The "New" East African Community: Effects on Trade, Welfare and Productive Activities in East Africa

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Abstract

This research seeks to examine the effects of the establishment of regional trade agreements (RTAs) among developing nations on trade, welfare and production activities. The focus here is on the "new" East African Community (EAC) formed between Kenya, Uganda and Tanzania and established in 1999. The formation of the "new" EAC raises the important question of whether this regionally based trading agreement is of economic merit to its members. This study begins by reviewing trends in regional trade flows and the extent to which regional integration has affected trade patterns and productive activities. Using a gravity model augmented with several sets of dummy variables, I estimate the effect of the EAC-RTA on trade and welfare on members and non-members. The results show that intra-bloc trade is on average 18 times higher than what would be expected in the absence of the agreement. However, this trend does not seem to be influenced by the official lowering of trade barriers with the formation of the EAC. Model results also show a decline in bloc exports to the rest of the world suggesting that the bloc has trade diverting tendencies. Since static gains from the EAC-RTA are quite low, possibly dynamic gains from regional integration lend more support to the economic merit of the EAC.

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Chapter 1

1.1 Introduction

Economic integration in East Africa developed over decades without the benefit of theory. The formation of an economic community was seen by most as a pragmatic response to administrative and commercial needs. The rich culture and heritage among the peoples of East Africa brought about the intermingling of traditions long before the Europeans ever ventured to the "Dark Continent". Trade between the coastal and the interior communities set the trend for the meshing of cultures.

Over the 20th century, the East African governments have undertaken several ventures to form a common market and customs union, with the aim of establishing a political and economic union to cement regional integration. These efforts have resulted in the formation of the East African Community (EAC). The EAC is comprised of 3 neighbouring states: Kenya, Uganda and Tanzania. The three countries have a combined population of approximately 90 million. In 2003, the three states had a combined GDP of $30.9 billion; Kenya, the largest economy, has a GDP of $14.3 billion, Uganda $6.2 billion, and Tanzania $10.2 billion. Data from the World Development Indicators (2004) shows that Kenya, over the period of 1990-2003, has posted a dismal average growth rate of only 1.8% compared to Uganda's strong growth rate of 6.8% and Tanzania's moderate growth rate of 3.7%.

The present or "new" EAC, formed in 1999, is a revival of the "old" EAC which was formed in 1967 and collapsed a decade later due to a variety of economic and political reasons (see Hazlewood, 1975 and Rothchild, 1968). The new EAC aims at deepening regional cooperation through programs in political, economic, socio-cultural, defense and judicial affairs for their mutual benefit. The first goal has been the establishment of a customs union enacted in November 2003 which aims to eliminate all existing intra-regional tariffs, remove existing non-trade barriers and establish a common external tariff (CET) in 2004. The member countries view the formation of the customs union as a stepping stone for the enhancement of intra-regional trade relations and increased production activities.

The growth of regional trade blocs has been a major development in international relations with virtually every country belonging to one or even multiple blocs (Schiff & Winters, 2003). Most regional trade blocs have a wide goal of lowering barriers to trade between members. With the growth of blocs such as Common Market for Eastern and Southern Africa (COMESA), the European Union (EU) and Mercosur, the question arises; do such arrangements increase trade and overall welfare of the member countries. Equally important is whether such agreements harm or benefit non-members.

It is an open question as to whether regional trading blocs create more trade than they divert. On one hand, the lowering of trade barriers among members may lead to greater competition and open up larger markets for producers in member countries. Indeed, a well crafted trade bloc can increase competition in domestic industries and spur productive efficiency gains which improve the quality and quantity of inputs and goods available to the economy (Dollar, 1992). The greater market size created through the

regional trade agreement (RTA) expands opportunities for exports and employment growth. On the other hand, RTAs may augment intra-bloc trade by diverting trade away from non-member countries. The second-best nature of trade liberalization under preferential trade agreements makes it very difficult to assess *a priori* whether trade effects will be positive such that trade creation will outweigh trade diversion (Clausing 2001).

The issue of trade creation and trade diversion and the implied welfare effects on RTA members and non-members forms the basis of this thesis. The formation of the new EAC raises the important question of whether this regionally based trading agreement is of economic merit to its members. The success of the EAC will ultimately depend on its ability to promote intra-regional trade. The expectation is that through the lowering of tariffs and removal of non-tariff barriers, trade costs will be lower and economic welfare in member countries will rise by facilitating consumer choice and increasing competition among producers. On paper, regional integration appears to be strong and moving towards deeper integration with the implementation of the EAC Customs Union in 2005 and plans for political integration in 2009. With the new EAC in its 7^{th} year of operation, it is an opportune time to examine what economic effects, if any, the EAC has brought about thus far. Before launching into the detailed objectives and features of the new EAC, it is important to understand the rich history and economic cooperation that has existed between Kenya, Uganda and Tanzania for decades. The next section outlines the geography, infrastructure and economic cooperation in East Africa as well as the new EAC goals. The specific objectives of my research as well as preliminary findings are discussed at the end of this chapter.

1.1.1 EAC: Geography, Infrastructure and Institutions

East Africa is the easternmost region of the African continent, variably defined by geography or geopolitics. "East Africa" commonly refers to Kenya, Uganda and Tanzania. Combined, these countries cover an area of 1.7 million square kilometers[1] and as a result of their common location, share similar climatic conditions. The major cities in Kenya are Nairobi (the capital), Mombasa and Kisumu. In Uganda, the capital city is Kampala while Dar-es-Salaam is the commercial capital of Tanzania. Looking at Figure 1.1 below, important geographical differences emerge. Most notable is the fact that Uganda is landlocked, and therefore relies on Kenya (port of Mombasa) and Tanzania (port of Dar-es-Salaam) for its access to the Indian Ocean.

In terms of shared waterways, the three countries share Lake Victoria which provides a huge water mass for inland transportation. Besides its socio-economic uses, Lake Victoria is a symbol of the strong unity that the three EAC economies are striving to achieve. With increased economic integration, it is anticipated that Lake Victoria will handle higher volumes of cargo. The Lake also possesses potential for investment in fishing[2], tourism, water and energy and is therefore of crucial importance to the region (EAC Official website).

Shared transportation in the region consists of international highways connecting the three commercial cities (Nairobi, Kampala and Dar-es-Salaam) as well as an extensive network of roads. The road infrastructure is notably quite poor and needs improvement in order to increase access to regional resources and markets. The East

[1] Uganda, the smallest country has a land area of 236,040 square kilometers, followed by Kenya and Tanzania with land areas of 582,650 and 945,090 square kilometers respectively. (CIA World Fact book).
[2] Fishing is an important resource of Lake Victoria. Annual earnings from fishing are estimated at US $ 400 million per year (EAC official website www.eac.int).

African Trade and Transportation Facilitation project has been set up to improve the trade environment by lowering transportation costs[3].

Figure 1.1: Map of East Africa showing major cities and lakes

In addition to road transportation, the three countries have an extensive, though ailing, railway system. The Kenya-Uganda railway has been in operation for several

[3] Transport costs in East Africa are quite high, especially for land-locked Uganda whose costs are estimated at about 35 per cent of the value of its trade in exports (OECD Publication, 2002.Oshikoya & Hussain). Infrastructure development needs to be undertaken in order to increase access to regional resources and markets.

decades and has experienced a slump in volume of trade due to improvements in the road network. Tanzania's dilapidated state railway system has also been in need of improvement. Railway restructuring, with the aim of integrating different railway systems in the region, was to be undertaken from December 2005[4] in order to enhance regional integration. This is in line with the objectives of the EAC in providing safe efficient and reliable railway operation and recognition of mutual dependence on one another.

Besides physical infrastructure, the EAC also has shared financial and legislative institutions. The East African Development Bank (EADB)[5] is owned by the three member states of Kenya, Uganda and Tanzania along with other shareholders[6] . Its mandate is to be an "*efficient provider of quality customer oriented financial products and services for regional development*". The legislative arm for the EAC is the East African Legislative Assembly (EALA) which was inaugurated in November 2003. The EALA has legislative functions as well as acting as a watch dog for all the EAC activities (EAC official website).

[4] The Rift Valley Consortium (RVRC) will manage the railways of Kenya and Uganda for the next 25 years. The RVRC will invest US $ 322 million into improving infrastructure. Tanzania has also been seeking to privatize its railway and is still negotiating with Rites Consortium of India on a takeover. All the EAC governments hope that the privatization of the national railways will lead to sustainable investment and contribute to East Africa's development (http://english.peopledaily.com.cn accessed October 17, 2006).
[5] The EADB was established in 1967 under the treaty of the old EAC. Following the dissolution of the EAC, the Bank was re-established under its own charter in 1980 (EADB Official website www.eadb.org)
[6] EADB shareholders include African Development Bank (ADB), FMO (Netherlands); DEG (Germany); Consortium of Yugoslav Institutions; Norbanken (Sweden); Commercial Bank of Africa,; Standard Chartered Bank, London; Barclays Bank International , London; and SBIC – Africa Holdings (EADB Official website www.eadb.org)

1.1.2 Economic Cooperation:

Kenya, Uganda and Tanzania have had a long history of economic cooperation going back to pre-independence period. A common market between the three territories came into being in stages over a number of decades. Kenya and Uganda established a customs union in 1917 (see Table 1.1 showing EAC Timelines) making tariff administration relatively easy as goods could flow freely across borders. A common external tariff was applied to all goods and enhanced trade. Tanzania joined the customs union in 1927 making the region a full customs union (Rothchild, 1968). Inter-territorial services were established in the region, the first of which was the Kenya-Uganda railway in 1931. The East African High Commission was formed in 1948 and the East African Common Services organization ran from 1961 to 1967.

The official formation of the East African Community was in 1967 which cemented regional integration. The aim of this treaty was to "*strengthen and regulate industrial, commercial and other relations to promote harmonious and balanced development of economic activities where the benefits whereof shall be equitably shared*" (Treaty for East African Co-operation, 1967). Under the EAC, the East African Development Bank (EADB) was formed to assist in the equalization of investment in the region through directing more funds to the two less developed partners, Uganda and Tanzania. Other services established under the EAC were the East African Airways, East African Harbors Corporation and the East African Legal Assembly.

Table 1.1: East African Community: Important Timelines

Year	Event
1917	Kenya and Uganda form a customs union
1927	Tanzania joins customs union and common external tariff is in place
1931	Kenya-Uganda railway opened as major inter-territorial service
1948	Inter-territorial co-operation formalized with East African High Commission
1962	Uganda gains independence from Britain
1963	Kenya gains independence from Britain
1964	Tanzania (formerly Tanganyika) gains independence from Britain
1967	Treaty for East African co-operation signed and EAC formed
1971-1985	Uganda goes through a period of civil unrest and political instability
1977	East African Community is dissolved
1996	Launching of the Tripartite commission for East African Co-operation
1999	Treaty for the establishment of the EAC is signed
2001	EAC officially inaugurated in January with headquarters in Arusha, Tanzania
2003	Establishment of the EAC customs union
2005	Introduction of common external tariff (CET)

However, the life span of the EAC was short. In 1977, the EAC was dissolved following intra-political community differences. The industrial dominance of Kenya created tension while Tanzanian and Ugandan trade deficits became a key area of dissension.[7] Differences in economic policies further exacerbated the community's problems as Kenya undertook a capitalist strategy of growth while Tanzania followed a socialist approach. The final blow was political in nature: Ugandan dictator Idi Amin attacked northern Tanzania in an effort to purge guerilla fighters. Tanzania retaliated and engaged in a war with Uganda successfully overthrowing Idi Amin and restoring the former president Milton Obote in 1979. During the 1980s Obote used violent means to

[7] This imbalance is still present as Uganda and Tanzania have to contend with Kenya's industrial dominance particularly within the manufacturing sectors. Kenya exports three-fifths of its goods to Uganda and Tanzania.

re-impose his rule, while the country continued to suffer economic chaos and civil unrest. The turning point for Uganda came in 1986 when, under Yoweri Museveni, peace was restored throughout most of the country.

The interim period between the collapse and re-establishment of the "new" EAC was very difficult for the three East African states. Kenya, which had been enjoying a robust and rapidly growing economy throughout the 1970's[8], had a very different experience in the 1980's. The deterioration of prices for coffee and tea in world markets, the second oil price rise and the subsequent world recession; the expansion of petroleum refining in the Arabian Gulf at the expense of Kenya's refined exports; and the deterioration of trade with Tanzania and Uganda all led to a slumped Kenyan economy (Enos, 1995). The nineties were no different for the Kenyan economy. A continued decline in agricultural prices, lack of export controls and a suspension of aid by the International Monetary Fund resulted in a sluggish performance.

In the post-independence period, Tanzania was one of the poorest countries in the world and highly dependent on agriculture. Following a socialist system, Tanzania made significant improvements in fields such as health, education and infrastructure. Public investment in industries led to industry advancement for most of the early 1970's[9]. All these modest improvements were largely undermined by the war with Uganda in 1979 and the demise of the EAC. Furthermore, the falling prices of agricultural produce on the world market reduced Tanzania's foreign exchange earnings and put a strain on the

[8] In 1969, the Kenyan economy registered a growth in incomes within agriculture (35%), industry (20%) and services (46%). Between 1969 and 1979, Kenya achieved an average yearly rate of growth of a little over 3 percent (Enos, 1995)

[9] From independence to the mid 1970's, growth in per-capita incomes in Tanzania coincided with a growth in the industrial sector. Over the next decade, the industrial sector declined and was unable to achieve the peak reached in mid 1970's (Enos, 1995)

economy. In 1986, an economic recovery program generated an increase in economic activity through the support of multilateral donors. Growth in the nineties featured an increase in industrial production, particularly in mineral extraction, with GDP rising at an annual average rate of 3.1 percent during 1990 to 2001 (World Bank Country overview).

Uganda followed a similar path with Tanzania in terms of the level of growth in the mid 1960's to the 1970's. During the years of civil unrest, as would be expected, per capita income fell almost 40 percent (Enos, 1995). Following this period, Uganda was able to receive loans from the World Bank under its Economic Recovery program. With this financial assistance, Uganda was able to contemplate economic advances in the early 1990's[10] registering a growth in the industrial sector. Uganda's macroeconomic growth has been quite impressive, averaging at almost 6.5 percent over the past decade with projections for 2006 at 6.6 percent (World Bank Country overview).

Differences in overall GDP and per capita incomes have narrowed over the past decade with stronger economic performance in Tanzania and Uganda and slow growth in Kenya. With an observed economic slowdown after the demise of the EAC in the 1980's, all the EAC partner states view the renewed efforts in regional integration as an essential part of their development strategy.

1.1.3 The "new" East African Community:

The Treaty for the Establishment of the East African Community was signed on 30 November, 1999, with the EAC officially inaugurated in January, 2001. The East African Community aims at widening and deepening cooperation among the members

[10] In 1963, the agricultural sector contributed to 53 percent of GDP, industry 13 percent and services 34 percent. In the 1980's, the agricultural sector contribution grew to 72 percent while industry and services declined to 5 and 24 percent respectively. The nineties brought a rise in the industrial sector to 12 percent and services to 37 percent (Enos, 1995).

through policies and programs in political, economic, social and cultural fields for their mutual benefit.

By forming a regional bloc the expectation is that this will aid the acceleration of the socio-economic transformation of East Africa. To achieve these goals, the plan is to establish a customs union, a common market, subsequently a monetary union, and ultimately a political federation of the East African states. Plans for the formation of a common market are set for 2009 and full economic integration by 2013. The EAC aims at achieving its goals and objectives through:

- Promotion of sustainable growth and equitable development of the region, including rational utilization of the region's natural resources and protection of the environment;
- Strengthening and consolidation of the longstanding political, economic, social, cultural and traditional ties and associations between the peoples of the region in promoting a people-centered mutual development;
- Enhancement and strengthening of participation of the private sector and civil society;
- Mainstreaming of gender in all its programs and enhancement of the role of women in development;
- Promotion of good governance, including adherence to the principles of democracy, rule of law, accountability, transparency, social justice, equal opportunities and gender equality; and
- Promotion of peace, security and stability within the region.

