Discussion Paper Series

Effects of Regional Trade Arrangements on Kenya's Export Flows

Simon Githuku

DP/113/2010

THE KENYA INSTITUTE FOR PUBLIC POLICY RESEARCH AND ANALYSIS (KIPPRA)

YOUNG PROFESSIONALS (YPs) TRAINING PROGRAMME

Effects of Regional Trade Arrangements on Kenya's Export Flows

Simon Githuku

Productive Sector Division
Kenya Institute for Public Policy
Research and Analysis

KIPPRA Discussion Paper No. 113
2010

KIPPRA
The KENYA INSTITUTE for PUBLIC
POLICY RESEARCH and ANALYSIS

KIPPRA IN BRIEF

The Kenya Institute for Public Policy Research and Analysis (KIPPRA) is an autonomous institute whose primary mission is to conduct public policy research leading to policy advice. KIPPRA's mission is to produce consistently high quality analysis of key issues of public policy and to contribute to the achievement of national long term development objectives by positively influencing the decision-making process. These goals are met through effective dissemination of recommendations resulting from analysis and by training policy analysts in the public sector. KIPPRA therefore produces a body of well researched and documented information on public policy, and in the process assists in formulating long-term strategic perspectives. KIPPRA serves as a centralized source from which the Government and the private sector may obtain information and advice on public policy issues.

Published 2010

Bishops Garden Towers, Bishops Road
P.O. Box 56445, Nairobi, Kenya
Tel: +254 20 2719933/4; Fax: +254 20 2719951
Email: **admin@kippra.or.ke**
website: http://www.kippra.org
ISBN 9966 777 72 5

The Discussion Paper Series disseminates results and reflections from ongoing research activities of the Institute's programmes. The papers are internally refereed and are disseminated to inform and invoke debate on policy issues. Opinions expressed in the papers are entirely those of the authors and do not necessarily reflect the views of the Institute.

This paper is produced under the KIPPRA Young Professionals (YPs) programme. The programme targets young scholars from the public and private sector, who undertake an intensive one-year course on public policy research and analysis, and during which they write a research paper on a selected public policy issue, with supervision from senior researchers at the Institute.

KIPPRA acknowledges generous support from the Government of Kenya (GoK), the African Capacity Building Foundation (ACBF), and the Think Tank Initiative of IDRC.

Abstract

This study examined the effects of Regional Trade Arrangements (RTAs) on Kenya's export flows. Empirical analysis was carried out using a gravity model for Kenya's trading partners in the East African Community (EAC) and Common Market for Eastern and Southern Africa (COMESA) between 1990 and 2008. Hausman Taylor Method (HTM) was the preferred estimation technique to Random Effects Model (REM) and Fixed Effects Model (FEM) because of its ability to deal with endogeneity problem, using internal instruments. This helps in avoiding the problem of bias due to invalid external instruments.

Kenya's bilateral exports were positively affected by its productive capacity, absorptive capacity of its trading partners, and Kenya's increased involvement in regional integration. Progression of COMESA from Preferential Trading Arrangement (PTA) to Free Trade Area (FTA) enhanced Kenya's bilateral exports by 52.5 per cent. The problem on overlapping membership had no effect on Kenya's exports. Policies to revitalize and accelerate economic growth in Kenya and its trading partners should be pursued. As distance variable has confirmed, Kenya needs to trade more with neighbouring countries. In particular, there is need to encourage development of key infrastructural sectors to reduce transaction costs, and also enourage active involvement of the country in regional integration efforts. Kenya can also choose to remain in EAC and avoid complications of being in more than one customs union, which is likely to raise the cost of doing business to traders. It is impractical for a country to belong to more than one customs union with differing Rules of Origin and tariff schedules.

Abbreviations and Acronyms

AFTA	ASEAN FTA
AGOA	African Growth and Opportunity Act
APEC	Asian-Pacific Economic Cooperation
ASEAN	Association of South East Asian Nations
CET	Common External Tariff
CGE	Computable General Equilibrium Model
COMESA	Common Market for Eastern and Southern Africa
EAC	East African Community
EFTA	European FTA
EU	European Union
FEM	Fixed Effects Model
FTA	Free Trade Area
GATS	General Agreement on Trade in Services
GATT	General Agreement on Trade and Tariff
GDP	Gross Domestic Product
GOK	Government of Kenya
H-O	Hecksher-Ohlin
HTM	Hausman Taylor Method
IMF	International Monetary Fund
MENA	Middle East and North Africa
MFN	Most-Favoured Nation
NIC	Newly Industrialized Countries
NTB	Non-Tariff Barriers
OLS	Ordinary Least Squares
PPP	Purchasing Power Parity
PTA	Preferential Trading Arrangements
REC	Regional Economic Communities

REM	Random Effects Model
RoO	Rules of Origin
RTA	Regional Trade Arrangements
SACU	South Africa Customs Union
SADC	South African Development Community
UEMOA	Western Africa Economic and Monetary Union
VIF	Variance Inflation Factor
WTO	World Trade Organization

Table of Contents

Abstract ..... *iii*

Abbreviations and Acronyms ..... *v*

1. Introduction 1
   - 1.1 Background Information 1
   - 1.2 Statement of the Problem 3
   - 1.3 Objectives of the Study 4
   - 1.4 Relevance of the Study 4

2. Potential Benefits and Risks of Regional Trade Areas Initiatives 6
   - 2.1 Benefits of Regional Trade Areas 6
   - 2.2 Risks of Regional Trade Areas 7

3. Literature Review 9
   - 3.1 Theoretical Literature 9
   - 3.2 Empirical Literature Review 11
   - 3.3 Synthesis of Literature 15

4. Methodology 16
   - 4.1 Theoretical Framework 16
   - 4.2 Model Specification 19
   - 4.3 Estimation Procedure 20
   - 4.4 Diagnostic Tests 23
   - 4.5 Data and Data Sources 24

5. Empirical Results and Discussions 25
   - 5.1 Descriptive Statistics 25
   - 5.2 Panel Regression Results 25

6. Conclusion and Policy Recommendations 29
   - 6.1 Conclusion 29
   - 6.2 Policy Recommendations 30
   - 6.3 Areas for Further Research 31

References 32

Appendix 36

1. Introduction

1.1 Background Information

Recent years have witnessed rapid growth in Regional Trade Arrangements (RTAs) in the world, a development that has come to be known as 'new regionalism'. Nearly all countries now participate in at least one RTA (Yang and Gupta, 2005). This has been happening in spite of RTAs being second-best trade policies, after trade liberalization on a most-favoured nation (MFN) basis.

RTAs are now a very prominent feature of the multilateral trading system. Some 421 RTAs had been notified to the General Agreement on Trade and Tariff/World Trade Organization (GATT/WTO) up to December 2008. Of these, 324 RTAs were notified under Article XXIV of the GATT 1947 or GATT 1994, 29 under the Enabling Clause, and 68 under Article V of the General Agreement on Trade in Services (GATS). At that same date, 230 agreements were in force. There were 400 RTAs to be implemented by 2010. Of these RTAs, free trade agreements and partial scope agreements account for over 90 per cent, while customs unions account for less than 10 per cent.[1]

This new regionalism is explained chiefly in terms of fear of exclusion from major markets (domino effect).[2] This does not mean total exclusion but less favourable market access than other countries. Some countries have been motivated by a desire to achieve strategic linkages in the region and strengthen regional security arrangements (Tumbarello, 2006). A sequence of events; the failure to launch a round of multilateral trade talks in Seattle in 1999, their short-lived recovery after the Doha ministerial meeting in 2001, and an impulsive breakdown in Cancun in 2003, have all sparked a renewed enthusiasm for preferential arrangements (Yang and Gupta, 2005). This apparent failure in multilateralism, difficulties in penetrating developed countries' markets, increased desire for collective bargaining power, new geopolitical realignments after the collapse of communism, and a shift towards export-led growth development strategies, have increased countries' desire to get involved in RTAs.

[1] Sourced from http://www.wto.org/english/tratop_e/region_e/region_e.htm (accessed on 2/9/2009)

[2] The desire to avoid the costs of being left-out and fear of exclusion provide incentives to join.

Africa is home to some 30 RTAs, many of which are part of deeper regional integration schemes (Yang and Gupta, 2005). Proliferation of RTAs on the African continent started especially after the 1980 Lagos Plan of Action and the Abuja Treaty of 1990, which called for increased cooperation and integration in Africa. However, Southern Africa Customs Union (SACU) and the original East Africa Community (EAC) had existed prior to this period. It is anticipated that these RTAs will act as building blocs for further trade liberalization in the continent in pursuit of a broader objective of economic integration of the African continent.

The main trading blocs in Eastern and Southern Africa are the Common Market for Eastern and Southern Africa (COMESA), Southern African Development Community (SADC) and the East African Community (EAC). There has also been a proliferation of unilateral trade arrangements such as Everything but Arms (EBA)[3] and African Growth Opportunity Act (AGOA), and bilateral reciprocal arrangements such as the European Union (EU) with Egypt and South Africa, and Economic Partnership Agreements (EPAs) between EU and EAC. Such arrangements complicate regional integration in the African continent.

