibility of economies of scales. According to Umemoto (2005) per capita income and volume of trade are positively related. Leitão and Faustino (2009) also found a positive relationship between the two in the case of Portugal. Data source: WDI (2013) Data Base.

DIST: this represents the geographical distance between any trading countries. Balassa and Bauwens (1987) argue that intra trade will be greater when trading partners are closer geographically. Due to the transportation costs incurred because of long distances, there exists a negative relationship between trade and distance. In their study Hummels and Levinshon (1995) confirmed the negative sign. Data source: WDI (2013) Data Base.

GDP - The capacity to supply exporting goods is reflected by the GDP of the domestic country. In the same manner, the importing country's GDP is believed to represent its demand for exports. This has the implication that the importer's demand is assumed to increase as its GDP increases (Kristjansdottir, 2005). Data source: WDI (2013) Data Base

RTA - Barriers to trade are also captured in the gravity model. Trading partners belonging to the same RTA, lead to formal trade barriers being reduced due to a harmonization/reduction of tariffs and other non-tariff barriers. GDP, population, distance and culture are the assumed control factors that explain normal trade flows among members of the same integration. Without a trading agreement, member countries trade would have the same relationship to the gravity variables as other countries in the same sample. Data source: WDI (2013) Data Base.

Table 3.5: Hypotheses for Gravity Model Variables

Variable name	Expected Sign	Measurement	Source	Expected Sign
GDP	+ve	In US dollar	WDI-CD-R0M(2008)	Growth in economic capacity boosts trade flows
GDP per Capita Income of i & j	+ve/-ve	In US dollar	WDI-CD-R0M(2008)	Because of economies of scale effect and absorption effect
Distance	-ve	In kilometers	Indo.com/distance	seen as a restriction or friction to trade
Regional dummy **EACXij** **EACTij**	 +ve/-ve +ve/-ve	Level of integration	World Fact Book(2008)	capture the influence of regional trading agreements on trade flows among nations
FDI Inflow	+ve/-ve	In US dollar	WDI-CD-R0M(2008)	Capture the effect of FDI on trade
Openness	+ve/-ve	In US dollar	WDI-CD-R0M(2008)	Capture the level of imports and exports as a fraction of GDP

3.6 Panel Data Diagonistic Tests

3.6.1 Hausman Test

Decision on whether to use fixed or random effects model was reached after carrying out Hausman test.

3.6.2 Panel Unit Root Tests

The time series properties of the variables were explored to determine the order of integration of each variable included in the models. The essence of this test is to avoid spurious regression problems normally associated with time series econometric modeling (Granger and Newbold, 1974). Running a regression with non stationary time series data yields spurious and inconsistent results. Therefore inferences based on such results are likely to be meaningless. As a result of this econometric problem, the next step is to make them stationary by differencing and checking for stationarity. The variables in the model are tested for panel unit roots using the Levin-Lin-Chu (LLC) method.

Levin-Lin-Chu (LLC) test is based on the following hypotheses:
Ho: Each time series is non stationary
Ha: Each time series is stationary

3.6.3 Cointegration Test

The next stage after establishing the integration order of each variable is to check if the non-stationary variables are cointegrated. Long run properties of variables are lost after stationarity of variables is attained through differencing. A set of variables are cointegrated if they individually follow a unit root process, but jointly move together in the long-run. Individually, movements appear random and unpredictable but the location of one variable, say *Y* can provide information on another variable say *X*. If the estimated errors of *Y* regressed on *X* are stationary, then there is evidence of cointegration according to Engle-Granger procedure. Therefore, cointegration test was carried out using the Engle-Granger two-step procedure. The Engle-Granger (EG) test for cointegration is a two-step residual-based test. Say that we suspect that the variables y, x_1...x_k

are cointegrated. The simplest form of the test is performed as follows. First, y is regressed on a constant and x_1...x_k and the residuals are calculated. Then, the first difference of the residuals is regressed on the lagged level of the residuals without a constant.

In the second step, the first difference of y is regressed on the lagged level of the first-step residual and the lagged first differences of x_1... x_k using OLS. The coefficient on the lagged residual is an estimate of the ECM "speed of correction" parameter.

3.7 Post Estimation Diagnostic Tests

Post-estimation panel diagnostic tests were carried out during the study. Heteroscedasticity, serial correlation and cross sectional dependence were tested for the above models before estimation and corrected accordingly.

3.7.1 Test for Cross-Sectional Dependence

Cross-sectional dependence is the interaction between cross-sectional units. Cross-sectional dependence leads to efficiency loss for least squares and invalidates conventional-tests and *F*-tests which use standard variance-covariance estimators. The study employed the Breush-Pagan Lagrange Multiplier (LM) test of independence. The null hypothesis is that the residuals across entities are not correlated.

3.7.2 Heteroscedasticity Test

Heteroscedasticity is a situation where the error terms do not have constant variance. It can be caused by measurement errors and if there are sub-population differences or other interaction effects. Heteroscedasticity does not lead to biased parameter estimates. However, the standard errors are biased if heteroscedasticity is present. This in turn leads to bias in test statistics and confidence intervals.