The EAC's bid to create a single East African market entails easing travel restrictions, harmonizing tariffs, increasing co-operation among security forces, improving communications, sharing electrical power and addressing Lake Victoria issues.

The EAC also collaborates with other African organizations' in the spirit of the Abuja Treaty for the establishment of the African Economic Community. Among these organizations are the African Union, Common Market for East and Southern Africa (COMESA), Inter-governmental Authority on Development and the Southern African Development Community (SADC)[11]. At the on-set, the EAC generally viewed itself as a fast track for regional integration in the Eastern and Southern African region, particularly as fast tracking the COMESA integration initiative. Before 1999, the three member states were also members of COMESA and were trading under the COMESA trade regime. Within the COMESA trade regime, Kenya had reached a tariff reduction of 90 per cent by 1999 while both Tanzania and Uganda were at 80 per cent. However, following a withdrawal from COMESA by Tanzania in September 1999, the three EAC states agreed within the framework of the Treaty for the Establishment of the EAC, to continue trading preferentially along the trade regime applicable at the time of signing of the Treaty. This continued until the protocol on the EAC Customs Union (CU) was signed and came into force in 2004. Further trade liberalization under the EAC CU was effected departing from the COMESA tariff preferences already in place (Stahl, 2005).

[11] Kenya and Uganda are members of COMESA (along with Egypt, Angola, Madagascar, Sudan, Eritrea, Malawi, Swaziland, DR Congo, Rwanda, Zambia, Zimbabwe, Mauritius, Libya, Djibouti, Seychelles, Ethiopia and Comoros). Tanzania is a member of SADC (along with Angola, Botswana, DR Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, United Republic of Tanzania, Zambia and Zimbabwe).

1.1.4 Tariff regimes in the EAC and the EAC common external tariff (CET)

The EAC trade regimes have been characterized by a "cascading" tariff structure that imposes the lowest rates on raw materials and capital goods, moderate rates on intermediate goods and the highest rates on consumer goods (McIntyre, 2005). From Table 1.2 below, it can be seen that the three countries have made progress in reducing their simple average tariffs[12] by almost 50 per cent between 1994 and 1997. This would suggest that trade flows both between these countries and with the rest of the world should have increased significantly over this period[13].

Table 1.2: Evolution of Tariff Regimes in the EAC

	1994	**1997**	**1999**	**2004**
Kenya				
Simple average	34.27	18.4	16.3	16.1
Maximum rate	62.0	35.0	35.0	35.0
Tariff bands	-	5.0	5.0	3.0
Uganda				
Simple average	16.01	13.2	9.0	7.0
Maximum rate	30.0	20.0	15.0	15.0
Tariff bands	-	4.0	3.0	3.0
Tanzania				
Simple average	18.2	21.8	16.1	14.3
Maximum rate	110	50.0	25.0	25.0
Tariff bands	-	9.0	5.0	3.0

Source: United Nations Conference on Trade and Development (UNCTAD) database with augmentation from McIntyre (2005)

Within the EAC, remarkable progress has been made towards lowering tariffs and liberalizing trade (see Table 1.3). Intra-regional trade has been liberalized to a large

[12] Simple average tariff of a market country for an origin group is calculated by taking the products that are imported by the market country from each country in the origin group. Tariff rates for products that are not traded are not included in the calculation of simple average tariffs (UNCTAD database http://stats.unctad.org/Handbook/TableViewer/dimView.aspx).

[13] In the succeeding chapters of this research, empirical analysis is carried out to determine if the tariff reductions following the EAC have had a significant impact on trade patterns, volume and production.

extent with Kenya already applying a preferential tariff reduction of 90 per cent on imports from the other two countries (Busse & Shams, 2003). The elimination of remaining tariffs on intra-EAC trade was undertaken with the establishment of the EAC customs union, enacted in November, 2003.

Table 1.3: Import Tariffs for the EAC (1999)

	Tariff rate within EAC (average)	**Tariff rate outside EAC (average)**
Kenya	2.0	20.4
Uganda	1.3	1.4
Tanzania	5.4	15.7

Source: Busse & Shams (pp.6, 2003)

The EAC trade liberalization program has not followed the traditional sequence of economic integration (from free trade area to customs union). Instead, the EAC has formed a customs union with the goal of progressively establishing a free trade area. The EAC customs union commenced operations on January 1, 2005. The key features of the customs union were the establishment of the common external tariff (CET), the elimination of internal tariffs and the establishment of rules of origin[14] and safeguard measures. A Directorate of Customs and Trade was set up to coordinate and monitor the CET and the activities of the commissioners in implementing the Customs Law. Changes under the Customs Union include (Bagamuhunda, 2005);

(i) Common duty rates that will apply uniformly on all goods imported into the EAC

(ii) Zero rates on most goods originating and traded within the EAC. CET has 3 tariff bands; 0 percent on agricultural goods, medicine, medical equipment, raw materials and capital goods, 10 percent for intermediate goods and 25 percent for consumer goods

[14] Rules of origin are the criteria used to define where a product is made. They require that sufficient transformation occurs when processing causes a product to shift from one tariff classification to another.

(iii) Reduction to zero rates on goods originating from Kenya and imported by Uganda and Tanzania. Under the CET, Uganda will eliminate 426 tariff lines and Tanzania 906 tariff lines to zero. The implementation will be in two phases; First, the adoption of the three-band structure, with Uganda and Tanzania maintaining tariffs on select Kenyan imports[15] and then removal of all internal tariffs by 2010 (McIntyre, 2004).

(iv) Classification of "sensitive items" that the EAC wants to protect from import competition. [16]. These items will attract rates of more than 25 percent

(v) Harmonised commodity descriptions and codes and harmonization of customs administration to eliminate delays and duplication

(vi) Formation of a court of justice, the EAC Court of Appeal, to enforce competition laws, process appeals and settle disputes that arise from the Customs Union

(vii) Tax incentives for exporters in the region where duties are waived including export processing zones, manufacturing under Bond, inward processing and duty drawback for manufactures for export

(viii) Computation of taxes based on a CIF value at the initial port of discharge (either at Mombasa or Dares Salaam)

(ix) COMESA and SADC preferential treatment will continue to apply on some products for the next two years

[15] This is to deal with the asymmetry of trade in the region so as to temporarily protect producers in Tanzania and Uganda from the increased competition from Kenyan imports.
[16] World Bank (2003) specifies sensitive items to include fabrics, milk, cigarettes, rice, wheat, flour, cement, sugar, tires and secondhand items.

(x) The WTO Customs Valuation Agreement which aims at a fair, neutral system for valuation of goods has been adopted. The agreement gives greater precision to the provisions of valuation in the original GATT (McIntyre, 2004)

The CET will have different effects on the regimes of member countries; it will increase tariffs in Uganda and to a lesser degree in Tanzania and reduce tariffs in Kenya (McIntyre, 2004). The CET will mean that all excise duties[17]and suspended duties will be removed. There have been delays in the complete implementation of the CET since the countries have needed additional time to finalize administrative arrangements to reflect the new tariff rates.

1.2 Objectives of Thesis

Reducing trade barriers between countries is likely to increase their propensity to trade with each other. Indeed for many trade blocs, this is the explicit objective. The main goal of the EAC is to boost trade and provide sustainable economic growth in the region. Through forming the EAC, the expectation is that the RTA should facilitate trade and capital movements, reduce the cost of doing business, increase investment and thereby increase the aggregate economic activity of its members. The link between trade liberalization and economic growth has been discussed in a myriad of research papers (see for instance Edwards, 1998; Panagariya, 2004) and it is argued that rapid economic growth cannot be sustained without rapid trade liberalization. Increased economic freedom in trade involves lower trade barriers, leading to lower costs and greater efficiency as entrepreneurs determine the activities in which they have a global or

[17] Except for duties applied to tobacco, beer, mineral water and other alcoholic beverages

regional competitive advantage. It is with this relationship in mind that I assess the impact of the new EAC RTA on trade, welfare and productive activities in the region. The focus of my research is on the extent to which trade between Kenya, Uganda and Tanzania has increased as a result of trade liberalization and the implied welfare effects that might arise from the EAC. I examine three key aspects:

1. Intra-regional trade patterns both before and after the revival of the EAC using various empirical measures presented in Chapter 3. The idea is to identify, what effect, if any; the signing of the RTA has had on the direction, volume and composition of trade between the members of the EAC as well as with their partners outside the EAC. Of particular importance is whether trade patterns have changed noticeably and if so, in what dimensions.
2. Changes to productive activities as indicated by the industry composition of exports using measures of intra-industry trade (IIT) and revealed comparative advantage (RCA) as presented in Chapter 3. These measures will provide an indication of the movement in production and changes in IIT and comparative advantage following the EAC. This analysis will allow for predictions to be made on the re-distribution of resources and production within the region.
3. The trade effects of the EAC on member countries using a gravity model presented in Chapter 4. In particular, the focus will be on whether the volume of trade within the RTA has grown (trade creation) without distorting trade with non-RTA members. Based on the model results, I will infer the overall welfare effects of the regional trade agreement.

Chapter 5 will provide a summary of the findings of this study and as well a discussion on possible extensions. This is an empirical study of the trade between the three partner states and the rest of the world to determine if the new EAC is of economic merit to its members. Data will be analyzed between 1990 and 2004 (where available) with particular attention to the transitional years when regional integration is revived.

1.3 Preliminary results

Trade between the partner states of the EAC has always been high, as dictated (as would be expected) by their geographical proximity. Indeed, trade intensity ratios for the region are almost 700 times higher than their trade with the rest of the world, as shown by the trade concentration index in Chapter 3. That said, I find that the formation of the new EAC has not led to a large increase in trade volumes among these countries. While there appears to be a convergence in the composition of exports as demonstrated by the dispersion and Herfindahl indices, there is no sudden break in the overall trend, confirming that the EAC RTA has not had a major impact on the exports in the region (or at least, not yet). It would appear as though the pattern of trade in the EAC is being driven by the process of development, rather than by trade pressures. Productive activities in the region show more of a change following the formation of the EAC. The level of intra-industry trade is observed to increase by almost 175 per cent in the years following regional integration.

Estimates from the gravity model reveal that trade linkages between the EAC members are quite dense. The dummy variable for intra-bloc trade is positive and significant over the entire period analyzed implying that intra-regional trade has continued to be high over the whole period examined. Trade within the EAC is on average 18.4 times larger than expected after accounting for the factors that drive trade over the 1996 to 1998 period. While there is evidence of trade creation, this evidence is at best weak and has not been found to directly coincide with the formation of the new EAC. The results for the intra-bloc coefficient are not statistically different over 1990 to

2004 suggesting that the new EAC is not promoting additional trade (nor making it worse).

There is weak evidence of a decline in imports and even stronger evidence of a fall in export propensities. Trade in exports to the rest of the world is found to have decreased from a magnitude of 1.7 over 1990 to 1995 to 0.6 in the latter years. While the diversion of imports to the EAC has been declining, diversion of exports from the EAC is on the rise. This suggests that there is some evidence of trade diversion in terms of the EAC's exports to non-members following the formation of the new EAC.

Inferring from trade creation/diversion results, welfare gains from the new EAC appear to be small. This suggests that the dynamic welfare gains such the harmonization of labor, improved infrastructure, increased regional investment and bargaining power in future economic partnerships could be of more importance to the EAC.

Chapter 2: Literature Review

This chapter provides a general conceptual background into the various forms of regional integration and the theoretical trade effects of regional integration. The literature reviewed provides the basis for the research that will be carried out in both Chapter 3 and Chapter 4. This chapter also reviews literature on other studies that have been conducted to determine the welfare effects of the EAC. The chapter concludes with a review of the potential dynamic gains to the EAC from economic integration

2.1 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 pursue them; however, the most common forms of regional integration include (OECD Publication, 1993):

1. ***Preferential Trade Area (PTA):*** 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. This is the weakest form of integration. An example of a PTA is between the European Union (EU) and the countries in the Africa, Caribbean and Pacific (ACP) pact

2. ***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 liberalised rules and harmonisation of technical standards. FTA's do not include the free movement of factors of production such as labour, nor do they require *de jure* harmonisation of members' economic policies such as constraints on domestic policies towards unilateral actions. Examples of FTA's include the North American Free Trade Agreement (NAFTA), European Free Trade Association (EFTA), South Asia Free Trade Agreement (SAFTA), *Mercado Commun del Sur* (Mercosur), Central European Free Trade Agreement (CEFTA) and the ASEAN Free Trade Agreement (AFTA) to name a few.
3. ***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. CU's do not call for free factor mobility and policy harmonisation. Examples of CU's include the Andean Community (CAN) in Latin America and the Southern African Customs Union (SACU) and the European Union (EU)- Andorra Customs Union
4. ***Common Market***: A common market extends from a customs union to include the liberalisation of factor movements among member countries and the application of a common external tariff to all third party countries. The European Economic Area (EEA) is an example of a bloc where members of the EFTA can participate in the European Single Market without having to be members of the EU.
5. ***Economic Union***: This is the most advanced stage of economic integration whereby the union involves free factor mobility, harmonization of economic polices and

possibly the adoption of a common currency. The EU is an example of an economic union that is also a monetary union.

In addition to these forms of regional integration, a recently emerged form of integration is between "North-South" countries. An example is the Asia-Pacific Economic Cooperation (APEC) where the high-income countries and developing countries are equal partners.

2.1.1 Theory of trade creation and trade diversion

A trading bloc can be defined as an association of countries that reduces intra-regional barriers to trade in goods and services in order to create a critical mass of production and sales in order to be competitive. Before Viner (1950), it was assumed that a customs union would be welfare improving since tariffs, which are in general welfare reducing, would fall. However, in what is now known as conventional theory, Viner showed that a customs union will not necessarily improve welfare since the tariff reductions occur in a world of the "second best"[18]. Thus a trade union will be beneficial if on balance it is "trade creating" and harmful if it is "trade diverting". If the increased territorial trade leads to the shifting of production from less efficient, high-cost producers to more efficient, low-cost producers within the union, this is known as "trade creation". If the effect of increased trade shifts production from low-cost producers outside the trading bloc to high-cost producers within the bloc, this is known as "trade diversion."

In general, trade creation means that a regional trade agreement creates trade that would not have existed otherwise. As a result, supply occurs from a more efficient

[18] The Theory of Second Best says that a policy that would be optimal without such constraints (such as a zero tariff in a small country) may not be second-best optimal if other policies is constrained (Lipsey and Lancaster, 1956). That is, in the presence of existing distortions such as tariffs, the reduction of some tariffs can make the existing distortions' worse.

producer of the product. In all cases trade creation will raise a country's national welfare. The aggregate welfare effect for the country is found by summing the gains and losses to consumers and producers[19].