Kenya is a member of both the EAC and COMESA and is currently the leading exporter to both regional blocs (Appendix 1 and 2). A significant amount of Kenya's exports also go to the EU market (Appendix 3). The COMESA region has been the leading destination of Kenya's manufactured goods, contributing 31.4 per cent of the export share.[4] COMESA was set up in 1994 and launched a FTA on 31 October 2000, and with 11 countries participating in the FTA at the

[3] EBA is an initiative of the European Union (EU) granting duty-free access to imports of all products from the least developed countries (LDCs), except arms and ammunitions, without any quantitative restrictions (with the exception of bananas, sugar and rice for a limited period).

[4] Most Kenyan exports to COMESA comprise of manufactured goods as opposed to primary products, thus enhancing diversification of Kenya's manufacturing base. Dominating exports are petroleum products, sacks and bags, medicaments, tea and food products.

time; Libya and Comoros joined in 2006.[5] It currently has 19 member states, 14 of whom are in a FTA and the other 5 are working towards joining the FTA.[6] The customs union was launched in June 2009, and there are plans to establish a common market by 2014 so as to deepen integration.

After the collapse of the original EAC in 1977, EAC was revived in 1999 and now has 5 member states following the entry of Rwanda and Burundi in July 2007. EAC implemented a customs union in January 2005; Burundi and Rwanda have now joined it. The EAC common market protocol was signed on 20 November 2009 and is set to be implemented starting July 2010. This will coincide with the period within which internal tariffs are going to be eliminated. Plans are underway for the formation of COMESA-EAC-SADC tripartite FTA (CES FTA). This is meant to foster inter-regional trade among the three regional economic communities (RECs) through the reduction of trade barriers.

1.2 Statement of the Problem

Kenya is an active participant in regional trade and the main exporter to both COMESA and EAC. The main motivation of engaging in regional trade is to overcome limitations of small and fragmented domestic market.

Free trade involves mainly tariff liberalization, and one would expect Kenya to trade more with the COMESA and EAC member states. This is due to preferential trade arrangements and close proximity to trading partners, which arguably lowers transaction costs. In addition, both COMESA and EAC member states have been implementing mechanisms for eliminating non-tariff barriers (NTBs), so as to promote regional trade.[7]

[5] The 11 countries are Djibouti, Egypt, Kenya, Madagascar, Malawi, Mauritius, Sudan, Burundi, Rwanda, Zambia and Zimbabwe. FTA is a trading arrangement where import duty for goods originating from partner states is zero rated, but where each country decides the tariff rate to charge goods from outside the FTA.

[6] The five countries are Uganda, Eritrea, DRC, Ethiopia and Swaziland.

[7] The examples of NTBs include: anti-dumping measures, countervailing duties, sanitary and phyto-sanitary measures, rules of origin, corruption, road blocs, cumbersome administrative and custom procedures, visa requirements, boarder controls, among others.

The main problems of multiple memberships are the implementation of Common External Tariffs (CET) for EAC and COMESA, trade deflection and harmonization of programmes and policies.[8] The outcome is that the cost of doing business increases, and further trade diversion effects may potentially arise.[9] Government of Kenya recognizes the challenge of dealing with unfair competition posed by the flow of exports through another partner state that may belong to another trading bloc when the rules of origin (RoO) are not strictly enforced.[10] This creates the need for an in-depth analysis of this pattern of trade, which is especially important now that there is a proposal for a merger of COMESA-EAC-SADC to form a tripartite FTA. If the merger is successful, it would increase member states to 26, hence a greater opportunity for export growth. The 26 member states of the proposed CES FTA has 527 million people and a GDP of 625 billion dollars, which is 57 per cent and 59 per cent of Africa's population and GDP, respectively.

1.3 Objectives of the Study

The main objective of the study is to examine the effects of RTAs on Kenya's export flows. The specific objectives are:

(i) To establish the determinants of export flows between Kenya, EAC and COMESA member states.

(ii) To determine the effects of overlapping membership in regional integration on Kenya's exports.

1.4 Relevance of the Study

Kenya, like many other developing countries, is involved in economic integration programmes to increase market access. Greater market size can expand opportunities for exporting products and lead to enterprise

[8] Trade deflection is the practice of deliberately exporting goods to one country through a transit country that is purportedly the country of destination.
[9] Trade diversion means that a FTA diverts trade away from a more efficient supplier outside the FTA, towards a less efficient supplier within the FTA.
[10] RoO are laws, regulations and administrative practices used to identify the country of origin of internationally traded goods. The most important function of RoO is to prevent trade deflection.

and employment growth. Economic integration by easing trade friction offers a great opportunity of fostering economic growth through growth of exports.[11] Thus, identifying factors that promote or impede regional trade is important to policy makers in designing and implementing appropriate policies meant to make Kenya benefit more from RECs.

All African countries belong to at least two RTAs, which creates a 'spaghetti bowl' complex.[12] It is theoretically impossible for a country to belong to more than one customs union, unless they have the same CET. COMESA-EAC-SADC member states have recognized the challenge posed by multiple memberships in their effort to accelerate inter-regional economic integration, creating the need to harmonize and coordinate regional integration programmes so as to mitigate the problem. This study will provide an empirical analysis of the overlapping membership problem.

The study will give an insight into countries in which Kenya has less trade friction and therefore offers greater opportunity for exports growth through trade promotional activities, thus reduce the cost of trade promotion, since the returns are likely to be much higher. It will help the government to broaden and deepen the export base and markets as is expounded in the Ministry of Trade's Strategic Plan (2008-2012).

[11] In the case of this study, trade friction refers to all factors that impede trade or cause trade resistance.

[12] Term developed by Bhagwati (1995). It is also called noodle bowl. This is caused by multiple (overlapping) membership problem.

2. Potential Benefits and Risks of RTAs Initiatives

2.1 Benefits of Regional Trade Areas

Regional trade areas (RTAs) play an important role in global trading system, especially with regard to easing or dismantling trade barriers and harmonizing rules governing trade. There are possibilities of expanding trade opportunities and benefits to member states if trade agreements are well designed. Regional trade areas can serve as a vehicle for dialogue and coordination on regional issues that are not part of the multilateral agenda, such as regulation, harmonization, infrastructure development, and collaboration among members to facilitate trade and transport. Proponents of regionalism contend that the multilateral system is unwieldy, and proliferating RTAs can accelerate global trade liberalization.

Through negotiations that happen during the formation of regional trade areas, developing countries (such as Kenya) can gain experience and experiment with trade liberalization on a limited scale.[13] The commitments to liberalize trade contained in preferential trade areas (PTAs) can provide policy makers with an opportunity to commit to future policy reforms or to cement past policy reforms. Regional trade areas can also be a forum for improved diplomatic relations and increased non-trade economic integration to foster peace and stability (Edmonds and Verbiest, 2002). This can strengthen political ties between countries in the region.

The lowering of trade barriers among bloc members may expose member economies to greater competitive pressures and open up larger markets for producers (Clarete *et al*., 2002). Trade liberalization effects in regional trade areas can offer domestic industries increased competition and improve the quality and quantity of inputs and goods available in the economy. Producers are also able to benefit from the greater market size created, which can then expand opportunities for exporting products, leading to employment creation. In the African countries' context, regional trade areas are viewed as a training ground to prepare local industries for broad-based liberalization (Yang and Gupta, 2005).

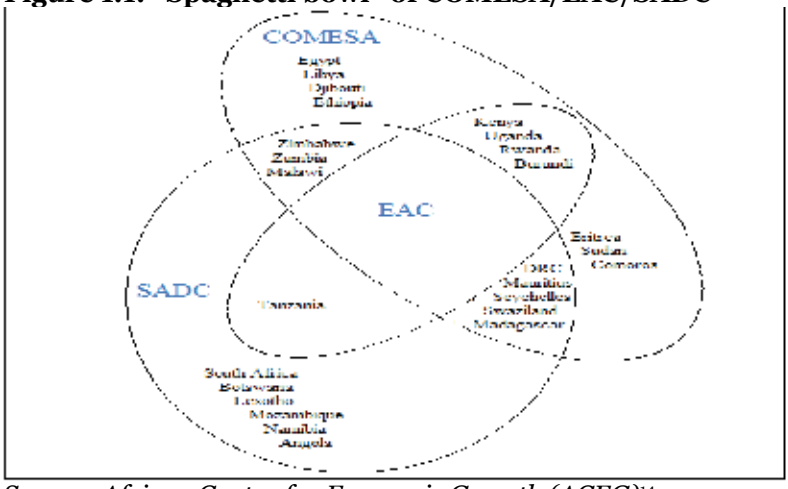
[13] For the purposes of this study, PTAs refer to RTAs; that is COMESA and EAC in which Kenya trades.

2.2 Risks of Regional Trade Areas

Regional trade areas as a discriminatory tool have harmful effects. In principle, PTAs are economically inferior to non-discriminatory trade liberalization on a MFN basis. There are risks that RTAs could, over time, turn into closed blocs. Regional trade areas could divert resources away from multilateral trade liberalization, both in the presence of limited administrative capacity, or because they are incorrectly perceived as a proxy for multilateral liberalization. This could thereby delay WTO negotiations and accession (Tumbarello, 2005). Political economy considerations also suggest that regional trade areas could create incentives for regional trade partners to lobby against any MFN-based reforms that would reduce the value of their tariff preferences, thus undermining prospects for future broader trade reforms (Krueger, 1995).