The null hypothesis specifies that $\sigma_i^2 = \sigma^2 \text{for} i = 1, \dots, N_g$, where N_g is the number of cross-sectional units. The modified Wald statistic is viable in testing for homoskendasticity when the assumption of normality is violated, at least in asymptotic terms.

3.7.3 Autocorrelation Test

Autocorrelation refers to the correlation of a time series or individual observations with its own past and future values. Autocorrelation occurs when the residuals do not have a random trend around the regression line. Positive autocorrelation which is the common one for time series is when the trend of the residuals is formed systematically above or below the regression line. Serial correlation causes the standard errors of the coefficients to be smaller than they actually are and higher R-squared. The study used Wooldridge test for autocorrelation in panel data.

3.7.4 Chow Test

A series of data can often contain a structural break, due to a change in policy or any shock to the economy for example oil crisis, financial crisis and so on. In order to test for a structural break, we often use the Chow test. Chow Test examines whether parameters of one group of the data are equal to those of the other groups. Simply, the test checks whether the data can be pooled. Chow test is often used to determine whether the independent variables have different impacts on different subgroups of the population.

In the first case we have just a single regression line to fit the data points (scatter plot), it can be expressed as:

$$y_t = \alpha_0 + \alpha_1 x_t + u_t$$

Where Y_t = dependent variable, X_t = set of independent variables, μ_t = error term, α_0 = intercept and α_1= set of coefficients for independent variables.

In the second case, where there is a structural break, we have two separate models, expressed as:

$$Y_t = \beta_1 + \beta_2 X_t + \mu_{1t} \dots\dots\dots\dots\dots\dots\dots\dots model\ 1$$

$$Y_t = \delta_1 + \delta_2 X_t + \mu_{2t} \dots\dots\dots\dots\dots\dots\dots\dots model\ 2$$

This suggests that model equation 1 above applies before the break at time t, and then model equation 2 applies after the structural break. If the parameters in the above models are the same, i.e. $\beta_1 = \delta_1, \beta_2 = \delta_2$, then models 1 and 2 can be expressed as a single model as in case 1, where

there is a single regression line. The Chow test basically tests whether the single regression line or the two separate regression lines fit the data best.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents descriptive properties and correlation of the variables used in this study. This gave the general characteristics of the variables in terms of mean, skewness, standard deviation and kurtosis. Panel data property tests are carried out to first of all to establish stationarity and cointegration of the variables. Regression analysis of panel data using fixed effects was carried out to establish the effects of EAC regional integration on intra trade performance.

4.2 Descriptive Statistics.

Table4.1 shows that the standard deviation for lnFDIx was the highest at 3.56352. This depicts the high volatility of FDI inflow for exporting countries. Most of the variables have negative skewness. Negative skew indicates that the tail on the left side of the probability density function is longer or fatter than the right side (many small values of the variables during the initial years of the study and few large values during later periods of the study). Only lnGDPpcm has skewness of close to zero. All variables have a kurtosis of less than 3, which is Platykurtic distribution, flatter than a normal distribution with a wider peak. Kurtosis is a measure of whether the data are peaked or flat relative to a normal distribution. That is, data sets with high kurtosis tend to have a distinct peak near the mean, decline rather rapidly, and have heavy tails. Data sets with low kurtosis tend to have a flat top near the mean rather than a sharp peak. The kurtosis results shows that the variables' distributions with respect to peakedness.

Table 4.1: Descriptive Statistics of all Variables 1980-2010.

	N	Mean		Std.dev	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
Lnexpo	310	2.4037	.1452	2.54446	-.503	.139	-.175	.277
Lngdpx	310	8.4251	.0628	1.10497	-.210	.138	-1.200	.276
Lngdpm	310	8.1343	.0481	.84689	.295	.138	-.754	.276
Lngdppcx	310	8.1343	.0481	.84689	.295	.138	-.754	.276
Lngdppcm	310	5.5239	.0206	.36351	.007	.138	-.344	.276
Lnfdix	310	15.6940	.2024	3.56352	-1.275	.138	2.004	.276
Lnfdim	310	16.2276	.1729	3.04459	-1.204	.138	2.794	.276
Lndistan	310	6.8478	.0443	.78085	.639	.138	.139	.276
Valid N (listwise)	310							

4.3 Correlation Results.

Table 4.2 shows the correlation matrix of variables in levels. It indicates the correlation between each pair of variables. The diagonal matrix has the values of unity (1.00) due to the fact that a variable is perfectly correlated with itself. The results display a high positive correlation between value of exports and GDP both for exporter and importer. This is because exports play a major role in the growth of any country's economy. There is also a high correlation between value of exports and GDPpc. This is because as trade volume increases, GDP of any economy increases hence increasing the GDPpc if the population does not grow faster than the GDP and also if income is fairly distributed among citizens. Distance has a negative correlation with exports, GDP, GDPpc and FDI. This may be due to transportation costs. FDI is positively correlated with value of Exports, GDP, GDPpc and Distance.