Figure 2.1: Trade creation

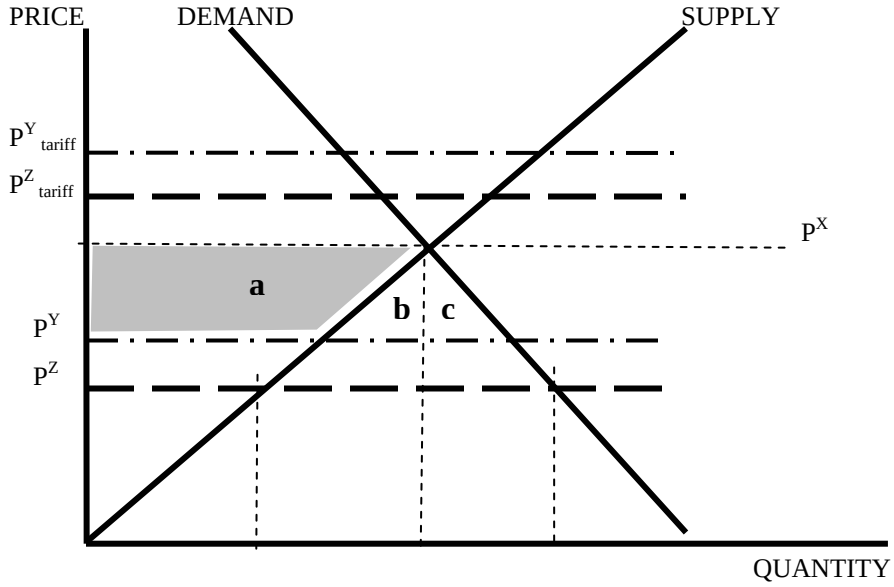


Figure 2.1 shows the demand and supply curves for a country X. P^Y and P^Z represent the free trade supply prices of the good from countries Y and Z respectively. Assuming that country X has set a tariff t* on imports from both Y and Z, the domestic supply prices of goods in country X rises to P^{Yt} and P^{Zt}. Since the supply prices, inclusive of tariffs, are higher than the domestic supply price in autarchy, P^X, country X will not import from either country and will supply the goods domestically.

[19] The graphical explanations of trade creation and diversion effects that follow are taken from "International Trade Theory & Policy Analysis" by Steven M. Suranovic available at http://internationalecon.com/v1.0/ch110/110c030.html

Suppose countries X and Y form a customs union and X eliminates the tariffs on Y`s imports. Once the tariff is eliminated, imports from Y replace most of the domestic supply of X since P^Y is less than P^X.

The free trade area will have the following effects (i) a decrease in producer surplus in X, shown by area *a* due to the lower price and (ii) an increase in consumer surplus, represented by area *abc* as consumers in X enjoy the lower prices. The RTA induces no revenue loss in this case as the product was not originally being imported due to the tariff rates. The net welfare effects, *b+ c* are therefore positive because country X is trading with the more efficient producer, country Y. Thus, if trade creation arises when a RTA is formed, it must result in net national welfare gains.

In general, trade diversion means that a regional trade agreement diverts trade, away from a more efficient supplier outside the RTA, towards a less efficient supplier within the RTA. In some cases, trade diversion will reduce a country's national welfare but in some cases national welfare could improve despite the trade diversion. The aggregate welfare effect for the country is found by summing the gains and losses to consumers, producers and the government.

Figure 2.2: Trade diversion with negative welfare effects

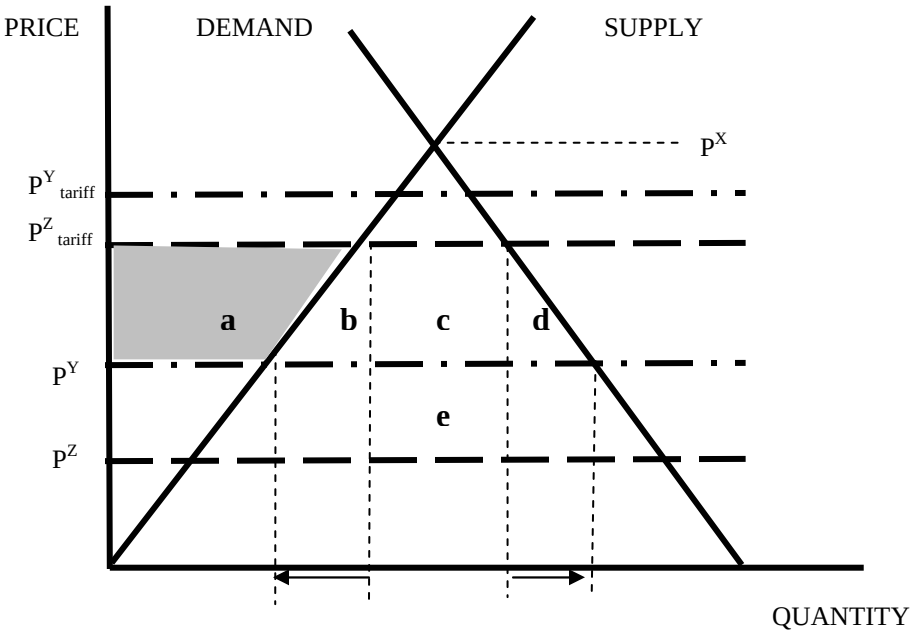


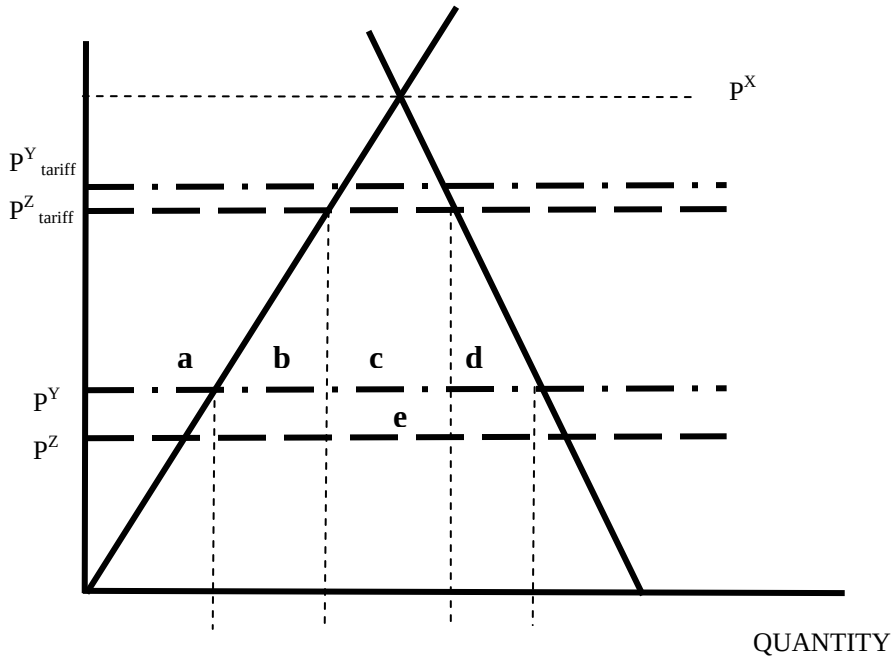
Figure 2.2 shows the demand and supply curves for a country X. P^Y and P^Z represent the free trade supply prices of the good from country's Y and Z, respectively. Assuming that country X has set a tariff t* on imports from both Y and Z, the domestic supply prices of goods in country X rises to P^{Yt} and P^{Zt}. Prior to liberalization, country X will not trade with country Y since imports from Z are cheaper. Suppose countries X and Y form a customs union and X eliminates the tariff on Y`s imports. Once the tariff is eliminated, imports from Y replace those from Z since P^Y is less than P^{Zt}.

The net effect consists of three components: (i) a loss in producer surplus represented by area *a* due to a decrease in the price of products on the domestic market which reduces producer surplus in country X, (ii) a positive consumption efficiency gain represented by area *abcd* due to the reduction in the domestic price of both imported goods and the domestic substitutes raises consumer surplus in the market and (iii) a negative tariff revenue loss to the government represented by area *ce* as it can no longer

collect tariffs on imports[20]. Because there are both positive and negative elements, the net national welfare effect can be either positive or negative. In Figure 2.2, since the non-distorted free trade price in country Z is lower than that in country Y, trade is said to be diverted from the more efficient supplier (Z) to a less efficient supplier (Y). In this case, net national welfare, *(b + d – e)* is decreasing as shown.

Suppose we changed the initial conditions and had free trade supply price offered by country Y, P^Y to be lower and closer to country Z's free trade supply price P^Z. As shown in Figure 2.3 below, the welfare effects would remain the same in direction but differ in magnitude.

Figure 2.3: Trade diversion with positive welfare effects



The consumer surplus gain, represented by area *abcd* is now larger due to the bigger decrease in the domestic price. The net national welfare *b + d – e* visually appears

[20] In many developing countries, import tariff revenues constitute a large portion of the government revenue from taxation. In order to maintain production efficiency, it is optimal for a small economy to reduce import taxes while raising taxes on consumption (Diamond & Mirrlees, 1972).

to be positive, implying a welfare improvement. Thus**,** trade diversion may be, but is not necessarily, welfare-reducing. Generally speaking, the larger the difference between the non-distorted prices in the RTA partner country and in the rest of the world, the more likely that trade diversion will reduce national welfare.

The theory of trade creation and diversion provides the foundation on which to assess the outcomes of the formation of a trading bloc. The problem is to identify which effect is more likely to occur. The theoretical and empirical work reviewed in the next section provides different approaches to assess which effect: trade diversion or creation, is the dominant outcome.

2.1.2 Theoretical and empirical work on effects of RTA's:

Since the work of Viner, several studies have been conducted examining the effects of regional trade agreements using various empirical methods (Clausing, 2001). Krueger (1999) and Drysdale & Garnaut (1993), to name a few, have examined trade shares before and after an agreement in order to assess the effect of the trade agreement on trade patterns. The assumption is that trade shares with partner countries do not change in the absence of an agreement. In keeping with this line of studies, I examine the trade patterns of the three East African countries using aggregate data covering both pre and post agreement years. Analysis of trade shares show that the region's total trade volume has increased significantly as a proportion of total trade over the years 1985-2003. Exports from Kenya to Uganda and Tanzania are disproportionately high, accounting for 18 per cent of its total exports in 2003. Uganda and Tanzania have relatively small but growing regional trade shares[21]. Overall, trade in the region has increased as demonstrated by the data; however, the new EAC has not yielded a noticeable rise in intra-regional trade shares.

It has been suggested that using intraregional trade shares alone as measures of trade orientation is empirically weak (Kirkpatrick & Wantabe, 2005). To provide a stronger picture of the trade relations and export compositions in the EAC, I calculate various indices for the region which are discussed at length in Chapter 3. Some interesting results arise. I find that the trade intensity ratios for the EAC are incredibly

[21] Total exports for Uganda to the EAC have grown from 0.9 per cent in 1985 to 15.8 per cent in 2003. For Tanzania, exports to the EAC have increased modestly from 1 per cent in 1985 to 5.8 per cent in 2003. For more analysis, see Chapter 3: Tables 3.1, 3.2, 3.3.

high[22] which is could be explained by the geographic proximity of these countries. It is this "higher than usual" trade concentration that prompts the use of a gravity model (Chapter 4) in order to capture the effects of the EAC with regards to trade and welfare effects. I also calculate the export dispersion index, Herfindahl index and the geographic concentration of export destinations. Overall, these indices demonstrate that the trade in the EAC is consistent with their level of development which is characterised by a wide range of export products to a diverse set of countries.

Changes in trade policies can have a significant effect on productive activities in a region. These changes can be investigated using a measure of revealed comparative advantage (RCA). The RCA is used as a measure of international trade specialization and competitiveness. Balassa (1965) derived the RCA index by inferring comparative advantage based on observed export and import data. Since then, studies have measured the RCA at global levels (see e.g. Vollrath, 1991) and others as bilateral trade between two countries or trading partners (see e.g. Dimelis & Gatsios, 1995). The changes in comparative advantage can be either inherent, whereby trade allows for more inputs to be directed to a sector in which a country traditionally has a RCA, or emergent, whereby trade causes redirection of resources into new industries. Changes in comparative advantage should reflect changes in factor endowment, but increasingly, changes in trade policies also affect a region's trade performance. For example, changes in trade policy in Latin America from inward looking to economic openness in the 1980's and 1990's led to a reduction in factor allocation distortions through a re-distribution of resources

[22] Trade in exports from Kenya to Tanzania and Uganda was on average 300 and 900 times larger (respectively) than the trade with the rest of the world in 2003. For Uganda to Tanzania and Kenya in 2003; Trade was 40 and 250 times higher than with the rest of the world. Tanzania had the lowest intensity ratios of the three countries. For more analysis, see Chapter 3: Table 3.5.

(Bender & Li, 2002). While the RCA measurement may not distinguish between the factor endowments effects from the trade policy effect, the RCA measure provides an indication of the movement in a region's comparative advantage. Thus, given the observed patterns of export performance in East Africa, I examine if the process of trade liberalization has led to changes in the RCA and provide a forward looking analysis into changes in production. The assumption here is that reducing barriers within the region will lead to the re-distribution of production. The expectation is that sectors with a RCA should continue to prosper and even grow with regional integration.

The changes in RCA in the EAC are also affected by the composition of intra-regional trade; that is: are export and imports in similar goods (intra-industry trade) or in different goods (inter-industry trade)? The conventional forces of comparative advantage occur between groups of industries whereby a country will tend to specialise in the particular industries giving rise to *inter-industry* trade. Another aspect, as argued by Krugman (1981), is that economies of scale in production lead a country to produce only a sub-set of goods within each industry such that *intra-industry* specialization and trade occurs. Intra-industry exchange produces extra gains from international trade over and above those associated with comparative advantage because it allows a country to take advantage of larger markets (World Bank website). Empirical evidence[23] tells us that intra-industry trade should increase with integration. This is due to outsourcing and specialization in smaller product lines. The changes in composition of intra-regional trade

[23] Grubel and Lloyd (1975) suggested an empirical measure of intra-industry trade in which they found two interesting phenomena: First, the empirical phenomenon that countries engaged in trade in similar industries was at odds with the Heckscher-Ohlin-Samuelson model of international trade. Secondly, the increase in intra-industry trade coincided with economic integration in western Europe (Egger, Egger & Greenaway, 2004)

are important in determining if the EAC has led to changes in the production systems and trading patterns between the member countries.

Studies using more elaborate counterfactuals have used gravity equations to assess the impact of regional agreements on trade flows. Those responsible in developing the theory of the gravity model include Deardorf (1984); Helpman and Krugman (1985); and Helpman (1987). Frankel (1997) cites Helpman and Krugman as the originators of the standard gravity model[24]. The model is used to explain the driving forces of exports using variables that affect trade flows such as national income and distance. My research follows the conventional gravity model explained in Chapter 4 using aggregate bilateral export data[25]. Using dummy variables, the impact of various trading agreements can be determined. Three variables will be important in determining the trade effects (Frankel, 1997); (i) intra-bloc trade, (ii) overall bloc imports and (iii) overall bloc exports. These variables reflect the overall openness of an RTA to imports and exports from and to the rest of the world. Changes in the coefficients of intra-trade and overall bloc imports will determine whether trade diversion/creation has occurred. Trade diversion will be identified when an increase in intra bloc trade coincides with a decrease in overall bloc imports. Trade creation will be found when changes in overall bloc imports are larger than the changes in the intra trade coefficient or if imports actually rise after the RTA is formed. Increases in both the overall bloc imports and intra-bloc trade would imply that the RTA promotes all forms of international trade i.e. both within and outside the RTA. The changes in the overall bloc exports will assess the welfare effects of non members in

[24] The gravity model is taken after Newton's theory of gravitation because of the analogy.
[25] Frankel 1997 notes that some effects of trading agreements are lost in tests due to highly aggregated data. This means that studies that only use aggregate data may be unable to exploit variations in the extent of trade liberalization across industries (Clausing, 2001).

terms of imports (i.e. members' exports). A negative coefficient will indicate that the RTA has negative impacts on non-members welfare relative to the norm, as identified by the gravity equation. The magnitude effects obtained from the coefficients will demonstrate if trade for the EAC has increased or decreased relative to the norm.

The studies mentioned above using trade shares, revealed comparative advantage and gravity models are ex-post studies. Other studies use empirical methods that provide forward-looking assessment of the likely future effects of trading agreements. Computable general equilibrium (CGE) models give an indication of the impact of the agreements (see for instance Brown, Deardorff & Stern 1992; Brown & Stern 1989; Haaland & Norman 1992). CGE studies are very sensitive to the assumptions, data and parameters used thereby requiring careful interpretation. This type of study is convenient when using benchmark data with explicit specifications. Most CGE models use input-output data that contain valuable information on market allocation of resources in an economic system. Due to data limitations[26] and the complexities involved in the formation and calibration of a CGE model, I will not be using this approach. The ex-post approaches that I will use will allow for an analysis of post trade situations and the deduction of impact of the EAC RTA on trade volumes, composition and welfare over multiple years (1990-2004).