The proliferation of overlapping preferential agreements can create a 'spaghetti bowl' effect due to inconsistencies between various elements of the agreements, such as different schedules for phasing out tariffs, different RoO, exclusions, conflicting standards, and differences in rules dealing with anti-dumping and other regulations and policies. The more dimensions there are to the new agreements, the wider the scope for inconsistencies to emerge.

Figure 1.1: "Spaghetti bowl" of COMESA/EAC/SADC



Source: African Centre for Economic Growth (ACEG)[14]

[14] A study on COMESA-EAC-SADC Tripartite Free Trade Area Roadmap carried out in 2009.

Proliferation of regional trade areas usually creates hubs (usually large economies) and spokes (usually small economies) trade system between countries. A hub can be described as a situation arising from the decision of an outside country to form a bilateral agreement with only one member of a multi-member pre-existing regional trade area. The inside country is called the hub. Under such an arrangement, even if tariffs were removed along each spoke, the spoke countries would still not have free access to each other's market. They only access the hub. The favoured position of the hub will make it gain more compared to the spokes mainly because of preference market access to each spoke economy. Ongoing competitive (or 'additive') regionalism further strengthens such relationships, which tend to benefit the hub disproportionately more than the spokes because of differing RoO, product exclusions, non-trade issues, and trade investment diversion (Yang and Gupta, 2005).

3. Literature Review

3.1 Theoretical Literature

There are three complementary approaches that can be used in assessing the effects of different trade policy arrangements, including RTAs: the use of computable general equilibrium (CGE) models; sectoral studies founded on partial equilibrium analysis, undertaken to go beyond the insights afforded by CGE work and provide greater sectoral detail and understanding; and the use of gravity models.

CGE models and sector studies complement each other in terms of their quantitative results. Quantification of the effects of trade policy changes is desirable in order to best assess the magnitude of effects, the trade-offs and benefits/costs to different policy alternatives. CGE model simulation is applied in ex-ante analysis. It takes cross-sectional data from a single base period, not only for trade but also production, and consumption, and imposes a detailed theoretical structure on the interactions between different data elements. CGE models can also be used to consider the effect of existing arrangements through back casting the model, or by using a past equilibrium and projecting forward in the absence of policy changes to try and capture what the economy in question might have looked like without intervention (Gilbert *et al.*, 2001).

The use of CGE models for policy simulations has advantages and disadvantages (Tyler, 2006). The advantages include the following: first, CGE models are based upon solid microeconomic theoretical foundations. Second, they are complete in that they model the entire economy and can be used to capture and estimate total effects, taking into account interdependencies and linkages embedded in the functioning of the economy. Third, CGE models generate quantifiable results for the impact of policy changes, including output, resource allocation, and welfare. Income distributional implications can also be simulated. Fourth, since policy impacts are quantitatively estimated, analyses of alternative policy packages can be assessed and ranked in a consistent framework. Fifth, CGE models are well suited to analyze major policy changes as opposed to minor or marginal changes.

The disadvantages include: first, CGE models require massive and detailed data inputs, building upon an elaborate social accounting matrix framework, including household consumer surveys, national account

information, fiscal data, trade flow and restriction information among others, for the multiple regions (or countries) being modelled. Second, the aggregation in CGE models, normally mandated by data limitation considerations, may mask important effects in any simulation. Third, the more elaborate and detailed CGE model, the more likely it is to become a black box for which result interpretation is difficult. Fourth, there is no time dimension in a CGE model. The supposition is that with the imposed shock (for example policy change), the economy moves from one equilibrium to another. Fifth, there is no financial sector in most CGE models. Sixth, and very importantly, despite efforts to dynamize CGE models, they are essentially comparative static models.

The gravity approach is used in ex-post analysis to confirm the presence of trade creation/diversion after the agreements have been put in place. This approach utilizes a cross-section of bilateral trade data and attempts to estimate a 'normal' trade pattern. This technique can provide useful information on trade effects of RTAs, especially when the cross sections are available for several time periods (Gilbert *et al.*, 2001).

Gravity model, which dominates ex-post trade analysis, will thus be used in this study. The model is based on the idea that trade between two countries is analogous to the gravitational force exerted between two objects. Gravity model hypothesizes that the larger, the richer (in terms of Gross Domestic Product (GDP)/GDP per capita), and the closer two countries are, the more they trade. Standard gravity factors explain about two-thirds of the variation in global trade, leaving only one third to be explained by other trade factors (Ciuriak and Kinjo, n.d).

According to Medvedev (2006), the gravity model approach has enjoyed continued popularity due to its two major advantages: ease of implementation, and superior empirical performance. Data requirements of the traditional model are low and rely on widely available information, while the estimation procedure is straightforward through ordinary least squares (OLS) or generalized least squares (GLS). With regard to the second advantage, the empirical success of gravity models in forecasting the volumes of bilateral trade is well-documented. Rose (2002) notes that the gravity-estimated elasticities of trade with respect to both income and distance are consistently signed correctly, economically large, and statistically significant in an equation that explains a reasonable proportion of the cross-country variation in trade.

In addition, the argument that gravity models cannot clearly trace the links between trade policy and changes in trade flows does not disprove the validity of the gravity equation as long as one interprets the PTA coefficient(s) as the ex-post total effect on trade, reflecting not only the tariff reduction clauses of a PTA, but also other provisions that may enhance or diminish the liberalization potential of an agreement along with possible implementation problems.

There are five levels of regional integration schemes. First, the most basic is PTA, where member states offer each other favourable terms of trade through lower tariff and NTBs compared to third countries. Second, FTA, where trading partners eliminate all barriers to trade with member states, but where each country is free to elect its own protective measures against imports from third parties. Third, a custom union where countries in addition to FTA, adopt a CET on imports from third parties. Fourth, a common market which is a FTA with free movement of factors of production. Finally, the economic and monetary union that incorporates features of a common market, plus common supranational or inter-governmental policy making body. It is at this stage that RTA adopts a common currency and a common central bank, for example the EU.

3.2 Empirical Literature Review

For nearly half a century, the 'gravity equation' has been used to explain currency unions, language and other measures of trade costs in bilateral trade flows. Clarete *et al.* (2002) studied Asian regionalism and its effects on trade in the 1980s and 1990s. Gravity model, augmented with several sets of dummy variables, was used to estimate the effect of various PTAs on trade flows within and across membership groupings, as well as the effect of PTAs on members' trade with Asian countries. The study showed that PTAs had augmented trade in Asia. Srinivasan and Archana (2008) sought to find out the impact of RTAs/PTAs on India's trade flows using a gravity model. Greater distances reduced bilateral trade, while larger GDP and population enhanced trade. Language was also a significant determining factor. Tariff of the importing countries affected India's export flows negatively.

Researchers have applied the sectoral gravity model to explain bilateral trade flows. For example, Makochekanwa and Jordaan (n.d.) applied it in Botswana's five export sectors to characterize the

peculiarity of its trade patterns. Results showed that of the five sectors investigated, diamond and textile sectors' export trade followed a product differentiation model. The Heckscher-Ohlin (H-O) model underpinned exports in vehicle/automotive, copper, nickel and mate, and meat export sectors. The study also revealed that specific trade arrangements positively affected Botswana's trade sectoral exports to its trade partners.

Other studies have sought to establish whether RTAs have been trade creating or diverting. Ismail *et al.* (2007) investigated the effect of trade creation and trade diversion in the Association of South East Asian Nations (ASEAN) using a gravity model. The study found GDP, population, relative endowment, distance and common language as the main determinants of bilateral trade in ASEAN. The Association of South East Asian Nations dummies used to measure intra-ASEAN trade indicated that there was trade creation among the five ASEAN members. A further examination revealed that trade creation among the ASEAN was enhanced after the establishment of ASEAN FTA (AFTA). There was no evidence of trade diversion in pre-FTA analysis, but there was strong evidence of this during the post-AFTA period.

A study by DeRosa (2007) examined "new" evidence from the gravity model that indicated that majority of PTAs today are predominantly trade-creating. This is achieved after using a variant of the gravity model formulated by Rose (2004) and applies up to date regression data using a variety of econometric methods, including the Tobit regression method.

Using a number of gravity models, Tumbarello (2006) studied Mekong countries to establish whether RTAs always promote faster growth in overall trade or they discourage trade with non-members, and whether they lead to trade creation or trade diversion. The study showed that RTAs in Asia appeared not to have led to trade diversion, probably because regional integration in Asia followed a long period of unilateral liberalization during the 1980s and 1990s, and also only a limited amount of intra-ASEAN trade had been carried out under AFTA preferences. The results further suggested that the number of RTAs in Asia, especially ASEAN and Asian-Pacific Economic Cooperation forum (APEC), showed a higher degree of openness vis-à-vis the rest of the world than other members of RTAs outside the region.

Roberts (2004) sought to find out the policy implications for both the proposed China-AFTA and the Multilateral Trade System by way

of trade diversion and trade creation, and the possible effects on the economic welfare of integrating and non-integrating members. The results of the gravity model exhibited a good fit in explaining trade flows within China-FTA. Further, the results of the model proved that the China-FTA economies would have to map out policies and strategies to bring about convergence in their income levels, should maximum benefits be expected from the proposed FTA. On the multilateral trading environment, the model revealed an insignificant effect in terms of potential trade creation that could result from the integration.