Table 4.2: Correlation Matrix of Variables

	Log Exp	Log GDPx	Log GDPm	Log GDPpcx	Log GDPpcm	LogDist	Log FDIx	Log FDIm
Log Exp	**1**							
Log GDPx	**.829(**)**	**1**						
Log GDPm	**.854(**)**	**.764(**)**	**1**					
Log GDPpcx	**.798(**)**	**.865(**)**	**.678(**)**	**1**				
Log GDPpcm	**.673(**)**	**.543(**)**	**.602(**)**	**.602(**)**	**1**			
Log Dist	**-.673(**)**	**-.459(**)**	**-.563(**)**	**-.607(**)**	**-462(**)**	**1**		
Log FDIx	**.211(**)**	**.598(**)**	**.432(**)**	**.441(**)**	**.321(**)**	**.010(*)**	**1**	
Log FDIm	**.654(**)**	**.453(**)**	**.561(**)**	**.654(**)**	**.487(**)**	**.621(**)**	**.576(**)**	**1**

**Significant at the 0.01 level (2-tailed).

*Significant at the 0.05 level (2-tailed).

4.4. Panel Data Diagonistic Tests

4.4.1 Unit Root Tests

From the results in Table 4.3, all variables were non-stationary at 5 per cent significance level. They are integrated of order one I (1), that is, they were stationary after differencing once.

Table 4.3 LLC Tests for Non-Stationarity/Unit Root Tests for all Variables.

Variable	LLC(level)	LLC(P-value) Level	LLC (First Difference)	LLC(P-value) Level	Order of differentiation
Log Exports	0.3841 4.2541	1.0000	-8.9358 -5.1061	0.0000	I(1)
Log GDP	0.2800 2.6948	0.9965	-6.9529 -3.5215	0.0002	I(1)
Log GDPpc	-1.8334 0.9671	0.8333	-7.5528 -4.2699	0.0000	I(1)
LogFDI Inflow	-3.2458 -1.3511	0.0883	-13.5234 -9.6956	0.0000	1(1)
Log Dist	-1.1132 -1.0303	0.8624	-5.1897 -3.2571	0.0000	1(1)

4.4.2 Cointegration Test: Engle-Granger Two-Step Approach

Cointegration test was carried out using the Engle-Granger two-step procedure. This was carried out by generating residuals from the long-run equation of the non-stationary variables, LLC unit root test was carried out which established that the residuals were stationary at 5 percent level of significance. This confirmed the existence of cointegration and therefore an error correction model was adopted.

Table 4.4 shows the results for LLC test carried out on the residual that was generated from different regression models. Residual 1 was generated from the model of the Gravity model relationship using DlogGDP and Dlogdistance. Residual 2 was generated from the model of the gravity model relationship after inclusion of the development variable DlogGDPpc. Residual 3 was generated from the model of the gravity model relationship with the inclusion of transaction cost dummies (Shared border and EAC). Residual 4 was generated from the model of the gravity model relationship with the inclusion of DlogFDI. The residuals were stationary at 5 percent level of significance, this established evidence of cointegration. Therefore, an Error Correction Model was used to estimate the relationship between Value of Exports and other explanatory variables (GDP, GDPpc, FDI and Distance).

Table 4.4: LLC Unit Root Tests for Stationarity of Residuals

Residual	Statistic		P-Value
Residual 1	Unadjusted t	-3.4539	0.0226
	Adjusted t*	-2.2146	
Residual 2	Unadjusted t	-3.4043	0.0342
	Adjusted t*	-1.8023	
Residual 3	Unadjusted t	-4.1543	0.0127
	Adjusted t*	-1.2384	
Residual 4	Unadjusted t	-2.9435	0.0208
	Adjusted t*	-0.2705	

4.4.3 Hausman Test

Decision on whether to use fixed or random effects model was reached after carrying out Hausman test (Hausman, 1978). From the Hausman test results in Table 4.5, the p- value is 0.0543, greater than 0.05. This shows that the value is insignificant at 5% significance level and therefore Random Effects model is applicable in regression. The random effects model was therefore chosen for other models based on Hausman test carried out.

Table 4.5: Hausman Test Results

Variables (V)	(b) Fixed	(B) Random	(b-B) Difference	Std.Error
Log Exports	**0.21**	**0.15**	**0.06**	**0.03**
Log GDPx	**3.23**	**3.43**	**-1.9**	**5.73**
Log GDPm	**2.93**	**2.67**	**0.26**	**4.94**
Log GDPpcx	**-0.21**	**0.36**	**-0.57**	**0.02**
Log GDPpcm	**0.21**	**0.15**	**0.06**	**0.03**
Log FDIx	**-1.41**	**-4.38**	**2.97**	**0.03**
Log FDIm	**-2.32**	**-3.76**	**0.14**	**0.04**
Log Dist	**-1.10**	**-1.36**	**0.25**	**0.35**
χ^2 (8) = 0.06		**Prob> χ^2 = 0.0543**		