[26] Input-output data for the EAC countries is difficult to obtain. In a study conducted by Milner, Morrissey et al.(2005) using a CGE model on the EAC and EU, data were obtained from locally published trade statistics on a fieldwork trip to these countries. I do not have access to this data and therefore CGE modelling is not a feasible approach. In addition, they only collected data for one year: 1995 and my study requires data covering at least ten years.

2.2 Studies on the welfare effects of the EAC RTA

Since the re-establishment of the EAC, there have been a few studies, using various empirical models that have considered the effects of the agreement including Kirkpatrick and Wantabe (2005), McIntyre (2005) and Busse and Shams (2003). The key aspects of my research are not systematically addressed in any of these papers, but they do provide insights into the effects of the EAC RTA.

Kirkpatrick and Wantabe (2005) use a gravity model to analyze the pattern of trade between the three East African countries between 1970 and 2001. The main focus of Kirkpatrick and Wantabe is to examine if regional cooperation has coincided with an increase in the volume of trade. They divide their analysis into three different time periods that coincide with the periods of regional cooperation. The results of the gravity model indicate that the regional trade agreement (RTA) had a positive effect on the intensity of regional trade flows in the 1970's, whereas during the 1980's, the constant level of intra-regional trade reflected the lack of regional integration. Their results are sufficiently robust to support the conclusion that regional trade cooperation can support the expansion of trade between the three economies. Regional cooperation in East Africa has had a positive effect on trade flows between the three countries, with no evidence of trade diversion. This study does not go as far as to examine the coefficients of intra trade, bloc export and imports to deduce explicitly the welfare impacts of either the "old" or "new" EAC.

Busse and Shams (2003) and McIntyre (2005) both use ex ante approaches in the analysis of welfare effects. Busse and Shams (2003) use a partial equilibrium model. Their results show that total trade would increase by roughly US $13 million. Trade

creation amounts to US $4.5 million and trade diversion to US $8.7 million. The biggest trade effects are seen in Tanzania due to its relatively high intra-EAC tariff rates. For all the three countries, trade diversion exceeds trade creation implying that imports are now from high-cost producers, decreasing net welfare. Kenya is found to profit the most from preferential trade liberalization; however this result is to be expected due to the high export share of Kenyan exports within the EAC. Uganda and Tanzania would gain less from the EAC-CET, but their trade balances would not deteriorate significantly. On average, the trade creation figure is quite small and so this would suggest that the total growth in trade accruing to the EAC will be minimal. Their findings reinforce the idea proposed in my research that dynamic rather than static gains are of greater importance to this RTA.

McIntyre (2005) analyzes the potential trade impact of the EAC customs union and the extent to which the common external tariff (CET) will liberalize their trade regimes. The paper provides simulations to determine the impact of the CET on Kenya. McIntyre uses a static partial equilibrium model using a simulation known as SMART[27]. McIntyre finds that trade creation is the dominant effect of the EAC CET. Preliminary evidence shows that the EAC customs union will have positive trade benefits for Kenya since the EAC CET will allow for increased flows of cheaper extra-regional imports that will likely lower consumer prices with positive welfare effects[28]. Overall, the simulation

[27] SMART is a static partial equilibrium model that provides a snapshot of the projected impact of tariff reductions while disregarding any adjustment process accompanying this change. SMART was jointly developed by the United Nations Conference on Trade and Development (UNCTAD) and the World Bank (McIntyre, 2005).

[28] Note that in the simulation by McIntyre, the removal of internal tariffs through the EAC-CET is assumed to be accompanied by a lowering of most-favoured nation (MFN) tariffs. This assumption in derived from a World Bank study that concluded that RTAs between developing countries (South-South) that provide preferential access to member states but do not lower tariffs with the rest of the world are likely to lower welfare for the bloc as a whole.

results show an increase in trade of $193.5 million with trade creation at $193.9 million and trade diversion at $0.3 million. While these results are larger than those found by Busse and Shams (2003); the figures are still small relative to the trade that these countries carry out with the rest of the world. This suggests that while the increase in the volume of intra regional trade is desired, the dynamic effects of regional integration such as improved infrastructure, governance and promotion of investment are of more importance. In the next section I proceed by examining the dynamic gains from regional integration and the implications for the EAC[29].

2.3 Dynamic gains from regional integration

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. Nondiscriminatory 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 an RTA), why are RTAs so popular? From the EAC objectives outlined in Chapter 1, it is clear that trade integration is not the only reason for regional integration in East Africa. Other anticipated gains from regional integration are discussed below[30].

[29] Welfare gains from static models are usually quite low as has been observed for the EAC. This is because welfare is ultimately determined by productivity and so while trade does promote productivity; it is unlikely to be the main driving force behind it.

[30] It should be noted that not all the gains discussed below are necessarily due to the formation of a regional trade bloc. Some gains can be obtained simply through increased openness to trade with the world, whether in a trade bloc or in bilateral and multilateral trade agreements.

Regional trade blocs have been known to reduce the tensions between antagonistic neighbors (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 neighbor 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[31]. In order to uphold this objective, the defense chiefs from each of the member states agreed on a Memorandum of Understanding for co-operation in defense matters in 1997 (EAC official website). The EAC also has an institution to provide a democratic forum for debate, the East African Legislative Assembly (EALA), as well the East African Court of Justice to ensure that community law is followed.

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 should be noted that forming an RTA does not necessarily imply an increase in investment especially if the RTA is

[31] The old EAC is an example of how integration can trigger conflict. The economic dominance of Kenya in the 1960's and 70's created an atmosphere of hostility among the neighbors'. There was also political tension that contributed to the conflict between Tanzania and Uganda in 1979.

between developing countries (South-South)[32]. Rather, general policy reforms in macroeconomic policies and financial systems are more likely to influence investment. Since the EAC is a South-South RTA, it will only bring about increased investment if the integration is accompanied by good policy overall in the member countries.

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. Since an RTA in principle combines markets, there will several types of benefits including; increased competition, the exploitation of economies of scale due to market enlargement, increased variety of products and reductions in internal inefficiencies of firms which would increase productivity (Schiff & Winters, 2003 pp.50,51). 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.

[32] Theoretical arguments on the ability of an RTA to raise returns and investment in developing countries are more persuasive for North-South RTAs than South-South ones (Schiff & Winters pp.101, 2003).

The EAC has had a long history of cooperation as discussed in Chapter 1. It is exactly this history that has led the EAC to undertake steps to integrate domestic policies in areas such as labor 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. The formation of a COMESA customs union is attractive as 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.

Chapter 3

3.1 Introduction

This chapter is an empirical investigation of the overall trade and production behaviour of the EAC. The idea is to identify what effect, if any, the signing of the RTA has had on the direction, volume, and composition of trade between the members of the EAC as well as with their partners outside the EAC. Of particular importance is whether trade patterns have changed noticeably and, if so, along what dimensions. Data for the empirical review of trade patterns in the EAC for this chapter is drawn from a variety of sources, depending on the type of data required. Aggregate trade data on exports and imports is obtained from the Direction of Trade Statistics (DOTS) yearbooks and the UN COMTRADE database for 1990 to 2004. Commodity export data collected at the 3 digit SITC level is obtained from the World Trade Analyzer database[33]

3.2 Overall Trade Patterns

3.2.1 Trade patterns for the EAC members

The region's total trade volume has increased significantly as a proportion of total trade over the years 1985-2003. The major trading partners of the three countries are the European Union, Japan, China, India, United Arab Emirates (UAE) and Saudi Arabia.

[33] World Trade Analyzer database did not have data for 2002-2004 so any indices calculated in this research requiring data from this source will be for years 1990-2001.

Tables 3.1, 3.2 and 3.3 below show the destination for exports and imports from each of the EAC countries. The percentage of Kenya's exports to industrial countries has been quite stable over the years and accounted for 47 per cent of its total exports in 2003. Imports from industrial countries into Kenya fell between 1985 and 2003 (from 57% to 39%) while imports from the Middle East grew significantly to 32% of total imports in 2003. This shows that the Middle East has become an important source of imports for Kenya. Trade with Asia has also been growing over the years accounting for 12.6 per cent of exports and 23 per cent of imports.

Table 3.1: Exports and Imports for Kenya

	Exports					Imports				
Kenya	**1985**	**1990**	**1996**	**2000**	**2003**	**1985**	**1990**	**1996**	**2000**	**2003**
Total Trade (US$M)	957.5	1095.9	2141.0	1733.9	2411.2	1436.1	2147.7	3690.0	3105.5	3725.3
Industrial countries	534.5	624.0	1030.0	829.3	1133.4	822.9	1230.7	1649.0	1507.4	1465.6
Developing countries	342.6	386.5	1042.0	1025.2	1388.1	591.2	884.2	2034.0	1867.2	2716.7
Africa	211.1	238.0	696.0	613.9	842.7	22.8	34.0	308.0	402.2	561.8
Asia	81.7	93.9	214.0	251.5	304.1	140.4	223.8	1091.0	535.1	849.6
Europe	2.1	2.7	14.0	14.1	33.5	6.0	9.0	54.0	48.4	72.4
Middle East	47.6	51.9	115.0	140.8	200.5	419.8	642.6	545.0	813.5	1190.4
Uganda	83.3	88.5	199.0	268.9	324.8	1.2	2.0	9.0	65.0	86.3
Tanzania	12.0	12.7	161.0	84.6	109.6	4.0	6.5	14.0	42.3	47.1
% of Total trade with EAC	10.0	9.2	16.8	20.4	18.0	0.4	0.4	0.6	3.5	3.6
Percentage distributions										
% Industrial	55.8	56.9	48.1	47.8	47.0	57.3	57.3	44.7	48.5	39.3
%Africa	22.0	21.7	32.5	35.4	34.9	1.6	1.6	8.3	13.0	15.1
% Asia	8.5	8.6	10.0	14.5	12.6	9.8	10.4	29.6	17.2	22.8
% Middle East	5.0	4.7	5.4	8.1	8.3	29.2	29.9	14.8	26.2	32.0

Source: Direction of Trade Statistics Yearbooks, (millions of U.S dollars)
Industrialized countries: Australia, Japan, Switzerland, USA, Belgium, France, Germany, Netherlands, Italy, UK
Asian countries: China PR Mainland, India, Indonesia, Malaysia, Pakistan
Middle East: Bahrain, Saudi Arabia, United Arab Emirates

Exports to other African countries have been on the rise. In 1985, exports to Africa accounted for 22 per cent of total exports and continued to rise to 35 per cent in 2003. Imports from Africa have also grown accounting for 15 per cent of total trade in 2003, up from 1.6 per cent in 1985. This indicates that Africa has become a major player

in Kenya's trade sector. This is likely due to the increasing number of regional trade blocs in Africa. Alternately, it may be due to the consistently stronger growth in GDP that has taken place over the last 20 years in Africa (such that higher income levels lead to more demand and, consequently, more supply). With regards to the other East African countries, Kenya has an imbalance between its imports and exports. Exports to Uganda and Tanzania accounted for 20 per cent of total trade in 2000 while its imports from the two are only 3.5 per cent in the same year. Evidently, this shows that the regional market provided by Uganda and Tanzania is of importance to Kenya. Exports to Uganda are almost four times larger in 2003 (324 million) than in 1985 (83.3 million) and are much larger than exports to Tanzania. That said, exports from Kenya to Tanzania have also grown with a peak in 1996 of 161 million. Imports to its neighbors have not grown nearly as much, showing the imbalance mentioned earlier.

Looking at Uganda's exports and imports in the Table 3.2 below, Uganda's exports to Industrial countries, though declining, accounted for the largest percentage of total exports (88% in 1985 and 46.8% in 2003). Exports to Africa have also been growing and, from a low of 1.2 per cent in 1985, these exports accounted for 35 per cent in 2003. The importance of trade with Africa is also observed when looking at the imports from Africa such that imports from Africa and industrial countries each account for 38 per cent of total trade in 2003. Consequently, it is not surprising to observe total trade with its EAC partners has grown from 0.9 per cent to 15.8 per cent in exports. The level of imports from the EAC has consistently been at about 25 per cent with main imports from Kenya. Asia has become an important trade partner in terms of its imports as it

accounted for 23 per cent in 2003 making it Uganda's third largest trading partner. Trade with the Middle East is quite minimal for Uganda in terms of both imports and exports.

Table 3.2: Exports and Imports for Uganda

	Exports					Imports				
Uganda	**1985**	**1990**	**1996**	**2000**	**2003**	**1985**	**1990**	**1996**	**2000**	**2003**
Total Trade US$M)	381.6	178.8	566.0	399.6	531.9	327.4	481.4	745.0	1536.4	1251.5
Industrial countries	337.0	160.3	467.0	223.4	248.7	155.1	275.6	334.0	334.7	474.0
Developing countries	41.6	18.4	99.0	164.1	248.0	125.5	195.4	389.0	620.2	897.6
Africa	4.4	4.3	13.0	122.5	189.2	95.3	96.2	264.0	381.2	483.6
Asia	30.0	3.0	16.0	31.1	30.5	22.4	77.7	93.0	156.3	291.5
Europe	0.0	3.1	60.0	1.9	6.8	0.1	2.5	4.0	3.9	8.4
Middle East	7.1	7.9	10.0	7.7	21.2	7.4	17.0	27.0	66.2	108.1
Kenya	1.1	1.8	9.0	63.0	78.4	91.6	97.3	217.0	295.8	357.3
Tanzania	2.5	1.6	2.0	5.5	5.8	2.0	1.7	11.0	8.9	10.8
% of Total trade with EAC	0.9	1.9	1.9	17.2	15.8	28.6	20.6	30.6	19.8	29.4
Percentage distributions	**1985**	**1990**	**1996**	**2000**	**2003**	**1985**	**1990**	**1996**	**2000**	**2003**
% Industrial	88.3	89.7	82.5	55.9	46.8	47.4	57.3	44.8	21.8	37.9
%Africa	1.2	2.4	2.3	30.7	35.6	29.1	20.0	35.4	24.8	38.6
% Asia	7.9	1.7	2.8	7.8	5.7	6.8	16.1	12.5	10.2	23.3
% Middle East	1.9	4.4	1.8	1.9	4.0	2.2	3.5	3.6	4.3	8.6

Source: Direction of Trade Statistics Yearbook, (millions of U.S dollars)
Industrialized countries: Australia, Japan, Switzerland, USA, Belgium, France, Germany, Netherlands, Italy, UK
Asian countries: China PR Mainland, India, Indonesia, Malaysia, Pakistan
Middle East: Bahrain, Saudi Arabia, United Arab Emirates

Tanzania's trade flows are similar to Kenya and Uganda with the bulk of its exports/imports going to/from industrial countries, Africa, and Asia. Exports and imports to industrial countries as a percentage of total trade declined by almost half between 1985 and 2003. Asia has been rising in terms of both exports and imports with the former accounting for 35 per cent in 1996. The Middle East does not represent a significant percentage of exports although the imports increase from 7 per cent in 1985 to 26 per cent in 2003.