Studies have also tried to address the shortcomings of the gravity model; that is its inability to take into account comparative advantage which still forms the bedrock of economists' understanding of international trade. One such study was by Ciuriak and Kinjo (n.d.) who used a trade specialization index to capture the degree of complementarity among trading partners. Trade specialization index distinguished countries that were generally believed to be 'most similar' from those that were believed to be 'most different'. The explanatory power of the gravity equation was good, comparing well with other established variables, and it improved the gravity equation.

Investigations of the effects of RTAs have not been limited to the use of gravity models; CGE models have also been applied. Tyler (2006) sought to analyze the effects of various types of trade integration of the Americans and various forms of diverse trading arrangements such as the Southern Common Market (MERCOSUL), North American FTA (NAFTA), the proposed FTA of the Americas (FTAA), Central America FTA (CAFTA), and the United States bilateral FTAs with different countries, among others, using a CGE model. In general, the analytical findings were that FTAA would bring greater benefits to its members than bilateral FTAs, but a successful Doha Round could bring even greater welfare improvements for Western hemisphere countries.

Researchers have also used gravity and CGE models to investigate the effects of RTAs. Innwon and Soonchan (2008) applied an ex-ante simulation approach and an ex-post econometric approach. Gravity regression analysis was used to quantitatively estimate trade effects of customs unions and FTAs. In general, the study found that a customs union was a superior type of RTA to an FTA in terms of creating more intra-union trade. In addition to analyzing the trade effects of RTAs according to type, the study quantitatively evaluated the welfare and output effects of customs unions for East Asia (ASEAN+3 and China-

Japan-Korea customs unions) compared to FTAs by applying a CGE model analysis. The East Asian customs unions adopted a system of CET based on simple-averaged, import weighted, consumption-weighted, and minimum rates. Overall, the ASEAN+3 customs union with the minimum CET was the most desirable type of RTA for both East Asian member countries and the world economy as a whole.

Using a CGE model, Innwon (2006) quantitatively evaluated the effects different paths have on East Asian RTAs. The study found that the static effect of the proposed East Asian RTAs on world and members' welfare was sufficiently positive and would lead to non-discriminatory global free trade. This was by triggering the domino effect of regionalism over time, if the RTAs take an expansionary path by cooperating with each other, in contrast to competing to achieve the first mover advantage, or hub-self-interest. Also, higher positive welfare and output gains were associated with original members of existing RTAs. Additional positive trade creation effects arose for original members as associated RTAs. Finally, welfare and output gains were in an uneven distribution for a hub relative to smaller or even negative gains for spokes.

A study by Agbodji (2008) evaluated the impact of PTAs and the monetary union on bilateral trade between Western Africa Economic and Monetary Union (UEMOA) member countries, using a dynamic gravity model. Membership in a common monetary zone and the implementation of common economic reforms had a significant effect on bilateral trade within the zone, although more was in terms of creating trade. Furthermore, economic policy distortions that fostered informal trans-border trade had a negative effect on trade within the region.

Bhattacharya and Wolde (2010) estimated a gravity model for Middle East and North Africa (MENA) countries to find out whether trade volumes were significantly lower than what would be expected given their economic, cultural and geographical characteristics. The standard gravity model variables could not explain a significant part of MENA trade performance, especially on exports. When these variables were augmented with variables from the World Bank's Business Enterprise Surveys, transport and customs inefficiencies were found to be the most important factors responsible for underperformance in trade.

3.3 Synthesis of Literature

There are two main approaches of analyzing the effects of RTAs; that is, CGE and gravity model approaches for ex-ante and ex-post trade analysis, respectively. Since the current study is an ex-post one, gravity model was preferred. Further, the gravity model is highly acclaimed for its simplicity and empirical robustness (Roberts, 2004). Empirical literature has revealed that gravity model approach is a popular tool and has been used widely by researchers in analyzing the effects of RTAs. There is lack of empirical evidence on the effects of RTAs on Kenya's export flows.

4. Methodology

4.1 Theoretical Framework

Gravity model use the concept of gravitational force borrowed from Newton's gravitational theory to explain the volume of trade, capital flows, and migration among countries of the world. Newton's theory postulates that the force of attraction between two separate entities i and j is positively related to entities' respective masses and inversely related to the square of distance between the objects as shown in equation 1.

$$F_{ij} = \frac{GM_iM_j}{D_{ij}^2} \quad \text{.....(1)}$$

Where F_{ij}=gravitational force between i and j, M_i M_j=masses, D_{ij}=Distance between i and j, and G=gravitational constant.

In the gravity model of international trade, gravitational force in Newton's law is replaced by trade flows or exports from country i to j, while GDP is used as a proxy for a country's mass, and distance is often measured using 'great circle' calculations in accordance with equation 1. Gravity model of international trade between countries is represented by equation 2.

$$X_{ij} = \frac{KY_i^{\alpha}Y_j^{\beta}}{T_{ij}^{\theta}} \quad \text{.....(2)}$$

Where X_{ij}=exports (in value) between country i and j, K=gravitational constant, Y_{ij}=economic size (GDP or population) for country i and j, T_{ij}=trade costs between country i and j. If $\alpha=\beta=1$ and $\theta=2$, we get the Newton's law.

Equation 2 can be converted into a log-log form as presented in equation 3.

$$LnX_{ij} = LnK + \alpha LnY_i + \beta LnY_j - \theta LnT_{ij} + \delta Z + \varepsilon \quad \text{.....(3)}$$

where δZ denotes other factors that positively or negatively affect export flows, while ε is the stochastic term.

Trade between two countries is positively affected by the economic mass of trading partners and inversely related to distance between them. Additional variables such as physical area, population, indicators

of cultural affinity, and sharing contiguous boarders are usually added to empirical gravity models to elaborate on the 'economic mass' and distance variables (Clarete *et al.*, 2002).

Application of the gravity model in the context of international trade was for the first time independently done by Tinbergen (1962) and Poyhonen (1963), who did not make any attempt to justify it theoretically but referred to a simple analogy of physics (Makochekanwa and Jordaan, n.d.). Trade theorists have attempted to connect the gravity model to key elements in trade theory. The standard assumption of the Heckscher Ohlin (H-O) model that prices of traded goods are the same in each country has proved to be faulty due to the presence of what trade economists call 'border effects'. Accounting for these costs requires prices of traded goods to differ among the countries of the world.

A first attempt was made by Anderson (1979) to derive a gravity model from a linear model of expenditures using Armington assumption (that is, goods differentiated by country of origin). By specifying demand in these terms, Anderson helped to explain the presence of income variables in the gravity model, as well as their multiplicative (or log-log form). Later on, Bergstrand (1985) addressed the role of multilateral prices. Another attempt was made by Helpman (1987) and Bergstrand (1989) using monopolistic competition model approach. Here, the product differentiation by country of origin approach was replaced by product differentiation among producing firms, and the empirical success of the gravity model considered to be supportive of the monopolistic competition of intra-industry trade. Bergstrand (1990) built on the work of Anderson and monopolistic competition, but used existing price indexes instead of those derived through theory.

However, Deardorff (1995) showed that the gravity model could be derived from the H-O model based on comparative advantage and perfect competition if it is properly considered. According to him, absence of all barriers to trade in homogenous product causes producers and consumers to be indifferent to the trading partners, both domestic and foreign, so long as they buy or sell the desired goods. Based on this assumption, he derived the expected trade flows that correspond exactly to the simple frictionless gravity equation, whenever preferences are identical (Makochekanwa and Jordaan, n.d.).

Anderson and van Wincoop (2003) enhanced the theoretical foundations of the gravity model equation to emphasize the importance of accounting properly for the endogeneity of prices. Though elegant, the model assumed symmetric bilateral trade costs to generate an estimable set of structural equations (Bergstrand *et al.*, 2007). The most recent attempt was by Helpman *et al.* (2008), who derived the gravity equation from heterogeneous firm model of trade (ARTNet, 2008).

According to the generalized gravity model of trade, the volume of exports between pairs of countries X_{ij} is a function of their incomes (GDPs), population, geographical distance and a set of dummies. The general gravity model is specified as:

$$X_{ij} = \beta_0 Y_i^{\beta_1} Y_j^{\beta_2} N_i^{\beta_3} N_j^{\beta_4} D_{ij}^{\beta_5} A_{ij}^{\beta_6} e^{\gamma m} e^{u_{ij}} \quad \text{.....(4)}$$

Where Y_i (Y_j) represents the GDP of the exporter (importer), N_i (N_j) are the populations of the exporter (importer), D_{ij} measures the distance between the two countries' capitals, and A_{ij} represents other factors that could aid or impede trade between countries, $e^{\gamma m}$ is a vector of dummies, and $e^{u_{ij}}$ is the error term.