4.5 Estimates of Cointegrating Relationship

Hypotheses 2: EAC integration has had no influence on export volume.

$$DlnX_{ij} = ln\beta_0 + \beta_1 DlnY_{it} + \beta_2\, DlnY_{jt} + \beta_3 DlnGDPpc_{it} + \beta_4 DlnGDPpc_{jt} + \beta_5 DlnD_{ij} + \beta_6 Boarder_{ij} + \beta_7 EAC_{ij} + \beta_8 DlnFDI_t + \varepsilon_{ij} \dots\dots\dots\dots (6)$$

Where,

Y_i, Y_j Represents the GDP of country *i* and *j* respectively;

D_{ij} Represents the distance between two trading countries;

$GDPpc_{it}$= Income per capita income of exporters at time t.

$GDPpc_{it}$= Income per capita income of importers at time t

$Border$ = shared border between country i and j

EAC = integration dummy, takes the value one when countries belong to a common integration, zero otherwise.

FDI = Foreign Direct Investment inflow

ε_j^i = Represents the residual/ error term

The variables were differenced and hence the 'D' before the natural logarithms of some variables.

From Table 4.6, the coefficients and the intercept found in Regression 1 are statistically significant at 5percent significance level and explain 72.4 per cent of the variation in (logged and differenced) trade volumes. This illustrates that basic gravity equation is well defined by the variables. Results indicate that a 1percent increase in the exporter's GDP raises exports by 0.987 per cent while a 1percent increase in the importer's GDP raises these exports by 0.956 percent. The effect of distance is revealed to be negatively related with trade falling by 0.868 per cent for every 1 per cent increase in distance. The dummy variable for EAC shows that trade is increased 2.202 times more than it would be with the absence of the integration. The coefficient is significant at 5 per cent.

Inclusion of development characteristics (regression 2) shows that a 1 percent increase in exporter's and importer's GDP increases trade volume by 0.849 percent and 0.949 percent respectively. A 1 per cent increase in exporter's GDPpc raises the trade volume by 0.116 per cent. On the other hand, a 1 per cent increase in importer's GDPpc increases the trade volume by 0.078 per cent. A 1 percent increase in distance reduces trade by 0.717 per cent. This concurs with the theory since when consumer's income increases, consumption also increased and hence the increased volume of trade. Inclusion of the dummy variable for EAC shows that trade is increased by 2.341 times than it would be observed in absence of integration. The parameters in

regression 2 are also statistically significant at 5 per cent significance level and explain 71.2 percent of the variations in the dependent variable.

In regression (3), the shared border dummy is introduced in the regression model. A 1 per cent increase in exporter's and importer's GDP increases trade volume by 1.139 per cent and 0.936 per cent respectively. A 1 per cent increase in distance reduces trade volume by 0.684 per cent. A 1 per cent increase in exporter's GDPpc increases trade volume by 0.054 per cent. A 1 per cent increase in importer's GDPpc decreases trade volume by 0.02 per cent. The presence of a shared border has a positive impact on trade volume. The presence of a common border increases trade volume by 0.487 percent. The coefficient for the EAC dummy is 2.014. Independent variables in this regression explain 72.3 per cent of variations in the dependent variable. The parameters are statistically significant at 5 per cent.

Regression 4 includes all the variables in the model. The parameters are statistically significant at 5 per cent. A 1 per cent increase in exporter's and importer's GDP increases trade volume by 0.956 per cent and 0.943 per cent respectively. A 1 per cent increase in distance reduces trade volume by 0.784 per cent. A 1 per cent increase in exporter's GDPpc increases trade volume by 0.076 per cent. A 1 per cent increase in importer's GDPpc decreases trade volume by 0.018 per cent. The presence of a common border increases trade volume by 0.462 percent. A 1 per cent increase in exporter's FDI increases trade volume by 0.355 per cent while that of the importer increases trade by 0.124 per cent. Explanatory variables in this regression explain 76.4 per cent of variations in the explained variable.