Table 3.3: Exports and Imports for Tanzania

	Exports					Imports				
Tanzania	**1985**	**1990**	**1996**	**2000**	**2003**	**1985**	**1990**	**1996**	**2000**	**2003**
Total Trade (US$M)	283.9	423.0	760.0	734.9	944.3	1028.0	1150.0	1632.0	1523.5	2258.7
Industrial countries	201.1	254.4	318.0	428.4	415.8	666.6	814.5	598.0	683.3	729.1
Developing countries	74.3	161.2	413.0	306.4	518.9	347.8	327.1	970.0	837.2	1529.0
Africa	14.5	29.7	113.0	136.2	184.1	64.9	47.4	412.0	308.4	531.2
Asia	54.4	115.6	267.0	139.6	190.3	72.0	150.5	334.0	306.3	578.6
Europe	1.4	9.2	20.0	10.8	103.9	13.4	7.7	13.0	18.5	109.4
Middle East	3.9	6.7	12.0	14.6	39.8	191.5	115.3	201.0	174.3	294.2
Kenya	1.0	5.9	13.0	38.0	44.7	20.0	14.0	176.0	93.1	115.4
Uganda	1.8	1.6	10.0	25.0	9.8	2.7	1.7	2.0	5.6	6.4
% of Total trade with EAC	1.0	1.8	3.0	8.6	5.8	2.2	1.4	10.9	6.5	5.4
Percentage distributions										
% Industrial	70.8	60.1	41.8	58.3	44.0	64.8	70.8	36.6	44.9	32.3
%Africa	5.1	7.0	14.9	18.5	19.5	6.3	4.1	25.2	20.2	23.5
% Asia	19.2	27.3	35.1	19.0	20.2	7.0	13.1	20.5	20.1	25.6
% Middle East	1.4	1.6	1.6	2.0	4.2	18.6	10.0	12.3	11.4	13.0

Source: Direction of Trade Statistics Yearbooks, (millions of U.S dollars)
Industrialized countries: Australia, Japan, Switzerland, USA, Belgium, France, Germany, Netherlands, Italy, UK
Asian countries: China PR Mainland, India, Indonesia, Malaysia, Pakistan
Middle East: Bahrain, Saudi Arabia, United Arab Emirates

Compared to its EAC partners, Tanzania's trade with Africa is quite low with exports and imports recorded at only 19.5 per cent and 23.5 per cent respectively. Despite the low percentage of trade with Africa, the volume of trade with Africa has increased between 1985 and 2003. Trade with the EAC has been quite balanced in terms of imports and exports albeit small. Tanzania sent only 8.6% of its total exports to the EAC and received from it 6.5% in 2000, showing that trade flows between Tanzania and other EAC countries are quite small.

3.2.2 Commodity Composition of Imports and Exports for the EAC

Commodity composition within the EAC is consistent with their level of development. The region's principal exports to the rest of the world are mainly agricultural products. These include horticulture, tea, coffee, cotton, tobacco, pyrethrum,

fish, and hides and skins. There has been a significant decline in the agricultural sectors in Kenya and Uganda, decreasing from 29% to 16 %, and 57% to 32% respectively from 1990 to 2003[34]. Tanzania has maintained a large agricultural sector over this period without much growth in any of the other sectors. Other exports include handicrafts and minerals such as gold, diamonds, gemstones, soda ash and limestone. Tourism is also one of the major sources of foreign exchange for the three countries. The region's major imports are machinery and other capital equipment, industrial supplies and raw materials, motor vehicles and motor vehicle parts, fertilizer, crude and refined petroleum products.

Trade within the EAC, however, follows a different pattern as shown in Table 3.4 below. Manufactures and petroleum are important regional exports for Kenya. The percentage of Kenya's exports in manufactures to Uganda and Tanzania are 53 and 59 per cent respectively. Imports to Kenya from Uganda consist mainly of food produce (79%) and manufacturing (11.5%). Imports to Kenya from Tanzania consist of mainly manufactures (43.4%). It is interesting to note that almost 50 per cent of Kenya's exports to, and imports from, Tanzania are within the manufacturing industry. Uganda's main exports are food produce, energy[35] and electricity while imports are mainly in energy (from Kenya, 52.7%) and manufacturing (71.3% from Tanzania and 33.8% from Kenya). Tanzania's exports to the region consist of food produce (68% to Kenya and 20% to Uganda) and manufactures (13.9% to Kenya and 58.8% to Uganda). Within other sectors such as the textile fibres and ores, Tanzania appears to be the regional producer exporting 6 per cent in textiles to Kenya and 3.3 per cent in ores to Uganda.

[34] See Appendix A: Figures 1,2 and 3 showing structure of output for Kenya, Uganda and Tanzania in 1990 and 2003.
[35] Over 99 per cent of Uganda's energy is provided by hydro-electric power. Uganda exports over 18 per cent of its total capacity to Kenya, Tanzania and Rwanda (www.small-hydro.com).

Table 3.4: EAC regional trade by commodities, 2001 (% of total)

	Imports from:		Exports to:	
Kenya	**Uganda**	**Tanzania**	**Uganda**	**Tanzania**
Food produce	79.8	21.6	8.4	18.8
Agricultural materials	6.1	19.3	8.4	2.8
Textiles, fibres	2.4	2.0	-	-
Ores, minerals and metals	0.1	11.8	3.9	3.6
Energy	0.1	2.0	26.4	15.7
Petroleum, petroleum products	-	2.0	26.1	15.7
Gas, natural and manufactured	-	-	0.3	-
Electric current	-	-	-	-
Manufacturing	11.5	43.4	52.9	59.1
Uganda	**Kenya**	**Tanzania**	**Kenya**	**Tanzania**
Food produce	3.6	18.3	64.5	34.6
Agricultural materials	6.3	8.6	11.7	0.5
Textiles, fibres	0.1	0.2	4.7	0.4
Ores, minerals and metals	3.5	0.3	2.8	-
Energy	52.7	1.4	12.9	26.4
Petroleum, petroleum products	52.4	1.4	0.1	-
Gas, natural and manufactured	0.3	-	-	-
Electric current	-	-	12.8	26.4
Manufacturing	33.8	71.3	3.3	38.2
Tanzania	**Kenya**	**Uganda**	**Kenya**	**Uganda**
Food produce	10.8	23.1	68.4	20.0
Agricultural materials	2.6	0.1	10.9	5.4
Textiles, fibres	0.2	0.1	6.0	0.6
Ores, minerals and metals	2.9	-	0.3	3.3
Energy	26.7	60.0	0.5	11.8
Petroleum, petroleum products	26.7	60.0	0.5	11.8
Gas, natural and manufactured	-	-	-	-
Electric current	-	-	-	-
Manufacturing	56.8	16.6	13.9	58.8

Source: UN Commodity Trade Statistics Database, 2003 (Taken from McIntyre, 2005)

It is clear that the manufacturing industry is of importance to intra-regional trade for the EAC and will likely expand in the future enhancing the region's potential to produce exports that can compete in the international market[36]. Manufactures are observed to go both ways; for example, Kenya exports manufactures to Tanzania and

[36] A shift in commodity exports from agricultures to manufactures will tend to improve the terms of trade of these countries. Trade in agricultures is very volatile, with world prices often fluctuating and yielding low returns.

imports manufactures from Tanzania. This exchange of similar goods can be characterised as intra-industry trade. The extent of intra- industry versus inter-industry trade among the EAC member countries is explored under the trade indices later in this chapter.

3.2.3 Openness Index

A key area in international trade theory is the link between economic growth and trade openness. It has been argued that sustained rapid growth cannot be achieved without rapid growth in trade. According to Panagariya (2004), a review of the experience over the past four decades offers "virtually no examples of countries that have achieved sustained rapid growth without simultaneously experiencing sustained rapid trade growth in the presence of low or high but declining trade barriers." Increased economic freedom in trade involves lower trade barriers, leading to lower costs and greater efficiency as entrepreneurs determine the activities in which they have a global or regional comparative advantage. These gains translate into increased economic and per capita income growth[37]. The level of openness in East Africa is important as it demonstrates the potential for growth in the region as they lower trade barriers amongst themselves as well as becoming more integrated into the world economy.

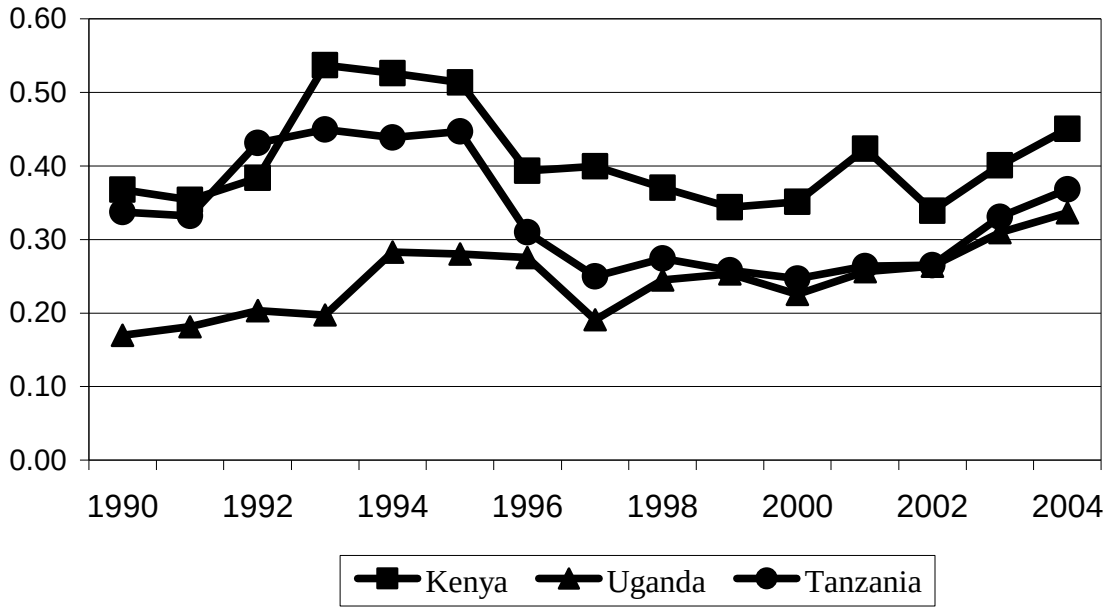
The degree of openness to international trade can be demonstrated using an openness index. The trade openness index computed in this paper is defined as the sum of exports and imports over GDP[38]. As can be seen from Figure 3.1 below, Kenya

[37] A World Bank study (2002) found that increased integration into the world economy from the late 1970s to the late 1990s by 24 developing countries led to higher growth in income with an average growth in per capita income of 5 percent per year in the 1990s.

[38] This basic trade openness index can be corrected to account for differences in country size and levels of development. The idea is that large countries in terms of GDP/population tend to trade less as most trade

consistently has the highest level of trade openness[39] among the three EAC countries with an index of 0.45 in 2004 compared to 0.34 for Uganda and 0.37 for Tanzania. Uganda's level of openness has been rising since the early nineties, reaching its highest level of 0.34 in 2004. Tanzania's level of openness appears to have been highest in the early nineties peaking at 0.45 between 1993 and 1995[40]. The index declines for most of the late nineties only to improve in 2003 (0.33) and 2004 (0.37)[41].

Figure 3.1: Openness Index for EAC



takes place within the countries (Low *et al*, 1999). Since the three EAC countries are at quite similar levels of development and population and GDP differentials are not very large, the basic trade openness index will suffice for this study.

[39] For the years 1993, 1994 and 1995, the openness index for Kenya appears to be quite high. However, this can be attributed to the slump in the economy in this period as demonstrated by the sharp decline in GDP from 8 billion in 1992 to 5 billion in 1993 (GDP data from World Bank database,2004)

[40] Tanzania appears to have an imbalance between exports and imports in the early nineties. Imports exceed exports almost three-fold with very little change in GDP. This imbalance may explain the high level of openness demonstrated over the years 1992 to 1995. (GDP data from World Bank database,2004)

[41] Note the upward bias in the openness index may be due to the fact that for most developing countries, a lot of economic activity is not included in the GDP whereas almost all external (legal) trade is quantified.

Even though all the three countries start off at different levels of openness, they follow a similar trend with an increase in the index in 1992 and from 2000 onwards. With regards to the formation of the EAC in 1999 and the years leading up its establishment; the openness index does not appear to have changed much. While all the EAC members are observed to be moving towards more openness in the latter years, this openness does not appear to coincide with to the formation of the regional trade bloc.

Overall, the pattern of increasing openness in the EAC bodes very well for the region as opening up to trade is beneficial to growth since the economies will be free to choose a better specialization pattern that is more in line with their comparative advantage. The next section is an empirical review of the trade relations and export compositions for the EAC as measured by various indices.

3.3 Trade Indices

I have looked at the aggregate data for the intraregional trade shares between each of the East African countries as well as with other trading partners. When compared to their trade with the rest of the world, these figures are quite small[42]; suggesting that the EAC members do not rely exclusively on each other. While the aggregate export data paints a general picture of the trade between Kenya, Uganda and Tanzania and the rest of the world, it does not provide much insight into the relative trade shares, export composition, and direction of exports. To account for all these aspects, I perform an empirical study of the pattern and nature of trade using the following measures;

i. Trade Intensity Index
ii. Export Dispersion Index
iii. Herfindahl Index of Export Concentration
iv. Geographic Index of Concentration of Export Markets
v. Intra industry trade index
vi. Revealed comparative advantage (RCA) indices

3.3.1 Trade Intensity Index

The weakness of intraregional trade shares as measures of trade orientation can be addressed by using simple concentration ratios or trade intensity indicators. The idea here is that we need to look at the trade intensity and scale for relative sizes of the economies. For instance, it is expected that there will be more trade with larger countries than smaller ones. The question is whether this trade is stronger than would be expected. In order to

[42] Intra-regional shares of world trade are quite low as shown in Tables 3.1, 3.2 and 3.3. For example, in 2003, the percentage of total trade for Kenya, Uganda and Tanzania with the other EAC countries was 18%, 15% and 5.8% respectively. However, given these countries relatively small sizes, each takes a proportionately large amount of trade.

identify if trading relationships are "deeper" than simple trade shares predict, intensity indices can be used[43]. Trade intensity indices also provide additional insights into the nature and importance of secular changes in bilateral trade flows. These indices can highlight the relative importance of (seemingly minor) changes in trade between countries that have relatively small global trade shares. The trade intensity (concentration) index (TI) is used to determine whether the value of trade between two countries is greater or smaller than would be expected on the basis of their importance in world trade. It is defined as the share of one country's exports going to a partner divided by the share of world exports going to the partner. It is calculated as:

$$TI_j^c = \frac{[x_j^c / X_j]}{[x_w^c / X_w]} \tag{3.1}$$

where x_j^c are country *j*'s exports to partner country *c;* X_j are country *j*'s total exports; x_w^c are the worlds exports to partner country *c* and X_w are the total world exports. When the trade intensity indicator is equal to one, then there is no preferential trade and the RTA does not have any trade-diverting effect. That is, RTA members are trading among themselves at the same intensity as they would with non-members. If the trade intensity index is more (less) than one, this indicates that the countries *i* and *j* have greater (less) bilateral trade than would be expected based on the partner country's share of world trade. For instance, suppose Canada absorbs 3 per cent of world trade but take in 5 per cent of U.S exports, then the TI is 1.6. From this, a pattern of preferential trade would be noted between Canada and the United States. Note however that the TI does not tell us

[43] Note that a gravity model can also be used to identify deeper integration. This model is presented in Chapter 4.