Equation 4 requires to be converted into a log-log form before estimation. The GDP of the exporting country measures productive capacity, while that of the importing country measures absorptive capacity. A positive relationship is expected between GDP and trade flows due to productivity and absorptive capacity on exports. Population in the gravity model is used as a measure of country size. Countries with a large population tend to be more inwardly oriented than smaller countries, because they are better able to exploit economies of scale in their large domestic market (Frankel, 1997 cited in Clarete *et al.*, 2002). Thus, an inverse relationship is expected between population and trade flows. Distance (in kilometres between Kenya's capital city and that of trading partner) between two countries is an important factor in determining geographic pattern of trade and is used as a proxy for transaction costs. Trade will be meaningful to a country if gains from trade are higher than the costs incurred in realizing those gains. The larger the distance, the higher the transaction costs. A negative relationship is expected between trade flows and distance. Beyond some distance, transaction costs may be such that trade does not occur at all.

4.2 Model Specification

Empirical model that was used closely followed the one used by Gilbert *et al.*, 2001). The model finds out whether RTA membership was more likely to produce trade creation or trade diversion (this was carried out using dummy variables to capture participation in RTAs). A sample of 20 countries (Kenya included) belonging to either COMESA or EAC or both were included in the study. The study period was from 1990 to 2008 to enable capturing of pre- and post- FTA trade liberalization periods.

Empirical model used in this study was specified as follows:

$$LnX_{ij} = \alpha_{ij} + \beta_1 Ln(GDP_i GDP_j) + \beta_2 LnPoP_j + \beta_3 Ln(PC_i PC_j) + \beta_4 Ln(|PC_i - PC_j|) + \beta_5 LnD_{ij} + \beta_6 COMPTA_{ij} + \beta_7 COMFTA_{ij} + \beta_8 EACCU_{ij} + \beta_9 OVLP_{ij} + \beta_{10} T_t + \varepsilon_{ij} + v_{ij} \quad \text{.....(5)}$$

Where L_n denotes variables in natural logs, α_{ij} is a constant, GDP_{ij} is for country i and j, PoP_j is the population for country j, PC_iPC_j is the product of per capita income for country i and j, $|PC_i\text{-}PC_j|$ is the absolute per capita income difference for country i and j, and D_{ij} is the distance from i to j. Four dummy variables were introduced, that is: *COMPTA, COMFTA, EACCU* and *OVLP* representing *COMESA PTA, COMESA FTA, EAC* customs union, and overlapping membership, respectively. These variables were meant to capture the effects of RTAs. Time dummy (T) was meant to capture the effects of time. An F-test was carried out to find out whether time was jointly significant in determining export flows. The null hypothesis was that time dummies were not jointly significant, if the null hypothesis was rejected, meaning that time was important and should be included in the regression. The error term was decomposed into ε_{ij} which denoted the unobservable individual specific effect, with v_{ij} being the stochastic error term that changes across time and cross-section.

The expected signs of D_{ij}, PoP_{ij} and GDP_iGDP_j remain the same as explained in equation 4.[16] Per capita income (PC) enters the gravity equation as the product of bilateral per-capita GDPs and as absolute

[16] GDP is in multiplicative form. The logic behind this is that there should be a simultaneous growth in incomes for both the importing and the exporting country. Exporting country income would reflect productive capacity, while importing country reflects the absorptive capacity. Their incomes have to grow together; for example, if the income of Kenya is increasing and that of trading partner falling, then the ability of the trading partner to import will fall. This will negatively affect bilateral exports.

value of the difference. The former can be thought of as capturing the importance of wealth (as opposed to size) as a determinant of trade, and it is expected to be positively related to exports. The latter can be thought of as capturing the importance of differences between economies as emphasized in the H-O type models (Gilbert *et al.*, 2001).[17] The coefficients of variables in logarithmic form are interpreted as elasticities; that is, proportionate change in X_{ij} due to a 1 per cent change in these variables.

The first dummy variable takes the value of one when the two countries are both members of COMESA PTA and zero otherwise. The second dummy variable takes the value of one if both countries are members of COMESA FTA and zero otherwise. The third dummy variable takes the value of one if both countries belong to the EAC customs union and zero otherwise. The final dummy (OVLP) takes the value of one if a trading partner belongs to more than one regional bloc at a given point in time and zero otherwise.[18] A positive coefficient is expected for COMPTA, COMFTA and EACCU dummies. The coefficient of OVLP dummy is expected to be indeterminate because belonging to more than one trading bloc could result to increased export volumes due to an expanded market or reduction of export volumes caused by complications associated with overlapping membership. There is no hypothesized relationship between time and trade flows.

4.3 Estimation Procedure

The study estimated a gravity model using panel data econometrics techniques. Panel data estimation technique has several advantages over cross-section analysis. It may be possible to reveal dynamics that are difficult to detect with cross-sectional data. It is possible to monitor unobservable trade-partners-pair's individual effects, and it allows capturing of the overall business cycle phenomenon, which is key in international macroeconomics.

[17] Some other studies, for example Rober (2004), used absolute per-capita differences to test for the Linder hypothesis, which states that the more similar the demand structure of the two countries, the higher the potential for trade between these two countries. Linder argued that the hypothesis was more applicable to developed and not developing countries, since developed countries produced highly tradable goods. If the Linder hypothesis is supported by the data of this analysis, then the coefficient on this variable should be negative and statistically significant.

[18] Regional blocs considered are COMESA, SADC and the EAC.

Should the individual specific effects be omitted, OLS estimates will be biased if individual specific effects are correlated with the regressors. When carrying out estimations, one may assume that there are no individual country-specific effects present in the panel, or that country specific effects are present. Estimation of individual country-specific effects can be carried out by either Fixed Effects Model (FEM) or Random Effects Model (REM). One has to choose the method before embarking on estimation. Hausman specification test was used to check which model is more efficient for this study. The null hypothesis of the test is that there is no correlation between the individual effects and the regressors.

Under FEM, trade effects of variables that are time invariant and whose values do not change over time cannot be directly estimated because inherent transformation wipes out such variables. However, the effects of these variables can be easily estimated in an auxiliary regression that involves running another equation with the estimated individual effects for each country as the dependent variable, and the time invariant variables, but which vary across countries (distances in the case of this study) regressors as specified in equation 6. This method was proposed by Cheng and Wall (2005) and involves estimating the following supporting regression equation.

$$IE_{ij} = \alpha_0 + \alpha_1 D_{ij} + \mu_i \quad \text{.....(6)}$$

Individual effects (IE) are estimated from the main regression. REM has the advantage of allowing us to estimate parameters for time-invariant regressors, which may be of policy relevance. However, we cannot interpret the coefficients for the unobserved heterogeneity. The existence of a potential correlation between the unobservable characteristics and a set of the explanatory variables introduces the risk of obtaining biased estimates. FEM has two major limitations: the time invariant variables are dropped during regression; and FEM ignores variations across individuals, which may or may not be correlated with the explanatory variables, a problem that is usually solved by using instrumental variables (IV).

A superior method to both the FEM and REM that can estimate time invariant variables and address the problem of endogeneity was proposed by Hausman and Taylor (1981) and is called Hausman Taylor

Method (HTM). The source of potential endogeneity bias in gravity model estimations is the unobserved individual heterogeneity (Rault *et al.*, 2008). Unlike the conventional IV method that uses external instruments, HTM uses variables that are specified in a regression equation as instruments to solve the problem of endogeneity. This makes it possible to eliminate the correlation between the explanatory variables and the unobserved individual effects that undermine the appropriateness of the REM in the gravity model context (Keith, 2006). Another advantage of HTM over IV regression is that it is usually difficult to find variables not specified in an equation that can serve as valid instruments for endogenous regressors. If the instruments are weak, precision of IV regression results is greatly undermined and can be lower than those of OLS (Baum, 2007).

Therefore, HTM results were used to draw conclusions and policy recommendations for this study. Following Greene (2002), HTM specification of the gravity model takes the following form:

$$Y_{it} = X'_{1it}\beta_1 + X'_{2it}\beta_2 + Z'_{1i}\alpha_1 + Z'_{2i}\alpha_2 + \varepsilon_{it} + u_i \quad \text{.....(7)}$$

Where $\beta = (\beta'_1, \beta'_2)', \alpha = (\alpha'_1, \alpha'_2)'$ and u_i contain all individual country specific effects not included in the model. All individual effects denoted by Z_i are observed. Hausman and Taylor defined four sets of observed variables in the model:

X_{1it} is K_1 variables that are time varying and uncorrelated with u_i;
Z_{1i} is L_1 variables that are time invariant and uncorrelated with u_i;
X_{2it} is K_2 variables that are time varying and correlated with u_i;
Z_{2i} is L_2 variables that are time invariant and are correlated with u_i.

According to HTM, those variables (X_{2it}) that are time varying and correlated with u_i are instrumented by the deviation from individual means, while Z_{2i} variables are time invariant but correlated with u_i and are instrumented by the average of X_{1it} regressors. The presence of Z_{2i} and X_{1it} is the cause of biased results of the REM. Hausman and Taylor did not give a criterion for selecting variables that are to be instrumented, and one has to use economic intuition to identify those variables that are likely to cause endogeneity.

From equation 5, X_{2it} variables are GDP_{ij} and $|PC_i\text{-}PC_j|$ and regional integration dummies. GDP_{ij} cannot be regarded as exogenous since

trade increases income (Frankel and Rose, 2002). They thus state 'interpreting a significant correlation between trade and growth as implying causality from the former to the latter is potentially problematic because of the serious problem of simultaneity bias'. McPherson and Trumbull (n.d.) also argue that Linder variable (absolute difference in per capita income), that is $|PC_i\text{-}PC_j|$), is also a potential source of endogeneity. This is because countries with similar wealth levels could have similar demographic, geographical, or cultural aspects, which are included in u_i. Furthermore, this variable could be correlated with the level of development of infrastructure, consumer preferences and ability to obtain hard currency.