Table 4.6: Long- Run Regression Results

Variables	Regression models							
	1		2		3		4	
Gravity variables	**Coeff (p-value)**	**t-value**	**Coeff (p-value)**	**t-value**	**Coeff (p-value)**	**t-value**	**Coeff (p-value)**	**t-value**
Intercept	**-20.656 (0.047)**	**1.9457**	**-18.502 (0.049)**	**1.8976**	**-23.475 (0.047)**	**1.8976**	**-22.214 (0.038)**	**2.8943**
EAC (dummy variable)	**2.202 (0.037)**	**1.9876**	**2.341 (0.042)**	**2.9054**	**2.014 (0.039)**	**2.8765**	**2.146 (0.043)**	**2.8965**
logGDPx(j)	**0.987 (0.033)**	**2.0348**	**0.849 (0.035)**	**2.8762**	**1.139 (0.045)**	**1.9765**	**0.956 (0.042)**	**2.7543**
logGDPm(i)	**0.956 (0.046)**	**2.4765**	**0.756 (0.045)**	**2.5463**	**0.936 (0.047)**	**2.9065**	**0.943 (0.032)**	**1.9876**
logdist(i)(j)	**-0.784 (0.048)**	**-2.7432**	**-0.822 (0.046)**	**-3.0034**	**-0.684 (0.048)**	**2.6754**	**-0.784 (0.041)**	**2.0897**
Development variables								
logGDPpc(j)			**0.178 (0.038)**	**2.5642**	**-0.012 (0.048)**	**2.2354**	**0.034 (0.043)**	**1.9087**
logGDPpc(i)			**0.126 (0.039)**	**2.5862**	**-0.021 (0.042)**	**2.6546**	**0.026 (0.02)**	**3.0054**
Transaction costs								
Shared border(dummy)					**0.487 (0.046)**	**3.2342**	**0.467 (0.044)**	**3.2152**
Inclusion of FDI								
Log FDI(j)							**0.355 (0.035)**	**2.9084**
Log DFDI(i)							**0.124 (0.035)**	**3.0453**
Adj R-square	**0.724**		**0.712**		**0.723**		**0.764**	

Significance level 5%

4.5.1 Estimates of the Error Correction Model (ECM)

Since all the variables in the model were I (1), cointegration test was carried out using the Engle – Granger two - step procedure and it was established that there was evidence of cointegration (see table 4.4). Consequently, an Error Correction Model (ECM) was formulated as follows.

$$DlnX_{ij} = ln\beta_0 + \beta_1 DlnY_{it} + \beta_2\, DlnY_{jt} + \beta_3 DlnGDPpc_{it} + \beta_4 DlnGDPpc_{jt} + \beta_5 DlnD_{ij} + \beta_6 Boarder_{ij} + \beta_7 EAC_{ij} + \beta_8 DlnFDI_t + YECT_{t-1} + \varepsilon_{ij} \ldots\ldots\ldots\ldots (7)$$

Where ECT is the Error Correction Term. The 'D' before the natural logarithms of some variables denotes first difference.

The Error correction model provides a framework for testing asymmetric and non linear adjustment mechanism to long run equilibrium. The short run model indicates how the adjustment mechanism works to revert to equilibrium condition when it is distributed by exogenous shocks which lead to deviations from the long run equilibrium. The Error Correction term in a long run relationship model captures and explains the speed with which the model returns to equilibrium following the exogenous shock. The term should be negatively signed, indicating a move back towards equilibrium; a positive sign indicates movement away from equilibrium. The coefficient should lie between 0 and 1. A zero (0), suggests no adjustment one time period later while one (1) indicates full adjustment. In the EAC, some of the shocks that arise are as a result of political instabilities, for example, civil wars in Uganda in 1980s, Rwanda genocide in 1994 and post election violence in Kenya in 1992 and 2008. These shocks could as well arise due to economic factors or policies.

Parameter Estimates

From table 4.7, the coefficients and the intercept found in Regression 1 are statistically significant and the model explains 74.3 per cent of variation in (logged and differenced) trade volumes. This illustrates that the basic gravity equation is well defined by the variables. The dummy variable for EAC shows that trade is increased 2.112 times more than it would be with the absence of the integration. The coefficient is significant at 5 per cent. Results indicate that a 1

per cent increase in the exporter's GDP raises exports by 0.82 per cent. These results are similar to those found by other papers (Kirkpatrick &Wantabe, 2005; Soloaga & Winters, 2000). The effect of distance is revealed to be negatively related with trade falling by 0.872 per cent for every 1 per cent increase in distance. The error correction term was lagged (ECTL1) and included in the model to capture the long term dynamics between the cointegrating series. It has the correct sign (negative) and is statistically significant at 5 per cent significance level. The coefficient indicates a speed of adjustment of 23.54 per cent from actual export volume in the previous year to equilibrium rate of GDP and Distance. The speed of adjustment is relatively low, implying that the deviations are not corrected within a year and in most situations the economy might be operating in disequilibrium.

When development characteristics are represented by the per capita income (Regression 2) are added to the model, the effect of GDP and distance on trade volume becomes smaller as compared in the first regression. This is multicollinearity. This was corrected by running different regressions. Inclusion of the dummy variable for EAC shows that trade is increased 2.002 times than it would be observed in absence of integration. A 1 per cent increase in exporter's per capita income increases trade by 0.168 per cent. On the other hand, a 1 per cent increase in importer's per capita income increases trade by 0.136 per cent. This concurs with the theory since when consumer's income increases, consumption also increases and hence increased volume of trade. The coefficient for ECM indicates a speed of adjustment of 32.14 per cent from actual export volume in the previous year to equilibrium rate of GDP, GDPpc and distance. The speed of adjustment is relatively low, but higher than in the previous regression implying that the deviations are not corrected within a year and in most situations the economy might be operating in disequilibrium. The parameters in regression 2 are also statistically significant at 5 per cent and explain 73.4 per cent of the variations in trade volume.