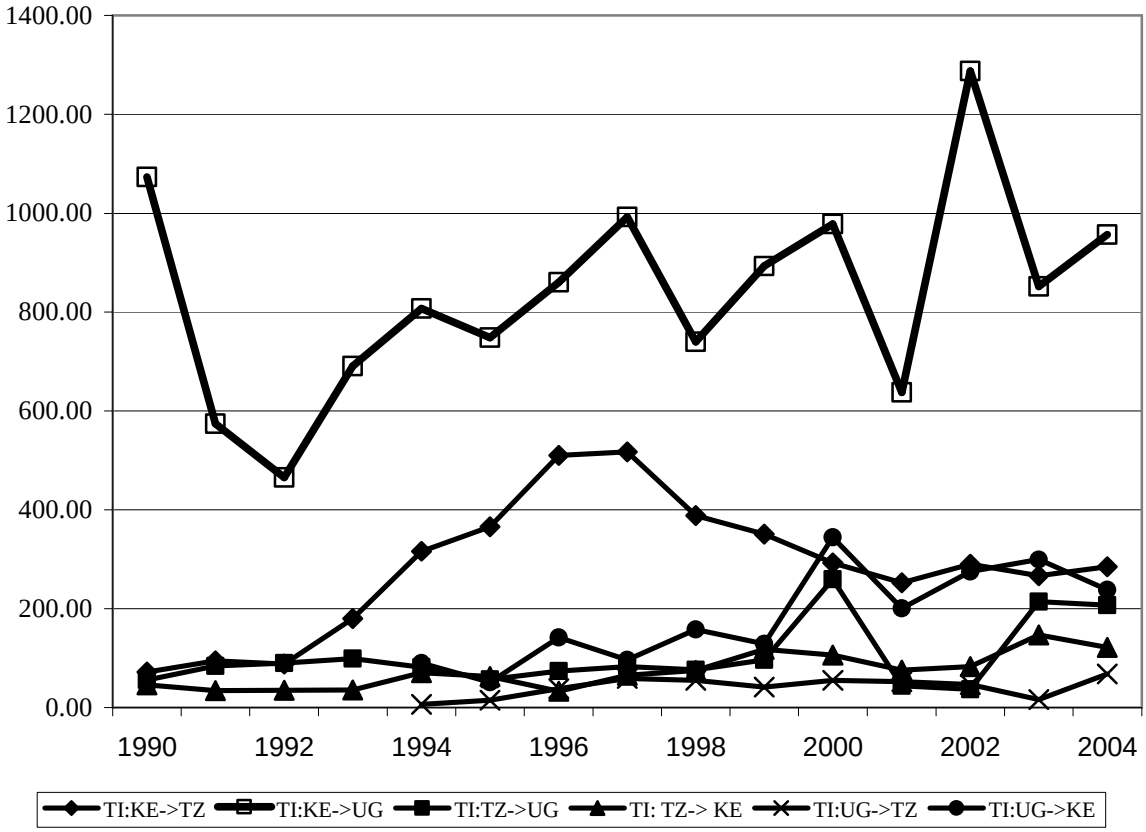
why trade is preferential. Data for total exports is obtained from the UN COMTRADE database with augmentation from the Direction of Trade Statistics (DOTS) yearbooks.

Figure 3.2 below shows the absolute values[44] of the trade intensities for the bilateral trade flows between the EAC countries. As mentioned earlier, due to the geographic proximity of these countries, we would expect to see trade concentration indices that are higher than normal[45]. In all cases concentration ratios are greater than one, confirming the bias towards trading with regional partners. The trade intensity indices between the EAC countries have always been quite high implying that these countries have had a high level of integration prior to the formation of the EAC. Kenya's trade concentration index to its regional partners is higher than that of Tanzania and Uganda. This confirms the observations made earlier in this chapter that Kenya relies more on the regional market for exports than Uganda and Tanzania.

[44] The trade concentration intensities for each bilateral trade flow and year (1990-2004) are shown in Appendix A: Table1

[45] The geographic distance between two trading partners influences the intensity to trade. In order to account for the higher than average trade intensity between neighboring countries, a gravity model is useful. I will consider the "gravitational" force between these countries when determining the trade and welfare effects of formation of the new EAC. The gravity model is discussed at length in Chapter 4.

Figure 3.2: Trade Intensity/Concentration Index for EAC (1990-2004)



Kenya's trade intensity with Uganda is almost 1000 times higher than what would be expected although it is difficult to conclude if this index has been rising over the past 14 years from the figure above. Kenya's intensity index with Tanzania has a clearer trend, moving upwards in the early nineties and falling slightly in the latter years. For Uganda[46], the intensity index is highest with Kenya (ranging from 89.92 in 1994 to 344.67 in 2000) compared to Tanzania. Uganda's trade intensity with Tanzania while greater than zero has remained quite low and does not display sharp increases/decreases

[46] The trade concentration index average values for Uganda over the period 1990-1995 are calculated using data from 1994 and 1995.Aggregate data for Uganda's exports to Kenya and Uganda for 1990 to 1993 were not available from the data sources used.

between 1994 and 2004. Tanzania's trade intensity index follows a different path in that it is observed to have higher trade intensity with Uganda compared to Kenya.

While the trade intensities between the EAC countries are quite high, it is difficult to determine the trend of the index over time due to yearly fluctuations. To counter the yearly variations, the changes in the intensities are important in reviewing the trend of the concentration index. Thus, the focus here is on the trend of the index over time, rather than the absolute value. Table 3.5 below reports the trade intensity index of Kenya, Uganda and Tanzania, averaged over three time periods as well as the signs of the changes in trade intensities. These years represent the timelines for the formation of the EAC namely; (i) *pre*-EAC between 1990-1995 (ii) 1996-1998 which represents period when the Tripartite commission was established and (iii) 1999-2004 which represents the formation of the EAC and customs union. The expectation is that trade intensities between the three partners will increase in the last two periods due to the move towards trade liberalization in intra-regional trade.

Table 3.5: EAC Trade Concentration Intensities

		Trading Partner		
Exporter	**Year**	**Kenya**	**Uganda**	**Tanzania**
Kenya	1990-1995	-	726.62 (-)	186.03 (+)
	1996-1998	-	864.40 (+)	472.15 (+)
	1999-2004	-	934.26 (+)	289.34 (-)
Uganda	1990-1995	70.42(-)	-	10.72 (+)
	1996-1998	131.84 (+)	-	50.51 (+)
	1999-2004	247.60 (+)	-	46.60 (+)
Tanzania	1990-1995	47.30 (+)	77.78 (+)	-
	1996-1998	57.90 (+)	77.74 (+)	-
	1999-2004	108.44 (+)	142.88 (+)	-

Source: Authors calculation. Full table shown in Appendix A: Table 1
Note: Positive and negative signs depict the changes in the trade concentration intensities for each period.

This expectation holds true for Kenya's trade with Uganda as can be observed from Table 3.5 above. Kenya's trade intensity index with Uganda has been steadily increasing over time from 726.62 between 1990 and 1995 to 934.26 between 1999 and 2004. The situation is different for Kenya's trade intensity with Tanzania that displays a marked decline between 1999 and 2004 (falls from 472.15 to 289.34). This is unexpected due to the fact that the EAC RTA is established in this period. However this decline may reflect the growing importance of trade between Uganda and Tanzania. Uganda's trade concentration index follows a pattern with increasingly higher trade ratios observed with Kenya over the last two periods while trade ratios with Tanzania are quite small, albeit increasing. Tanzania's trade intensity ratios with Kenya show a marked increase over the three periods with a large positive change observed between 1996-1998 and 1999-2004. The change in Tanzania's trade intensity with Uganda is positive for all three periods with the greatest change observed in the third period.

Overall, from the years examined, trade concentration ratios have increased which implies that intra-EAC trade is rising faster than trade with non-EAC members. This signals a deeper level of integration between the three countries that has been supported by the formation of the EAC RTA.

So far I have looked at the flows and changes in bilateral aggregate trade flows within the EAC, relative to their trade with the rest of the world. The next step is to examine the degree to which exports from the EAC members resemble the pattern of world exports.

3.3.2. Export Dispersion Index

Traditional trade theory suggests a strong link between factor endowments, production and trade. If two countries differ in their export bundles, this is understood as stemming from dispersion in factor endowments between the trading partners (Baxter & Kouparitas, 2003). In order to compare the trade pattern of the EAC countries to the rest of the world, I examine the dispersion of their production and trade structure. The dispersion index is useful to gauge the extent to which a country's exports diverge from the diversified world trade. To measure a country's dispersion from the rest of the world (ROW) with respect to its trade structure, I construct the dispersion index as follows:

$$DX_c = \frac{\sum | h_c^i - x_W^i |}{2} \tag{3.2}$$

where h_c^i is the share of commodity *i* in the total exports of country *c* and x_W^i is the share of commodity *i* in world exports. The smaller the index value, the closer a country is to the trade pattern of the world. Since it is computed relative to the world pattern of exports, if $DX = 0$, then country trade in exports replicates world trade. Commodity export data is obtained from the World Trade Analyzer database (3 digit SITC level) with exports recorded in 55 industries for Kenya and Tanzania and 51 for Uganda. Data for total exports is obtained from the UN COMTRADE database with augmentation from the Direction of Trade Statistics (DOTS) yearbooks. Note that the dispersion index is quite variable. This reflects the relatively small amount of trade that takes place meaning it is sensitive to small production/price shocks.

Table 3.6: Dispersion index for EAC over period 1990-2001

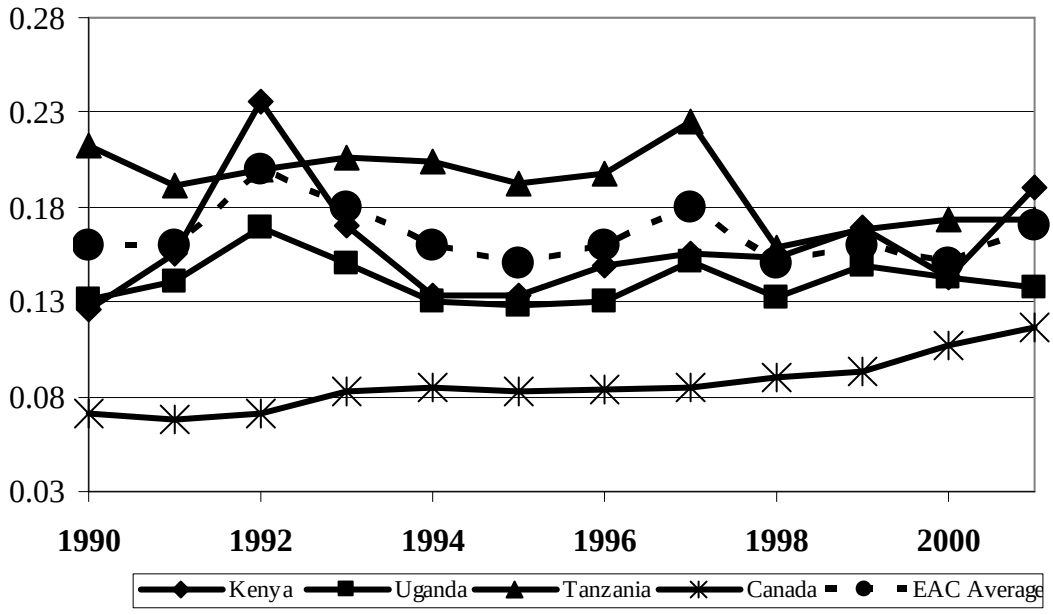
Year	Kenya	Uganda	Tanzania	EAC Average
1990	0.13	0.13	0.21	0.16
1991	0.16	0.14	0.19	0.16
1992	0.24	0.17	0.20	0.20
1993	0.17	0.15	0.21	0.18
1994	0.13	0.13	0.20	0.16
1995	0.13	0.13	0.19	0.15
1996	0.15	0.13	0.20	0.16
1997	0.16	0.15	0.22	0.18
1998	0.15	0.13	0.16	0.15
1999	0.17	0.15	0.17	0.16
2000	0.14	0.14	0.17	0.15
2001	0.19	0.14	0.17	0.17

Source: Authors calculation

The dispersion index for each of the EAC countries is shown in Table 3.6 above. The indices for Kenya and Uganda display a rise in the early nineties with each country obtaining a peak DX value of 0.24 and 0.17 respectively in 1992. Between 1992 and 1995, Kenya and Uganda show a decline in their DX values. This implies a movement towards the world "average". Tanzania starts off at a higher level of 0.21 in 1990 and continues to lie above the DX values of Kenya and Uganda over the period shown. This means that of the EAC countries, Tanzania is the farthest from the world "average". For the periods 1995-1997 and 1998-2001, the EAC dispersion index is rising. This would indicate that exports in the region are becoming less like the world basket of exports. These countries follow a similar level of export dispersion suggesting that they have similar product dispersion. Overall, the three countries have quite similar export dispersion levels ranging from 0.13 to 0.24 which could reflect their common level of development.

As the EAC countries are developing nations, the expectation is that their production and trade structure will be different from their trading partners, yielding high dispersion indices (Baxter & Kouparitas, 2003). Looking at these DX values alone, one could conclude that the EAC countries closely resemble the export pattern of the rest of the world and thus do not live up to the expectation. To view how these countries compare to a developed country, I have calculated the DX values for Canada as a comparison. Canada being a developed country is expected to have a low dispersion index as its production and trade structure tends to be similar to its trading partners (Baxter & Kouparitas, 2003).

Figure 3.3 Export Dispersion Index for the EAC and Canada



From Figure 3.3 above which includes the DX for Canada, it is apparent that the DX for Canada is far lower than that of the EAC countries with values ranging between 0.07 and 0.12.This probably reflects the relative importance of manufactures in trade. The EAC is resource intensive and so it looks different from Canada. The rise in the export dispersion for Canada is likely due to concentration within the manufacturing sectors.

There is a steady and upward trend observed from 1992 towards fewer exports. This may be due to Canada joining North American Free Trade Agreement (NAFTA). The effect of the formation of the EAC is not entirely apparent; there is no break in the data around 1996-1999 although the three countries appear to be converging in their export dispersion and possibly becoming more alike.

3.3.3 Herfindahl Index (diversified export products)

The export dispersion index discussed above is a measure of how closely trade in of the EAC countries replicates world trade. Another measure of concentration that can be used to examine the pattern of export diversification is the Herfindahl index. The Herfindahl index is traditionally used as a measure of industrial concentration within a country. With a range from 0 to 1, a small index indicates a competitive mix of industries with no dominant players. Using this idea, I calculate a Herfindahl index of export concentration by product. As opposed to the dispersion index, which is a relative measure, the Herfindahl index is an absolute measure that examines the concentration/diversification of exports from within a country. It is an important measure as, even if the dispersion index (DX) equals zero, a country can still experience significant terms of trade shocks if industrial concentration is in a few industries.

The Herfindahl index (HI) of export concentration by product is calculated as:

$$HI_j = \sqrt{\sum (x_j^i / X_j)^2} = \sqrt{\sum (s_j^i)^2} \quad \text{for } i = \text{industry } 1,\ldots. n \tag{3.3}$$

where x_j^i represents country j's exports of commodity i and n is the number of products for export. With a range from 0 to 1/n, a small index indicates a diversified economy of exports. It is equal to one when a single product generates all the export revenue and

approaches zero when export revenues are distributed over a large number of products[47]. Commodity export data is obtained from the World Trade Analyzer database (3 digit SITC level) with exports recorded in 55 industries for Kenya and Tanzania and 51 for Uganda. Data for total exports is obtained from the UN COMTRADE database with augmentation from the Direction of Trade Statistics (DOTS) yearbooks.