Membership to the regional economic blocs is also likely to cause endogeneity. Countries that trade more have a higher probability of trading more (Toubal, 2006). In this case, COMPTA, COMFTA and EACCU are likely to cause endogeneity.

Another potential problem when dealing with pooled dataset that has cross-sectional and time-series elements is autocorrelation. This is dealt with through the covariance method; that is, specifying an additional annual dummy variable for all years but the first. This technique can also be interpreted as controlling for the growth and inflation in the world economy (Gilbert *et al.*, 2001).

4.4 Diagnostic Tests

4.4.1 Test for multicollinearity

Presence of multicollinearity can be detected by use of Variance Inflation Factor (VIF) or tolerance (1/VIF). Tolerances close to 1 means that there is little multicollinearity, while a high VIF is an indication of serious multicollinearity. The rule of the thumb while using VIF is that if it exceeds 10, multicollinearity is a serious problem. VIF results are presented in Table 4.1.

From Table 4.1, VIF was 2.16, indicating that multicollinearity was not a serious problem. Using tolerance, individual variables that have elements of multicollinearity are POP and GDP.

Table 4.1: Variance inflation factor results

Variable	VIF	1/VIF
Ln population	4.07	0.25
Ln GDP*GDP	3.93	0.25
Ln distance	2.19	0.46
Ln per capita difference	1.90	0.53
COMESA PTA	1.77	0.57
Overlapping membership	1.73	0.58
EAC customs union	1.41	0.71
COMESA FTA	1.41	0.71
Ln product of per capita	1.06	0.94
Mean VIF	2.16	

Source: Author's own computation

4.4.2 Detecting heteroskedasticity

This was carried out using Breusch-Pagan/Cook-Weisberg test. The null hypothesis is that the residuals are homoskedastic. The statistic distributed as a Chi-Square (X_2) and a high value of the X_2 statistic (or a low p-value) allows one to reject the null hypothesis, implying there is the problem of heteroskedasticity. In our case, X_2 =84.98 and a Prob>X_2=0.00, thus the null hypothesis is rejected, meaning that the dataset has a problem of heteroskedasticity. Due to the presence of heteroskedasticity in the regression results, robust standard errors were used to correct the problem. Robust standard errors relax OLS assumptions that the errors are independent and identically distributed. Robust standard errors in the presence of heteroskedasticity are more trustworthy.

4.5 Data and Data Sources

Data on exports (US$) between Kenya and her trading partners was obtained from UN COMTRADE database. Data on population (millions), GDP, per capita income (both in US$ millions) was obtained from International Monetary Fund's (IMF) World Economic Outlook database. GDP and GDP per capita are in purchasing power parity (PPP) terms, which allow avoidance of having arbitrary temporary movements in exchange rates that exert undue influence over the results (Gilbert *et al.*, 2001). Data on distance was obtained from www.timeanddate.com and was in kilometres.

5. Empirical Results and Discussions

5.1 Descriptive Statistics

Table 5.1 shows that exports, product of GDP, population, product of per capita incomes, absolute per capita income difference, distance, COMESA PTA and FTA, EAC CU, and overlapping membership averaged 4.53e+07; 1,104.62; 17.80; 3,674,104; 2,068.87; 1,927.84; 0.40; 0.24; 0.03 and 0.06, respectively. Some variables such as exports and product of per capita incomes seem to have a high standard deviation. However, a standard deviation can be considered to be high if it is the mean value severally. This is not the case for these two variables.

5.2 Panel Regression Results

Before deciding whether to use REM or FEM, Hausman test must be carried out. A large and significant Hausman statistic would mean that we reject the null that the two methods are the same in favour of the alternative hypothesis. FEM is appropriate and REM is not. Hausman test statistic was 4.49 with a Prob of 0.8107, meaning that REM was appropriate for the study.

As was previously explained, results of this study are based on HTM. However, for the purposes of comparison, pooled OLS, REM and FEM results have been presented. All coefficients of variables included in the study had the expected signs but not all of them were significant (Table 5.2). The time variable was dropped from the

Table 5.1: Descriptive statistics

Variable	Observation	Mean	Std. Dev	Min	Max
X	361	4.53e+07	9.64e+07	0.00	7.88e+08
GDP_i*GDP_j	361	1104.62	2820.91	9.87	26739.88
POP	361	17.80	20.47	0.07	79.18
PC_iPC_j	357	3674104	5873495	1154.8 3	3.75e+07
$\|PC_i-PC_j\|$	329	2068.87	3654.91	14.9	20196.67
DIS	361	1927.84	1006.29	503	4530
COMPTA	361	0.40	0.49	0	1
COMFTA	361	0.24	0.43	0	1
EACCU	361	0.03	0.18	0	1
OVLP	361	0.06	0.24	0	1

Source: Author's computation

Table 5.2: Pooled ordinary least squares, random effects model, fixed effects model and hausman taylor model results

Estimator	Pooled OLS	REM	FEM	HTM
Dependent Variable				
Product of GDP for country i & j	0.61*** (4.91)	0.80*** (4.33)	0.56* (2.60)	0.78*** (4.17)
Product of per capita incomes for country i & j	-0.01 (-0.07)	0.01 (0.17)	0.01 (0.30)	0.01 (0.24)
Absolute difference in per capita income for country i & j	-0.08 (-1.09)	-0.02 (-0.19)	-0.05 -0.02	(-0.09)
Distance between country i & j	-2.68*** (-12.10)	-2.98*** (-3.68)	-1.61***[19] (-4.59)	-2.72*** (-1.76)
Population of country j	0.02 (0.17)	0.06 (0.17)	2.00*** (1.81)	0.34 (0.73)
Membership into COMESA PTA (1=member; 0 otherwise)	0.50* (1.93)	0.62** (2.19)	0.83* (2.03)	0.66*** (3.30)
Membership into COMESA FTA (1=member; 0 otherwise)	1.07*** (4.18)	0.92*** (3.43)	0.92** (2.21)	0.90*** (4.25)
Membership into EAC CU (1=member; 0 otherwise)	0.14 (0.67)	0.30 (1.47)	0.22 (0.65)	0.27 (0.63)
Overlapping membership (1=belong to >1 RTA; 0 otherwise)	-0.09 (-0.50)	-0.46 (-1.59)	-0.42 (-0.94)	-0.43 (-0.65)
Time	-	-	-	-
Constant	32.32*** (16.13)	32.80*** (5.52)	8.38*** 11.87*** (3.42) (4.48)	30.35*** (2.71)
R^2	0.58	0.26	0.27[20] 0.06[21]	
Hausman Test x^2		4.49		

Source: Author's computation

****, **, *, significant at 1, 5 and 10 per cent, respectively. Note: Figures in the brackets are t-statistics for Pooled OLS and FEM, and z-statistics for REM and HTM. Also, there are two constants for the FEM, the first is obtained from equation 5, and the second from equation 6.*

regressions because an F-test showed that time dummies were jointly insignificant.

The coefficient on the logs of product of trading partners' GDP was positive and significant. This means that growth of Kenya and her trading partners' income is important in enhancing Kenya's bilateral exports.

[19] The coefficient was obtained after running an OLS regression for equation 6.
[20] R-squared excluding distance.
[21] R-squared for equation 6.

As was expected, the coefficient of distance was negative and significant. Thus, bilateral exports will decline with an increase in distance. The coefficient on distance variable was quite big (-2.72), meaning that of the factors considered, distance was the most important explanatory factor affecting Kenya's bilateral exports.

Membership into regional economic groups, specifically COMESA PTA and COMESA FTA dummies, had the expected sign and were significant. This therefore means that Kenya's involvement in regional trade is beneficial to the country as far as exports are concerned.

Product of GDP per capita incomes for Kenya and that of its trading partners had the expected sign but was insignificant. This variable was meant to capture the importance of wealth as opposed to size, meaning that wealth is not important in boosting Kenya's bilateral exports.

Absolute difference of per capita incomes for Kenya and her trading partners had the expected sign (-), thus rendering support to Linder hypothesis that if the trading partners have very pronounced income differences, they will tend to trade less. However, this variable was not significant. This could mean that per capita incomes of trading partners are converging as regional blocs moved to higher levels of economic integration. Thus, with time, countries should be able to trade more with each other once their per capita incomes converge.

The relationship between population of trading partner and Kenya's export flows was expected to be negative but was positive. However, the variable was insignificant, meaning that population is not important as far as Kenya's bilateral exports are concerned. A positive relationship between exports and population of Kenya's trading partner could suggest that the trading partners were able to absorb more exports (due to increased absorptive capacity).

The coefficient of EAC customs union membership was insignificant. This is probably because EAC customs union came into operation a few years ago, specifically in the year 2005. Also, partner states had considerably reduced trade barriers between them with the implementation of EAC FTA. In addition, Rwanda and Burundi have only joined the EAC customs union recently. The customs union protocol started being implemented in July 2009 after being accepted in EAC in July 2007.