In Regression (3), the effect of GDP on trade volume is now higher than the previous regression 2 while distance becomes even smaller. The coefficient of the dummy variable (common border) which capture additional transaction cost and transport cost is statistically significant 5 per cent and display the expected sign. The presence of a shared border increases trade volume by 0.487 per cent. Inclusion of dummy variable for EAC shows that trade is increased by 2.011 times than it would be observed in absence of integration. The coefficient of ECT indicates a speed of

adjustment of 34.63 per cent from actual export volume in the previous year to equilibrium rate of GDP, GDPpc, distance and the dummy variable for the common border and EAC. The speed of adjustment is relatively low implying that the deviations are not corrected within a year and in most situations the economy might be operating in disequilibrium. Parameters in regression 3 explain 75.6 per cent of variations in trade volume.

Regression (4) includes the policy variables represented by the presence of trade agreement. This model gives results as expected and explains 77.9 per cent of the variations in trade volume. The results show that all coefficients are statistically significant at 5 per cent and display expected signs. The presence of a common integration (EAC), increases trade by 2.134 times than it would be expected in absence of integration. The coefficient of ECM indicates a speed of 40.02 per cent from actual export volume in the previous year to equilibrium rate of all explanatory variables. The speed of adjustment is relatively low, but higher than in the previous regression implying that the deviations are not corrected within a year and in most cases the economy might be operating in disequilibrium.

The influence of FDI inflow is captured in regression 4 in table 4.7. The coefficient for exporter's FDI inflow is 0.356. This implies that a 1 per cent increase in FDI inflow in the exporting country increases trade by 0.356 per cent. A 1 per cent increase in importer's FDI inflow increases trade volume by 0.126 per cent. The coefficients are statistically significant at 5 per cent. The study therefore concludes that FDI inflow has a positive and significant influence on trade volume.

The aim of this stepwise regression was to test the stability of coefficients and to see which theoretical variables are statistically important. Ultimately, regression 4 is used since it included the policy variables of interest for review. Therefore, the hypotheses that EAC has had no effect on trade volume and conclude that , indeed, it has effect on trade volume among member countries that comprise the EAC.

Table 4.7: Exclusion Restriction Models Results

Variables	Regression models							
	1		2		3		4	
Gravity variables	**Coeff (p-value)**	**t-value**	**Coeff (p-value)**	**t-value**	**Coeff (p-value)**	**t-value**	**Coeff (p-value)**	**t-value**
Intercept	**-4.064 (0.042)**	**1.9345**	**-4.032 (0.047)**	**1.7980**	**-4.743 (0.043)**	**1.8879**	**-4.365 (0.034)**	**2.8967**
EAC (dummy variable)	**2.112 (0.037)**	**1.9786**	**2.002 (0.042)**	**2.8765**	**2.011 (0.036)**	**2.8662**	**2.134 (0.041)**	**2.8765**
logDGDPx(j)	**1.036 (0.027)**	**2.0452**	**0.843 (0.035)**	**2.7986**	**1.104 (0.041)**	**1.9478**	**0.924 (0.045)**	**2.7612**
logDGDPm(i)	**0.820 (0.039)**	**2.4235**	**0.766 (0.045)**	**2.4461**	**0.925 (0.047)**	**2.8912**	**0.963 (0.034)**	**1.9765**
logDdist(i)(j)	**-0.873 (0.042)**	**-2.6732**	**-0.827 (0.046)**	**-3.0034**	**-0.779 (0.046)**	**2.6821**	**-0.788 (0.037)**	**2.0868**
Development variables								
logDGDPpc(j)			**0.168 (0.038)**	**2.4542**	**-0.014 (0.042)**	**2.2423**	**0.036 (0.040)**	**1.9045**
logDGDPpc(i)			**0.136 (0.039)**	**2.5742**	**-0.020 (0.038)**	**2.6443**	**0.024 (0.32)**	**3.0032**
Transaction costs								
Shared border(dummy)					**0.487 (0.046)**	**3.2332**	**0.463 (0.042)**	**3.2124**
Inclusion of FDI								
Log DFDI(j)							**0.356 (0.033)**	**2.8976**
Log DFDI(i)							**0.126 (0.032)**	**3.0443**
ECTL1	**-0.2354 (0.037)**	**-1.9873**	**-0.3214 (0.041)**	**-2.0345**	**-0.3463 (0.035)**	**-2.1453**	**-0.4002 (0.042)**	**-2.0874**
Adj R-square	**0.743**		**0.734**		**0.756**		**0.779**	

Breusch-Pagan LM test of independence

$X^2(8) = 8.567$, Pr = 0.3457

Heteroscedasticity test

$X^2(8) = 208.12$

Prob> $X^2 = 0.0000$

Serial correlation

F(2, 8) = 3.942

Prob> F = 0.1431

4.5.2: Post – Estimation Panel Diagnostic Tests

Test for Cross - Sectional Dependence

The study employed the Breusch – Pagan Lagrange multiplier (LM) test of independence. The null hypothesis is that the residuals across entities are not correlated. From table 4.7, the p-value is greater than 0.05, therefore insignificant. It means that there is no cross-sectional dependence of cross- sectional units.