Table 3.7: Herfindahl Index of export concentration

Year	Kenya	Uganda	Tanzania	EAC Average
1990	0.03	0.04	0.16	0.08
1991	0.06	0.05	0.13	0.08
1992	0.22	0.11	0.15	0.16
1993	0.07	0.05	0.15	0.09
1994	0.03	0.02	0.15	0.07
1995	0.02	0.01	0.14	0.06
1996	0.04	0.02	0.14	0.07
1997	0.04	0.05	0.18	0.09
1998	0.03	0.01	0.05	0.03
1999	0.07	0.04	0.08	0.06
2000	0.02	0.02	0.06	0.03
2001	0.11	0.02	0.05	0.06

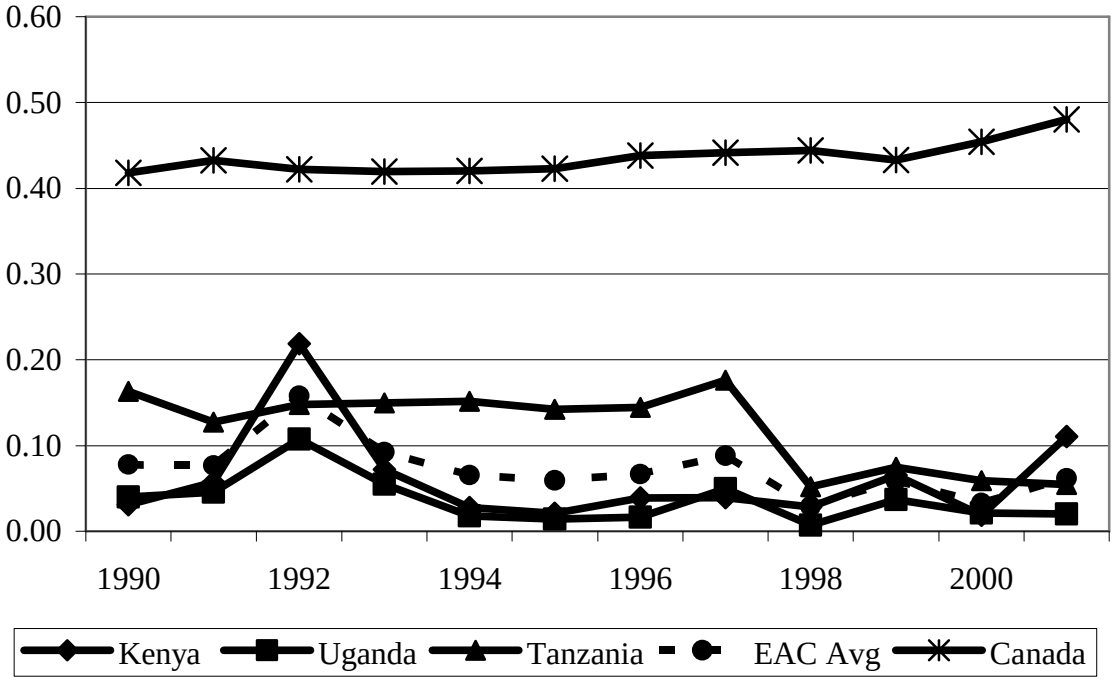
Source: Authors calculation

As observed in the export dispersion index, the Herfindahl index for each of the EAC countries displays a wide range of export products, tending to almost zero in most of the years. Uganda has the most diverse set of exports, followed by Kenya and then Tanzania. Kenya and Uganda follow a similar trend in their index values with a rise in the indices observed in 1992 (0.22 for Kenya and 0.11 for Uganda) and then a steady decline until 1996. Tanzania on average maintains an index of 0.15 over the early nineties with a peak position of 0.18 in 1997 followed by a decline in the index to 0.05 in 1998. Tanzania has definitely become more diversified in its exports. From Figure 3.4 below,

[47] It is important to note that not all products manufactured within a country will be exported. Essentially, exports are the surplus produce. Thus, if production shares, as opposed to export shares, were examined, they will have a lower Herfindahl value as there will be more products indicating higher production diversification.

there is a lot of variability in the Herfindahl index for the EAC. This demonstrates that the small amount of trade that takes place is sensitive to production and price shocks as dictated by their small country sizes.

Figure 3.4: Herfindahl Index of export concentration for EAC and Canada



Comparing the Herfindahl index for the EAC with Canada displays stark differences in the concentration of exports. Canada's Herfindahl index has high but consistent values ranging from 0.42 in 1990 to 0.48 in 2001. The move towards higher concentration of export products for Canada reflects a pattern of trade pressure that pushes developed economies into concentrating in few sectors in which fluctuations are small. For instance, Canada has its volume of exports in a few product groups such as oil and communications (service) industry By comparison, the EAC export mix reflects a pattern of development whereby exports are in a wider range of products. This is to insure against price fluctuations since their exports are mainly in volatile sectors such as

agriculture. However, it is not obvious that a pattern of diversification is optimal as a diverse mix of exports does not necessarily shield an economy from variability in prices. The important factor is the type of exports, for instance; exports in manufactures and services are less volatile than agricultural products.

The key years for the formation of the EAC (1996-1999) are marked by a convergence in Herfindahl index values. However, it is difficult to predict if the trend for each country will be towards a higher export concentration or diversification mix. Overall, the Herfindahl index values for the EAC average have declined over the 1990-2001 period. This suggests that development is dominating the trade process, similar to the observation with the export dispersion index.

3.3.4 Geographic Concentration Index of Export Markets

The importance of geographical concentration of exports markets is to observe what is happening to exports with respect to the EACs trading partners. Specifically, I investigate concentration of exports with respect to the destination countries. The geographic concentration index (GI) is an absolute measure, just like the Herfindahl index, which tells us where a country's exports are going. If a country's foreign trade depends heavily on a limited number of trading partners for a long period of time, then this country is vulnerable to business fluctuations in these countries, as argued here in the more general context of world trade. On the other hand, if the country in question could diversify both the export commodities and export markets and, also, if it had alternative sources for imports, then it would be more hedged against changes or fluctuations in other countries (Erlat & Akyuz, 2001). When a country joins a regional trade bloc, the expectation is that the propensity to trade with members within the bloc should rise due

to the preferential treatment that the members of the bloc enjoy. The extent to which the presence of the RTA causes exports to be directed to a few export markets (usually bloc members), thereby leading to an increase in the GI, varies between blocs.

The geographic concentration index for country *j* is calculated as;

$$GI_j = \sum (x_j^c / X_j)^2 = \sum (s_j^c)^2 \quad \text{for } c = \text{country } 1,\ldots, \text{n} \qquad (3.4)$$

where x_j^c represents exports from country *j* to country *c*, X_j are total exports from country *j* and *n* is the number of countries. If the geographic concentration index is one, all exports from country *i* go to only one country. As the geographic concentration index decreases from one, exports are more evenly distributed across trading partners.

Table 3.8: Geographic Index of export markets for EAC

Year	Kenya	Uganda	Tanzania	EAC Average
1990	0.06	0.15	0.06	0.09
1991	0.05	0.08	0.05	0.06
1992	0.04	0.12	0.12	0.09
1993	0.05	0.08	0.06	0.06
1994	0.07	0.00	0.03	0.03
1995	0.06	0.15	0.04	0.08
1996	0.06	0.15	0.04	0.08
1997	0.06	0.13	0.05	0.08
1998	0.07	0.05	0.07	0.07
1999	0.07	0.05	0.07	0.06
2000	0.07	0.11	0.10	0.09
2001	0.06	0.07	0.10	0.07

Source: Authors calculation

In all, 30 countries[48] are used to calculate the geographic concentration of exports (including the three EAC countries). The selection of trading countries has been based on export shares such that these trading partners constitute at least 70% of the total trade

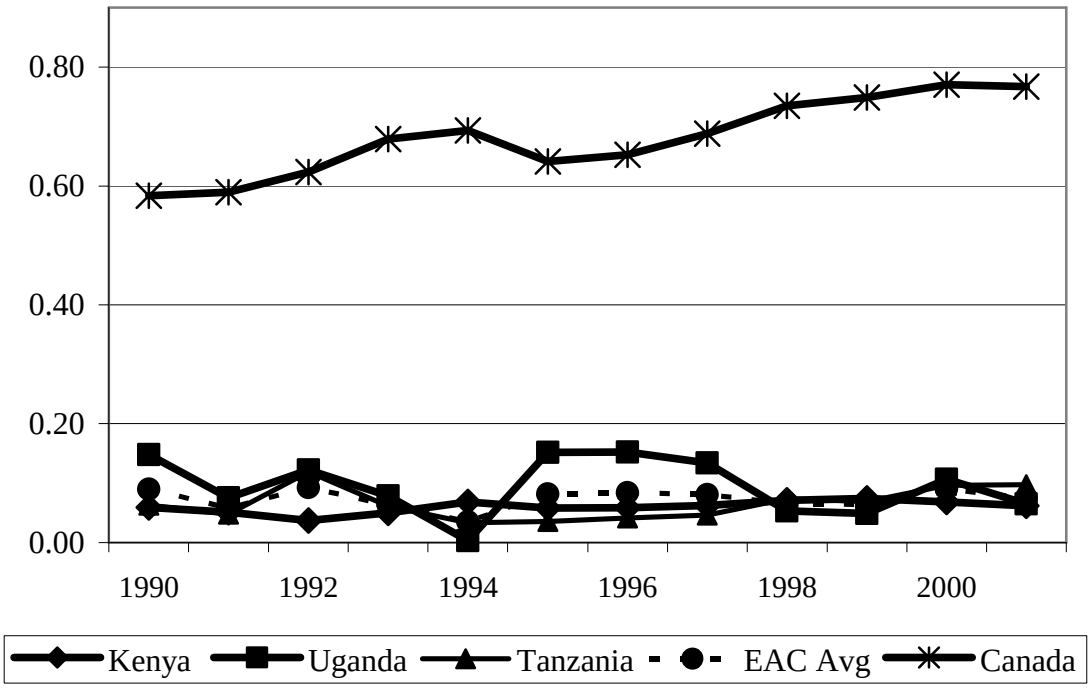
[48] The countries used are: Argentina, Australia, Canada, China, Hong Kong, Denmark, Egypt, Finland, France, Germany, India, Indonesia, Ireland, Israel, Italy, Japan, Malaysia, Netherlands, Pakistan, Rep. of S. Korea, Singapore, Spain, Sweden, Switzerland, Thailand, United Kingdom and USA.

with the EAC countries (Erlat & Akyuz, 2001). Bilateral trade data and aggregate country export data is obtained from the UN COMTRADE database.

From Table 3.8, each of the EAC countries has very low GI figures; Uganda has the highest GI value of the three EAC countries starting out at 0.15 in 1990 (compared to 0.06 for Kenya and Tanzania). This implies that Uganda has on average had less diversification in the destination of its exports. For the early part of the nineties (1992-1995), Kenya's GI rises from 0.04 to 0.07 while Uganda and Tanzania experience a decline (0.12 to 0.00 for Uganda and 0.12 to 0.03 for Tanzania). Uganda experiences an increase in its GI over 1995-1998 and then later converges to the levels of Tanzania and Kenya over the later years (1998-2001). The EAC has a very low GI average of about 0.06 which implies that these countries have a lot of export partners, as was discussed in an earlier section of this paper. Exports from the EAC are destined for the EU, Japan, China, USA, Africa and Asia. Overall, the EAC GI values are falling; this implies that these countries will continue to have several destinations for their exports over the next years.

If the EAC has had an effect on the destination of exports such that these countries would have a higher propensity to trade with each other, this should be marked by an increase in the GI values over 1996-1999. As can be seen in the figure below, this is not observed. The EAC average is quite flat with no obvious jump in the years following the EAC formation towards fewer export markets.

Figure 3.5: Geographic Index of export markets for the EAC and Canada



Canada, by comparison has rising GI values that are close to one. This means that the bulk of Canadian exports go to one country, the USA in this case. Indeed, exports to the USA account for almost 85 per cent of total Canadian exports (Canadian Manufacturers and Exporters Website). Once again the formation of the NAFTA has had an impact on the GI of export markets for Canada. From 1992, there is a marked increase in the GI (from 0.59 in 1991 to 0.62 in 1992) and this upward trend is maintained over the period shown with a peak value of 0.77 in 2001. The case of Canada shows that the formation of a regional trade bloc can have an impact on the direction of exports, demonstrated by the increase the GI upon joining NAFTA. Such a trend is not observed for the EAC.

3.3.5 Intra Industry Trade

In addition to the examining pattern of trade for the EAC countries as done in the previous section, it is also important to observe the nature of intra-regional trade; that is, is trade between the EAC members in different goods (inter-industry trade) or in similar products (intra-industry)? I am particularly interested in the extent to which trade within the EAC is "intra-industry" and if there has been a movement towards this type of trade with regional integration.

Intra-industry trade flows are defined as the two-way exchanges of goods within the standard industrial classifications. Intra-industry[49] exchange produces extra gains from international trade over and above those associated with comparative advantage because it allows a country to take advantage of larger markets (World Bank website). The extent of intra-industry trade is commonly measured by the Grubel-Lloyd index based on commodity group transactions. This index quantifies "intra-industry trade" as:

$$IIT_{i,jc} = \left[\frac{(x_{i,jc} + m_{i,jc}) - |(x_{i,jc} - m_{i,jc})|}{(x_{i,jc} + m_{i,jc})} \right] * 100 \qquad (3.5)$$

where $x_{i,jc}$ represents exports in commodity *i* from country *j* to country *c* and $m_{i,jc}$ represents imports in commodity *i* by country *j* from country *c*. The index ranges from a minimum value of zero, when there are no products in the same class that are imported and exported, to a maximum value of 100 when all trade is within the same product group (such that $x_{i,jc} = m_{i,jc}$). Commodity export data is obtained from the World

[49] Different types of trade are captured in the measurements of IIT: (i) horizontal trade in similar products which enables countries with similar factor endowments to benefit from economies of scale by specializing in similar products with differentiated varieties; (ii) trade in vertically differentiated products distinguished by quality and price. Vertical specialization of production across countries may be driven by comparative advantage such that a country with abundant cheap labor may be used for assembly of products while a country with skilled labor may be used for research and development (OECD Economic Outlook, 2002).

Trade Analyzer database (3 digit SITC level). There are nine headline SITC categories shown in the box below.

Table 3.9: Standard International Trade Classification Description

SITC CODE	DESCRIPTION
0	Food and live animals
1	Beverages and tobacco
2	Crude materials, inedible, except fuels
3	Mineral fuels, lubricants and related materials
4	Animal and vegetable oils, fats and waxes
5	Chemicals and related products n.e.s.
6	Manufactured goods classified chiefly by material
7	Machinery and transport equipment
8	Miscellaneous manufactured articles
9	Commodities and transactions not classified elsewhere

These categories can be further subdivided into sub sectors. This study uses exports as classified under the three digit[50] Standard International Trade Classification (SITC) level. The full list of sub sectors with exports recorded from the East African countries is provided in Appendix A: Table 2. Data for total exports is obtained from the UN COMTRADE database with augmentation from the Direction of Trade Statistics (DOTS) yearbooks.

The intra-industry trade index for each pair of countries is shown in Table 3.10 with the IIT values averaged for *pre*-EAC (1990-1995) and *post*-EAC (1996-2001). For Kenya and Uganda, intra-industry trade in the *pre*-EAC period is observed in chemicals and related products (SITC 5) and machinery and transport equipment (SITC 7). Within the SITC 5, carboxylic acids (513) has an IIT value of 30 which is quite high, considering that most categories display an IIT equal to zero (therefore representing "inter-industry trade"). Interestingly, for this industry in the *post*-EAC period, there is no cross-trading. A decline in the IIT is also noted in the insecticides (591) industry from 9.3 to 3.0. The

[50] The concept of an industry is used to examine the structure of trade at a disaggregate level. Studies associate an "industry" with a three digit SITC category (Balassa 1965).

chemicals and related products group shows an increase in the *post*–EAC period for the monofilament (583) industry although this value is quite low (2.32).

For machinery and transport equipment (SITC 7), increases in the level of IIT are observed for 8 out of 16 industries. Railway vehicle (791), with an IIT of 90.91, has the highest IIT value among all industries signifying that trade between Kenya and Uganda in this sector is almost entirely intra-industry. The lowering/elimination of tariff barriers and Uganda's lower labour costs (relative to Kenya) has likely led to the growth of IIT in this sector and others in SITC 7. A notable mention is the increase in IIT in the leather (611) industry. Overall, the number of sectors in which Kenya and Uganda are engaged in intra-industry trade has grown immensely in the *post*-EAC period, rising from 8 industries to 22 (175% change). This observation is in line with the theory that economic integration will lead to IIT due to outsourcing and specialization.

Of the EAC countries, Kenya and Tanzania have the most notable changes in the level of intra-industry trade between the *pre* and *post*-EAC periods and cover a diverse range of SITC groupings (SITC 2, 3, 6 and 7). Crude material (SITC 2) has increased in IIT all its sectors with the highest level of IIT of 39.25 noted for synthetic fibres (291). Kenya and Tanzania are observed to engage in IIT within the gas, natural and manufactured (341) and carboxylic acids (513) industries following regional integration.