Though belonging to more than one, RTA had negative impact on Kenya's trade flows; the coefficient of overlapping membership variable

was insignificant. This could be attributed to the fact that Kenya trades more with neighbouring countries, mainly those in EAC. For example, in 2008, Kenya's exports to Uganda, Tanzania and Rwanda accounted for about 70.2 per cent of all exports to Africa, and 33.1 per cent of Kenya's total exports (Government of Kenya, 2010), Appendix 3. This means that low volumes went to the other COMESA and EAC countries. Since most of the exports went to EAC member states, which have the same customs union, it is possible that adverse effects associated with overlapping membership were reduced considerably through the avoidance of high costs of implementing differing and conflicting RoO.

Since all the variables except the dummies were in natural logs, they can be interpreted as elasticities. Therefore, a 10 per cent increase in transaction costs (distance) could lead to a decline of bilateral exports by 27.2 per cent, thus bilateral exports decrease as distance increases.

An increase of incomes for Kenya and her trading partners by 10 per cent would lead to an increase in Kenya's bilateral exports by 7.8 per cent, indicating that productive capacity of Kenya and absorptive capacity of trading partners are important in increasing exports.

Involvement in RTA enhances bilateral exports. This was exemplified by positive coefficients for COMESA PTA and COMESA FTA dummies. The estimated coefficients for these two variables were quite substantial. Belonging to COMESA PTA increased bilateral exports by exp (0.66)-1)=93.5 per cent, while belonging to COMESA FTA increased bilateral exports by exp (0.90)-1)=146 per cent.

6. Conclusion and Policy Recommendations

6.1 Conclusion

This study examined the effects of RTAs on Kenya's export flows involving countries in both COMESA and EAC. It covered the period 1990 to 2008 so as to capture both pre- and post-FTA periods. To realize its objectives, a gravity model was estimated using recent panel data econometrics methods, which are able to take into account unobserved heterogeneity. In order to deal with the problem of endogeneity, HTM was preferred because it does not use external instruments and it is able to avoid the problem of lack of valid instruments. In addition, it allows for the estimation of time invariant variables such as distance. HTM was thus preferred to REM and FEM.

Distance, income and membership in regional economic blocs (COMESA PTA and COMESA FTA) variables were important factors determining Kenya's bilateral exports. Distance variable had a very big elasticity (-2.72) and was very significant, meaning that exports will reduce with an increase in distance. Income of exporter, importer and COMESA membership enhanced Kenya's exports to trading partners. Transition of COMESA from PTA to COMESA raised bilateral exports from 93.5 to 146 per cent (a 52.5 % increase). This indicates that RTAs are-trade creating. Though overlapping membership variable had the expected sign, it was insignificant, meaning that adverse effect on Kenya's exports was minimal.

Econometrics results have revealed that Kenyan exports into the regional trading blocs are positively affected by income, and participation in regional trade integration is inversely affected by distance. Growth of incomes in trading partner states result into increased absorption of Kenyan exports, while growth of incomes in the domestic economy will boost productive capacity. Distance continues to exert negative influence on Kenya's export flows. This is an indication that despite the advances in technology for the most part of 20th and early 21st century, distance and by extension close proximity to trading partners is still an important determinant of export flows. However, there is a likelihood of the importance of distance to diminish over time if there is substantial investment in key infrastructure such as roads, railways and telecommunication technologies.

There is bilateral export enhancement for Kenya by involving herself in regional economic integration, especially by moving to higher levels of economic integration. This is clearly demonstrated by the rise in Kenyan exports by 52.5 per cent with the implementation of COMESA FTA. This can also be taken as evidence of increased intra-bloc trade as a result of the new wave of regionalism. Multiple memberships of Kenya's trading partners' has little adverse effects on Kenya's bilateral exports. The results imply that new initiatives to merge and expand the existing RTAs should be pursued and supported to provide a larger market for Kenyan goods. Such initiatives include the proposed tripartite FTA (COMESA-EAC-SADC).

6.2 Policy Recommendations

Whereas Kenya may not influence incomes of her trading partners, the country should explore and identify export opportunities in those countries that are experiencing high income growth, or where there are high prospects of income growth in the future. Kenya can increase productive capacity of the economy by instituting policy strategies aimed at reviving the economy, which is currently operating below its potential. This might include fast-tracking the implementation of the stimulus package as was proposed in the 2009/2010 budget.

As distance continues to exert negative influence on Kenya's bilateral export flows, it should seriously consider trading more with neighbouring countries, most of whom are in the EAC. It is also important to improve infrastructure so at to reduce transaction costs associated with long distances for trade in goods, since a good number of member states are landlocked. Countries in the region should cooperate to ensure that they improve the main roads connecting them. Also, it is important to improve the railways and telecommunication sector. Viewing infrastructure as an international public good raises the question of how the cost of infrastructure should be shared between trading partners. Individual countries should come up with frameworks of ensuring that they upgrade key infrastructure and link them, like it is happening in Kenya today where roads linking Ethiopia, Sudan and Tanzania are already under construction. Joint efforts should be encouraged in instances where setting up of certain types of infrastructural projects is highly capital intensive.

Kenya should continue to be an active participant in regional economic integration efforts aimed at reducing trade barriers, merging the existing trading blocs in the region and Africa as a whole, with a view to expanding the market for Kenyan goods. Focus should be made towards moving the current RTAs to higher levels of economic integration, such as common market and monetary union. However, these integration efforts should not substitute multilateral trade arrangements spearheaded by the WTO under MFN principle. Further, multiple memberships with inconsistent RoO should be avoided as that can complicate production and sourcing decisions by firms. Kenya can also choose to remain in the EAC, where most of her exports to Africa go, and avoid problems of implementing more than one customs union protocol, which essentially raises the cost of doing business to traders.

6.3 Areas for Further Research

Owing to lack of data, the study did not factor in trade specialization index as a proxy for comparative advantage. The study does not include NTBs, which are a major impediment to regional trade. Future studies can take this into account.

References

Agbodji, A.E. (2008), *Impact of Sub-Regional Integration on Bilateral Trade: The Case of UEMOA*, AERC Research Paper No. 186, Nairobi: African Economic Research Consortium.

Anderson, J.E. (1979), "A Theoretical Foundation to the Gravity Equation", *American Economic Review*, 69.

Anderson, J.E. and van Wincoop, E. (2003), "Gravity with Gravitas: A Solution to the Border Puzzle", *American Economic Review*, 93.

ARTNet (2008), *Gravity Models: Theoretical Foundations and Related Estimation Issues*, Capacity Building Workshop for Trade Research Presentation, Cambodia, Phnom Penh, June 2-6.

Baum, C.F., Schaffer, M.E. and Stillman S. (2002), *Instrumental Variables and GMM: Estimation and Testing*, Boston College Economics Working Paper 545.

Baum, C.F. (2007), Instrumental Variables Estimation in Stata, Boston College.

Bergstrand, J.H. (1989), "The Generalized Gravity Equation, Monopolistic Competition, and the Factor-Proportions Theory in International Trade", *Review of Economics and Statistics*, 71.

Bergstrand, J.H. (1985), "The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence". *Review of Economics and Statistics*, 67.

Bergstrand, J.H., Egger, P. and Larch, M. (2007), Gravity Redux: Structural Estimation of Gravity Equations with Asymmetric Bilateral Trade Costs.

Bhagwati, J. (1995), US Trade Policy: The Infatuation with Free Trade Areas, In: Bhagwati, J. and Krueger, A. O. (eds), *The Dangerous Drift to Preferential Trade Agreements*, Washington DC: American Enterprise Institute for Public Policy Research.

Bhattacharya, R. and Wolde, H. (2010), *Constraints on Trade in the MENA Region, Middle East and Central Asia Department, International Monetary Fund*, IMF Working Paper WP/10/31, available at http://www.imf.org/external/pubs/cat/longres.

cfm?sk=23487 (accessed on 8 March 2010).

Cheng, I.H. and Wall, H. (2005), "Controlling for Heterogeneity in Gravity Models of Trade and Integration", *Federal Reserve Bank of St. Louis Review*, 87(1).

Ciuriak, D. and Kinjo, S. (n.d.), Trade Specialization in the Gravity Model of International Trade, Canada.

Clarete, R., Edmonds, C. and Wallack, J.S. (2002), *Asian Regionalism and its Effects on Trade in the 1980s and 1990s*, Economic and Research Department Working Paper Series No. 30, Asian Development Bank.

Deardorff, A. V. (1995), *Determinants of Bilateral Trade: Does Gravity Work in a Neoclassic World?*, National Bureau of Economic Research Working Paper 5377.

DeRosa, D.A. (2007), *The Trade Effects of Preferential Arrangements: New Evidence from the Australia Productivity Commission*, Working Paper Series 07-1, Washington DC: Peterson Institute for International Economics.

Edmonds, C. and Verbiest, J.P. (2002), *The Role of Preferential Trading Arrangements in Asia*, Economics and Research Department Policy Brief Series No. 8, Asian Development Bank, available at http://www.adb.org/Documents/EDRC/Policy_Briefs/PB008.pdf (accessed on 10 November, 2009).

Frankel, J. and Rose, A. (2002), "An Estimation of the Effect of Common Currencies on Trade and Income", *The Quarterly Journal of Economics*, Vol. 117, No. 2: 437-466, available at http://links.jstor.org/.