Heteroscendasticity Test

From Table 4.7, the p-value is less than 0.05 and thus significant which shows the presence of heteroscendasticity. Therefore, the null hypothesis for homoscendasticity is rejected. The regression was done in the models by correcting for heteroscendasticity using the option 'robust' in random effects. The use of robust standard errors does not change coefficient estimates, but because the standard errors are changed, the test statistics gives a reasonable accurate p-values. Hence, when heteroscendasticity is present, robust standard errors tend to be more appropriate.

Test for Serial Correlation

Wooldridge (2002) provides a new test for serial correlation. It has few assumptions and is easy to implement thence easy to implement. The test for serial correlation was conducted and the results presented in Table 3. From the results the p-value is greater than 0.05, therefore, the null hypothesis of no correlation is not rejected. This implies that the standard errors are not biased.

4.5.3: Intra-bloc trade (EAC)

To capture the effects of EAC integration, regression had to be carried before and after the revival of the EAC integration. This was divided into pre and post EAC. The pre EAC period covered the period from 1980 - 2000 and post EAC covered the period 2001 – 2012. To carry out this and see the impact, Chow test was employed.

4.5.4 Chow Test

Significance of changes in the estimated coefficients for intra-bloc trade both pre and post EAC formation was carried using an F- test. This would determine if the coefficients of the intra-bloc trade between years are statistically similar. Study results reveal statistically significant changes in the propensity for intra-bloc trade after the formation of EAC. Chow test was therefore used to test the presence of structural break.

The critical F value F (v_1, v_2, α) where v_1 is given by k-1 and v_2 given by n-k and $\alpha = 0.05$. Therefore, the critical value F(8, 25,0.05) = 2.28. Comparing the Fcal in table 4.9, then Fcal > F (v_1, v_2, α). Therefore, null hypothesis is rejected and make conclusion that structural break indeed exists. Hence it is indeed in 2001 that EAC experienced changes in policies. The coefficient for EAC from Table 4.9 is less than the coefficient in Table 5.0. The study therefore concludes that the intra trade volume in EAC has indeed increased after the policy in 2001. This is clearly reflected by the rejection of the null hypothesis.

Table 4.8 Results for Overall Regression

Variables	*Coefficient*	*Std. Error*	*t-ratio*	*p-value*
Constant	-8.0826	1.95808	-4.1278	0.00005
LNDGDPX	0.596348	0.162472	3.6705	0.00029
LNDGDPM	1.32607	0.308674	4.2960	0.00002
LNDGDPPCX	1.2437	0.294	4.238	0.00003
LNDGDPPCM	-1.58393	0.393887	-4.0213	0.00007
LNDFDIX	0.0423357	0.0226492	1.8692	0.06260
LNDFDIM	-0.0331807	0.0250113	-1.3266	0.18567
LNDDIST	-0.457106	0.160892	-2.8411	0.00481
LNEAC	1.12564	0.12451	4.1531	0.00223

Mean dependent var	2.403713	S.D. dependent var	2.544459
Sum squared resid	1.821863	S.E. of regression	0.789890
R-squared	0.908039	Adjusted R-squared	0.903630
F(14, 292)	205.9472	P-value(F)	4.2e-142

Table 4.9 Results for Sample 1 Regression

Variables	*Coefficient*	*Std. Error*	*t-ratio*	*p-value*
Constant	-8.2117	2.91547	-2.8166	0.00539
LNDGDPX	0.0512745	0.218271	0.2349	0.81454
LNDGDPM	1.55701	0.45136	3.4496	0.00070
LNDGDPPCX	-1.98323	0.37463	2.9374	0.00056
LNDGDPPCM	-2.07769	0.556642	-3.7325	0.00025
LNDFDIX	0.0572374	0.0279463	2.0481	0.04198
LNDFDIM	-0.0224351	0.0265489	-0.8451	0.39919
LNDDIST	0.107493	0.19418	0.5536	0.58055
LNEAC	1.22564	0.22451	4.12043	0.00123
Mean dependent var		2.133350	S.D. dependent var	2.403695
Sum squared resid		1.056251	S.E. of regression	0.761812
R-squared		0.906728	Adjusted R-squared	0.899553
F(14, 182)		126.3769	P-value(F)	9.77e-86

Table 5.0 Results for Sample 2 Regression

Variables	*Coefficient*	*Std. Error*	*t-ratio*	*p-value*
Constant	1.68817	3.37888	0.4996	0.61846
LNDGDPX	1.39022	0.305497	4.5507	0.00002
LNDGDPM	3.49294	0.793548	4.4017	0.00003
LNDGDPPCX	3.37265	0.783421	4.4321	0.00003
LNDGDPPCM	-4.55752	1.07671	-4.2328	0.00005
LNDFDIX	0.0392768	0.0408652	-0.9611	0.33885
LNDFDIM	-0.135972	0.0659599	-2.0614	0.04191
LNDDIST	-1.41897	0.142435	-9.9623	0.00001
LNEAC	1.42564	0.25245	4.24751	0.00128
Mean dependent var	2.887909	S.D. dependent var	2.723495	
Sum squared resid	68.53116	S.E. of regression	0.836240	
R-squared	0.915237	Adjusted R-squared	0.905722	
F(11, 98)	96.19634	P-value(F)	2.02e-47	

CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

5.1 Introduction

This chapter gives a summary of study findings and policy implication. This paper attempted to investigate the effects of EAC regional trade agreement on intra trade performance using gravity model. For this purpose, panel data was considered.

5.2 Summary

The main objective of this research study was to investigate the effect of EAC integration on intra-EAC trade. The study also sought to examine the intra trade patterns both during the pre and post EAC eras. Influence of FDI on intra EAC trade was also a key focus of this study.

5.3 Conclusion

This study was focused to examining the effects of regional trade agreements (RTAs) among developing nations on intra-trade, with a focus on the East African Community (EAC) formed between Kenya, Uganda and Tanzania as the initial members and Burundi and Rwanda joining later.

These countries have had a history of high intra-trade volume, with Kenya displaying the highest reliance on its regional bloc partners as export markets. Trade intensities between the five partners have increased in the *post*-EAC years signifying a deeper level of integration between the five countries that has been supported by the formation of the EAC RTA. The EAC countries have been found to rely on export a suggestion that development is dominating the trade process. For the intra – regional trade patterns both before and after the integration, study results reveal that trade has significantly increased. This gives an implication that if EAC deepens its integration towards a monetary union or a political federation, there could be increased trade volume among the member states. However, there should be measures on the gains from advancement of integration.

From the effects of integration on intra-trade, the study reveals that EAC integration has significant positive effect on the volume of trade. Results show that trade has increased significantly than it would be the case in the absence of the integration. This confirms that integration actually reduces some trade barriers hence increasing the level of trade among member states.

Study results reveal that FDI positively impacts on the intra-EAC trade. FDIs provide a variety of goods and services to host country consumers and the surplus is exported to other countries. This increases the level of trade. However, the level of FDIs should be regulated so as not to impact negatively on host country industries.

In the final section of this research, the study estimated a gravity model of trade involving five countries from 1980 to 2012. Using some sets of dummy variables, the study estimated the effect of the EAC-RTA on trade. The gravity model's estimated coefficients (i.e for GDP, distance, GDPpc and border) explain and display the expected signs for intra- trade flows. Findings suggest that the EAC RTA has had an impact on the dynamisms of intra-regional trade.

Introduction of FDI inflow variable reveal a positive effect on the intra-regional trade. This growth in trade volume could be facilitated by modern technologies, transfer of innovative ideas and market information. This could also be as a result of economic reforms and openness to trade and investment policies undertaken by member countries. These reforms are facilitated by the adoption of new technology and innovative practices including information technology. The conclusion therefore, is that the basic gravity model variables in this study conform to the theory. EAC RTA has increased the trade among member states. On the other hand FDI inflow has a positive and significant impact on trade among the EAC member countries.

5.4 Policy Recommendations

From this study the basic gravity model variables conform to the economic theory. The additional variable, FDI, is also seen to positively impact on trade volume. Better trade policies among the member countries should be introduced into the EAC community. There is also need to promote growth of GDP among member countries to promote more exports and trade for that

matter through investment in manufacturing and agricultural sectors which form major source of exports from EAC member states. The role of the respective governments in the EAC members should carefully articulate proper policies to improve and maintain sound growth of GDP.

Improvement in the area of infrastructure is a key milestone in the reduction of trading costs associated with export transportation. These policies include giving infrastructural support through construction and maintenance of accessible roads and railway networks between the EAC member countries must be a priority. This will reduce the transaction and trading costs related to poor transport network and also reduces delays. This also enables timely delivery of exports to their destinations.

FDI should be encouraged since the study has found that it has a positive impact on trade. This can be through foreign investment especially in manufacturing and agricultural sectors. These two sectors are the main source of trade goods that are traded by EAC member states. Adoption of macroeconomic policies such as low inflation rates, incentive tax rates and interest rates will lead to realization of FDI growth. The rationale for this macroeconomic policy is to create investor confidence and stimulate foreign demand for exports. For investment decisions, the government should give priority FDI instead of accruing market related loans. The investment decisions should be focused to agricultural and industrial related production and exports in order to improve and promote exports. Government and other agencies must support the key export sectors. This will improve the volume of trade.

To support the above measures, adoption and development of technical know-how and skills should be embraced to improve efficiency and productivity in the agricultural and manufacturing sectors which form the key contributors to the exports of EAC countries. This can be achieved through research and development. Application of improved technologies will influence proper utilization of domestic resources. The government should fund agricultural and industrial research adequately to facilitate formulation of adequate technology related to policy plans.

5.5 Recommendation for Further Study

The researcher recommends that the impact of natural resource endowment on trade need to be identified. This is because resource endowment of a country impacts on the overall trade volume of that country. Natural resource either acts as raw material for local industries or otherwise exported hence impacting on trade volume.

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