Gilbert, J, Scollay, R. and Bora, B. (2001), *Assessing Regional Trading Arrangements in the Asia-Pacific, Policy United Nations Conference on Trade and Development*, Policy Issues in International Trade and Commodities Study Series No. 15.

Government of Kenya (2010), Economic Survey, Nairobi: Government Printer.

Greene, W.H. (2002), *Econometric Analysis*, 5th ed, Upper Saddle River, New Jersey: Prentice Hall.

Hausman, J. A. and Taylor, W.E. (1981), "Panel Data and Unobservable Individual Effects", *Econometrica*, 49: 1377-98.

Helpman et al (2008), "Estimating Trade Flows: Trading Partners and Training Volumes", *The Quarterly Journal of Economics*, 123.

Helpman, E. (1987), "Imperfect Competition and International Trade: Evidence from Fourteen Industrial countries", *Journal of Japanese and International Economy*, 1:62.

Innwon, P. and Soonchan, P. (2008), *Free Trade Agreements versus Customs Union: An Examination of East Asia, Munich Personal RePEc Archive (MPRA)*, MPRA Paper No. 11301, available at http://mpra.ub.uni-muenchen.de/11301/ (accessed April 13, 2010).

Innwon, P. (2006), *East Asian Regional Trade Agreements: Do They Promote Global Free Trade?* Paper Presented at the Joint Conference of AKES, KDI, KU, KIF, and R CIE on Korea and World Economy, v: Korea and the FTA, Seoul, Korea, 7-8 July.

Ismail, N.W, Smith, P. and Kugler, M. (2007), "Regional Economic Integration and Intra Regional Trade: The Evidence from the Association of Southeast Asian Nations (ASEAN) Free Trade Area", *Singapore Economic Review 2007*, Meritus Mandarin Singapore.

Keith, W. (2006), *Trade in Services: Does Gravity Hold? A Gravity Model Approach to Estimating Barriers to Services Trade*, IIIS Discussion Paper, Institute for International Integration Studies, Trinity College Dublin.

Krueger, A. (1995), *Free Trade Agreements Versus Customs Union*, National Bureau of Economic Research (NBER) Working Paper No. 5084, Cambridge, Massachusetts.

Makochekanwa, A. and Jordaan, A. C. (n.d.), *Identifying the Trade Theory Model Behind Botswana's Sectoral Exports*, Working Paper, Department of Economics, University of Pretoria.

McPherson, M. Q. and Trumbull, W.N. (n.d.), Winners and Losers: The Effect of Cuba's Political-Based Trading Policies, Available at http://lanic.utexas.edu/project/asce/pdfs/volume14/macphersontrumbull.pdf (accessed 15 February 2010).

Medvedev, D. (2006), *Preferential Trade Agreements and Their Role in World Trade*, Working Paper No. 4038, World Bank Policy Research Department.

Poyhonen, P. (1963), "A Tentative Model for Volume in Trade Between Countries", *Wilwirtschftliches Archiv*, 90.

Rault, C, Sova, R. and Sova, A.M. (2008), *Modelling International Trade Flows Between CEEC and OECD Countries*, CESIFO Working Paper No. 2282.

Roberts, B.A. (2004), "A Gravity Study of the Proposed China-ASEAN Free Trade Area", *The International Trade Journal* 18 (4).

Rose, A. (2002), Estimating Protectionalism through Residuals from the Gravity Model. Background Paper for World Economic Outlook 2002: Trade and Finance, International Monetary Fund.

Srinivasan, T.N. and Archana, V. (2008), India in the Global and Regional Trade: Aggregate and Bilateral Trade Flows and Determinants of Firms' Decision to Export, New Delhi: Indian Council for Research on International Economic Relations.

Tinbergen, J. (1962), *Shaping the World Economy*, New York: Twentieth Cenury Fund.

Toubal, F. (2006), Introduction to Stata (internet), available at http://team.univ-paris1.fr/teamperso/toubal/M2/stata/stata.pdf (accessed February 4, 2010).

Tumbarello, P. (2005), *Regional Integration and WTO Accession: Which is the Right Sequencing? An Application to the CIS*, IMF Working Paper No. 05/94.

Tumbarello, P. (2006), *Are Regional Trade Agreements in Asia Stumbling or Building Blocs? Some Implication for the Mekong Countries*, Seminar Paper, Siem Reap, Cambodia, June 26-27.

Tyler, W. (2006), "Trade Integration for the Americas. What Can Economic Analysis Tell Us?", *Universidade do Estado do Rió Janeiro (UERJ)*.

Yang, Y. and Gupta, S. (2005), *Regional Trade Arrangements in Africa: Past Performance and the Way Forward*, IMF Working Paper/05/36.

Appendix

Appendix 1: Intra-EAC trade (Exports in US$ million)

Country	2000	2001	2002	2003	2004	2005	2006	2007	Total
Burundi	8.3	5.7	9.3	2.9	5.4	4.0	5.5	5.3	46.3
Kenya	448.6	622.5	667.2	710.5	810.1	974.3	735.8	952.2	5921.2
Rwanda					25	34.9	33	40	132.9
Uganda	79.2	87.2	86.0	114.7	132.0	144.3	152.3	-	795.7
Tanzania	56.7	58.6	57.1	102.4	123.8	128.9	157.8	274.6	959.8
Total	592.8	774.0	819.5	930.5	1096.3	1286.4	1084.4	1272.1	7855.9
% Share-Kenya	0.76	0.80	0.81	0.76	0.74	0.76	0.68	0.75	0.75

Source: EAC and Author's computation (% share)

Appendix 2: Intra-COMESA trade (US$ millions) and % share for 2007

Rank	Exporter	Value	% Share		Rank	Importer	Value	% Share
1	Kenya	1,114.30	28.2		1	Kenya	665.8	14.6
2	Zambia	612.2	15.5		2	Zambia	515.9	11.3
3	Egypt	494.3	12.5		3	Egypt	441.1	9.7
4	Uganda	367.2	9.3		4	Uganda	428.3	9.4
5	Zimbabwe	258.6	6.5		5	Zimbabwe	394.6	8.7
6	Swaziland	191.1	4.8		6	Swaziland	312.2	6.9
7	DRC	188.1	4.8		7	DRC	312.2	6.9
8	Malawi	183.7	4.7		8	Malawi	278.5	6.1
9	Libya	153.5	3.9		9	Libya	264.9	5.8
10	Ethiopia	123.8	3.1		10	Ethiopia	213.7	4.7
11	Mauritius	75.4	1.9		11	Mauritius	175.4	3.9
12	Rwanda	50.7	1.3		12	Rwanda	140	3.1
13	Burundi	36.6	0.9		13	Burundi	122.8	2.7
14	Madagascar	31.7	0.8		14	Madagascar	120.8	2.7
15	Djibouti	31.7	0.8		15	Djibouti	108	2.4
16	Sudan	29.7	0.8		16	Sudan	26	0.6
17	Eritrea	6.3	0.2		17	Eritrea	25.5	0.6
18	Seychelles	0.7	0		18	Seychelles	4.9	0.1
19	Comoros	0.2	0		19	Comoros	2.8	0.1
	Total	3,949.90	100			Total	4,553.50	100

Source: COMSTAT database

Appendix 3: Proportion of commodity exports by country, 2001-2007 (%)

Destination	2001	2002	2003	2004	2005	2006	2007
Uganda	20.35	18.48	16.74	17.25	16.39	11.08	12.22
United Kingdom	11.1	11.6	11.75	10.43	9.09	10.85	10.48
Tanzania	9.15	8.38	7.96	8.34	7.66	7.29	8.13
Netherlands	6.71	6.51	7.72	7.96	7.04	7.83	7.98
USA	2.31	1.99	1.53	2.1	4.63	8.1	7
Pakistan	6.02	4.93	5	5.29	5.4	5.8	4.93
Sudan	1.66	1.66	2.39	2.6	2.61	4.02	4.22
Egypt	4.82	3.99	2.98	3.22	3.4	3.93	3.32
United Arab Emirates	3.41	1.46	1.15	1.12	1.56	1.98	3.14
Somalia	1.12	2.69	2.04	1.52	1.89	3.03	3.03
DRC	2.91	2.92	2.93	3.65	3.91	3.04	3.03
Germany	3.48	2.59	2.91	2.13	2.02	1.85	2.17
India	1.6	1.5	1.36	1.93	1.54	1.49	2.12
Rwanda	2.38	2.55	3.28	3.21	2.8	1.9	2.11
France	1.57	1.4	1.69	1.67	1.95	1.53	1.44
Ethiopia	1.46	1.17	0.89	1.03	0.97	1.46	1.25
Belgium	1.36	1.35	1.27	1.15	1.13	0.85	0.95
Italy	0.75	1.04	0.91	0.82	0.86	0.79	0.94
All other	17.84	23.79	25.48	24.5	25.15	23.31	21.54
Total exports	100	100	100	100	100	100	100

Source: Export Promotion Council

Kenya Institute for Public Policy Research and Analysis
Bishops Garden Towers, Bishops Road
PO Box 56445, Nairobi, Kenya
tel: +254 20 2719933/4, 2714714/5, 2721654, 2721110
fax: +254 20 2719951
email: admin@kippra.or.ke
website: http://www.kippra.org

ISBN 9966 777 72 5