Table 3.10: Intra-industry trade for EAC (averaged over 1990-1995 and 1996-2001)

SITC	Level 3	IIT for Kenya and Uganda 1990-1995	IIT for Kenya and Uganda 1996-2001	IIT for Kenya and Tanzania 1990-1995	IIT for Kenya and Tanzania 1996-2001	IIT for Uganda and Tanzania 1996-2001
0	**Food and live animals**					
75	Spices	0.00	2.38	na	20.33	na
91	Margarine and shortening	0.00	0.00	0.00	0.00	na
2	**Crude materials, inedible, except fuels**					
263	Cotton textile fibers	0.00	1.41	0.00	0.80	0.55
265	Vegetable textile fibers	na	0.00	0.00	7.27	na
266	Synthetic fibers suitable for spinning	0.00	0.00	0.00	39.25	9.81
3	**Mineral fuels, lubricants and related materials**					
334	Petroleum oils and oils from bituminous minerals	na	0.03	na	na	na
341	Gas, natural and manufactured	0.00	0.00	0.00	23.11	na
5	**Chemicals and related products**					
511	Hydrocarbons	0.00	0.00	0.00	0.00	na
513	Carboxylic acids and anhydrides	30.00	0.00	0.00	7.53	na
514	Nitrogen-function compounds	0.00	0.00	0.00	0.00	0.00
515	Organo-inorganic compounds	0.00	0.00	0.00	0.00	na
582	Plates, sheets, film, foil and strip of plastics	0.00	0.00	0.00	0.00	na
583	Monofilament	0.95	2.32	0.00	1.90	1.29
591	Insecticides, fungicides, herbicides	9.63	3.00	0.00	1.79	3.60
6	**Manufactured goods classified chiefly by material**					
611	Leather	0.00	25.91	0.00	11.11	na
612	Manufactures of leather	0.00	0.00	na	11.37	na
625	Rubber tires	0.00	0.29	0.00	33.00	8.32
665	Glassware	0.00	0.00	0.00	0.00	na
674	Iron and non-alloy steel flat-rolled products	0.00	0.10	6.02	1.47	1.90
689	Miscellaneous nonferrous base metals	na	na	na	0.00	na
691	Metal structures and parts	0.00	2.18	0.00	0.00	0.54
692	Metal containers for storage or transport	0.00	2.12	0.00	2.02	na
7	**Machinery and transport equipment**					
711	Steam or other vapor generating boilers	na	na	0.00	0.00	na
716	Rotating electric plant	0.00	18.37	22.73	44.94	21.51
722	Tractors	0.00	10.45	0.00	0.00	2.61
723	Civil engineering equipment	12.91	28.04	23.67	7.67	18.07
726	Printing and bookbinding machinery	0.00	50.00	0.00	0.00	na
727	Food-processing machines	3.85	5.77	0.00	0.00	2.40
742	Pumps for liquids	9.21	4.87	0.00	29.55	10.91
743	Pumps (not for liquids), air or gas compressors and fans	0.00	0.00	0.00	10.57	2.64
752	Automatic data processing machines	0.00	7.15	8.11	39.89	13.79
761	TV receivers (including video monitors & projectors)	0.00	0.00	na	100.00	33.33
762	Radio-broadcast receivers	0.00	0.00	na	0.00	na
771	Electric power machinery	0.00	41.88	13.44	4.94	15.07
772	Electrical apparatus for switching/protecting electrical circuits	6.25	1.14	0.00	38.12	11.38
776	Thermionic, cold cathode	0.00	0.00	0.00	0.00	na
786	Trailers and semi-trailers	0.00	0.00	0.76	15.43	na
791	Railway vehicles	na	90.91	na	27.66	na
792	Aircraft and associated equipment	na	na	0.00	27.35	na
793	Ships, boats and floating structures	na	na	0.00	3.42	na
8	**Miscellaneous manufactured articles**					
821	Furniture and parts thereof	1.12	1.07	4.29	18.22	6.17
895	Office and stationery supplies	0.00	0.91	0.00	0.11	0.26
897	Jewelry, goldsmiths' and silversmiths' ware	0.00	0.00	95.65	17.65	28.32
	Industries with Intra -industry trade >1	**8**	**22**	**8**	**28**	**20**

Source: World Trade Analyzer database, calculations performed by author. “na” means data not available.
Note: Data was not available for IIT for Uganda and Tanzania over 1990-1995

Under the manufactured good group (SITC 6), increases in IIT are noted in four industries for Kenya and Tanzania, namely, leather (611), manufactures of leather (612), rubber tires (625) and metal containers (692). The machinery and transport equipment group (SITC 7) shows the most significant changes in IIT with increases in 10 out of 18 industries. The IIT levels in this group are also quite high, for instance, the IIT for TV receiver (761) is 100 such that all trade is intra-industry[51]. Cross-trading in miscellaneous manufactured articles (SITC 8) has remained in the same industries between pre and *post*-EAC periods. As observed for Kenya and Uganda, Tanzania and Kenya have overall had an increase in the *post*-EAC period, rising from 8 industries to 28 industries.

Analysis for the trade relation between Uganda and Tanzania is hampered by the lack of data for the *pre*-EAC period such that a comparison cannot be carried out. That said, cross-trading occurs in SITC's 2, 5, 6, 7 and 8. The highest level of IIT is observed in TV receivers (761) industry with a value of 33.33. Interestingly this is the same sector with 100 per cent intra-industry trade between Kenya and Tanzania. The type of IIT (horizontal or vertical) may be determined by looking at the revealed comparative advantage indices discussed in the next section of this research.

Overall for the EAC, intra-industry trade has been observed mostly within machinery and transport equipment (SITC 7). This observation is consistent with the IIT literature whereby intra-industry trade is most likely to take place among sophisticated manufactured products such as machinery, transport equipment; electrical equipment and chemical because these products can benefit from scale economies in production and are easier to differentiate to the consumer (OECD Economic Outlook, 2002). The level of

[51] Due to lack of data for the *pre*-EAC period, I cannot conclude if the IIT =100 for TV receiver (761) has increased/decreased with the formation of the EAC.

intra-industry trade has also been found to increase dramatically in the *post*-EAC years. This means that, as economic integration in the EAC becomes deeper, re-distribution/re-location of industries will occur within the region as sectors with intra-industry trade will benefit from splitting up production across the region.

3.3.6 Revealed Comparative Advantage (RCA)

According to Classical Trade Theory, countries engage in international trade because they are different from each other. Differences between the countries give rise to trade and make trade mutually beneficial. Nations can benefit from their differences by reaching an agreement where each country produces goods that it does relatively well. This is essentially the concept of comparative advantage. Differences in the productivity of factors, factor endowments and technologies all affect the ability of a country to specialize in the production of goods. A country that has a comparative advantage in the production of a good should be found to produce and export a higher proportion of that good relative to other countries. In general, the greater the difference in the comparative advantages of member countries of a RTA, the greater the economic benefits of the agreement.

It is possible to "reveal" a country's comparative advantage using a variety of techniques as proposed by Balassa (1965) and Vollrath (1991) which will be discussed in the next section. The revealed comparative advantage (RCA) approach is used as a measure of international trade specialization and works on the basis of the assumption that the commodity pattern of trade reflects relative costs as well as differences in non-price factors. Comparative advantage is a dynamic concept and changes in the structure of the RCA become important in predicting the future industrial and trade relations

between trading partners. Changes in production processes, inputs required and products produced and in the location of production facilities all demonstrate the impact of trade on industrial restructuring.

Economic integration in general has substantial effects on the location of economic activities. In the absence of factor mobility across nations, specialization patterns are determined by differences in comparative advantage. However, the interpretation of comparative advantage and the forces that determine it change considerably when factors of production become mobile. A country is no longer restricted to its traditional comparative advantage and the forces of new economic geography emerge. The combination of trade costs and scale economies generates forces that encourage geographical clustering in production and other economic activities. The changes in comparative advantage can be either (i) inherent, whereby trade allows for more inputs to be directed to a sector in which a country traditionally has a RCA, or (ii) emergent, whereby trade causes redirection of resources into new industries.

Changes in comparative advantage are closely linked to restructuring. These changes have an uneven effect on industries in that a country may become more or less efficient in producing certain goods. As economic inputs and resources are redirected to new activities, some industries are destined to expand in terms of production shares, investment or exports, while others will contract. In South East Asia[52] for example, a contraction in the textile industry was accompanied by an expansion in electronics.

[52] These economies, as is the case with most developing nations, have dabbled in protectionist policies in their history (Lim 1995). In the 1960's and 70's, these economies concentrated on primary production and import substitution.By the 1980's, these economies had shifted to export oriented manufacturing. Multi-national corporate strategies led to the formation a booming electronics industry.

With the establishment of the EAC customs union in 2003, it is timely to examine and forecast the extent to which industries in East Africa will expand, contract or even remain unchanged. Using a measure of RCA, I do the following; (i) for a particular country and a specific industry, observe the change in the export performance in *pre*-EAC and *post*-EAC years; (ii) provide a summary of the overall changes in revealed comparative advantages across the three countries and predict the re-distribution of production in the region with further integration.

The measure of revealed comparative advantage is calculated as the ratio of the share of a given product in a country's exports to another country or region to the share of the same product in that country or region's total exports. The original RCA index, known as the Balassa index (1965) is calculated as the share of a given product in a country's exports to another country or region to the share of the same product in that country or region's total exports. It can be expressed as:

$$RCA_c^i = \frac{[x_{i,c} / X_c]}{[x_{i,n} / X_n]} \tag{3.6}$$

where $x_{i,c}$ represents exports of commodity *i* from country *c*, X is total exports, and *n* is a set of countries or the whole world.

The basic logic behind the RCA is to evaluate comparative advantage on the basis of a country's specialization in exports relative to some reference group. If the RCA is greater than 1, then comparative advantage is revealed as its export share of product *i* is larger than the export share in the group of reference countries. If the RCA is less than 1, then comparative disadvantage is revealed. This index assumes openness and no distortions.

The RCA in this study will be calculated for each EAC country relative to the other two countries. For example, the RCA for Kenya's exports in an industry *i* to the world will be found relative to the share of combined exports of Uganda and Tanzania in industry *i*. As an example, Kenya's RCA is presented in equation (3.7) below:

$$RCA^{i}_{KEN} = \frac{[x_{i,KEN} / X_{KEN}]}{[x_{i,UG+TZ} / X_{UG+TZ}]} \quad (3.7)$$

[53]

I use a detailed breakdown of exports from Kenya, Uganda and Tanzania specified according to commodity type from the World Trade Analyzer Tables similar to that used to calculate the intra-industry trade (IIT) index. Aggregate export data is obtained from the UN COMTRADE database with augmentations for missing years[54] obtained from Direction of Trade Statistics Yearbooks.

Empirical results for RCA

The data were analyzed by SITC for Kenya; Uganda and Tanzania for each year from 1990 to 2001. RCA was tested for the headline SITC categories as well as their respective sub-components. The EAC countries were identified to have exports in 51 SITC categories shown in Appendix A: Table 2. The respective RCA's are computed for each sector where exports are recorded at both the one and three digit SITC levels for each of the EAC countries. The focus of this analysis is to review if there have been any changes in the RCA values for the EAC members following the formation of the EAC. Therefore, the data is averaged for the first period, that is *pre*-EAC (1990-1995), and the second period, that is *post*-EAC (1996-2001). The layout of results is presented as follows:

[53] Note: All the export data used excludes intra-EAC trade.

[54] Aggregate export data was missing from the UN COMTRADE database for Uganda (1990 to 1994) and Tanzania (1990 to 1997). Data for Kenya for all years was obtained from UN COMTRADE.

i. Revealed comparative advantage by country (1 digit SITC level)

ii. Revealed comparative advantage by country (3 digit SITC level)

iii. Overall industry comparisons among the EAC countries

i. RCA's by Country (1 digit SITC level):

Kenya

Table 3.11 below shows the average RCA values for Kenya and the change in the RCA values. In the first period, four out of the eight sectors reported have an RCA>1 and in the second period, there are five sectors with RCA>1. Relative to Uganda and Tanzania, Kenya has a RCA>1 in minerals fuels (SITC 3), chemicals (SITC 5), manufactured goods (SITC 6) and miscellaneous manufactured articles (SITC 8). A significant increase in Kenya's revealed comparative advantage is observed within mineral fuels, lubricants and related materials where the RCA value increased by 1800 per cent over the two averaged periods.

Table 3.11: Average RCA values for Kenya (1990-2001)

Kenya RCA - 1 digit SITC	1990-1995	1996-2001	% Change
0 - Food and live animals	0.04	0.47	1159.67
1 - Beverages and tobacco	-	-	-
2 - Crude materials, inedible, except fuels	0.13	0.15	15.30
3 - Mineral fuels, lubricants and related materials	1.59	30.96	1848.22
5 - Chemicals and related products	11.18	21.93	96.21
6 - Manufactured goods classified chiefly by material	4.60	5.14	11.65
7 - Machinery and transport equipment	0.70	1.45	106.92
8 - Miscellaneous manufactured articles	279.61	12.54	-95.51

Source: Authors Calculation

The major rise in this group occurred in 1999[55] where the RCA value rose from 2.16 in 1998 to 120.17; by far the highest in the twelve year period examined. Food and live animals also registered an increase of 1159.6 although with a RCA<1. Small

[55] Full table of EAC RCA (1-digit SITC level) can be found in Appendix A: Table 3.

increases are also noted in chemicals and related products as well as in the manufactured goods groups. The chemicals sector has consistently displayed high RCA values in the period examined suggesting that this is a sector in which Kenya will continue to have a comparative advantage over Uganda and Tanzania. The machinery and transport equipment group has an increasing RCA value that moves from being less than one to greater than one. This implies that over the period 1996 to 2001, this group changed from having a revealed comparative disadvantage (RCD) to having a revealed comparative advantage. No RCA values are found for Kenya within the beverage and tobacco sector (SITC 1). The miscellaneous manufactured articles category is quite interesting. Over the 1990 to 1995 periods, Kenya had a significant revealed comparative advantage in this group with an average of 279.61. The RCA increased in the early nineties, peaking at 983.93 in 1992 and then declining sharply in the following years with a decline of 0.96 per cent. The RCA value was greater than one throughout the late nineties and there was a slight increase in 2000 to 30.65 followed by a fall in 2001.

Uganda

At the 1-digit SITC level, relative to Kenya and Tanzania, Uganda has a revealed comparative advantage in only one sector – machinery and transport equipment (SITC 7) in 1996-2001. This sector has changed from having a revealed comparative disadvantage (RCD) to having a RCA>1 which signifies an increase in the export performance of this sector.

Table 3.12: Average RCA values for Uganda (1990-2001)

Uganda RCA - 1 digit SITC	1990-1995	1996-2001	% Change
0 - Food and live animals	0.33	0.87	158.72
1 - Beverages and tobacco	-	-	-
2 - Crude materials, inedible, except fuels	0.82	0.50	-38.63
3 - Mineral fuels, lubricants and related materials	0.14	0.84	490.75
5 - Chemicals and related products	0.06	0.21	276.29
6 - Manufactured goods classified chiefly by material	0.08	0.25	208.66
7 - Machinery and transport equipment	0.60	1.19	98.88
8 - Miscellaneous manufactured articles	0.02	0.09	474.73

Source: Authors Calculation

Small increases in RCA values (not >1) are noted in miscellaneous manufactured articles (SITC 8), mineral fuels (SITC 3), chemicals (SITC 5), manufactured goods (SITC 6) and food and live animals (SITC 0). Mineral fuels increases by 490 per cent and the 1996-2001 RCA value is approaching a value of one. This would suggest that this is a growing sector that is gaining a comparative advantage in the region. However, this same sector was observed to be increasing in its RCA value in Kenya (increase of 1800 per cent). A plausible explanation could be the availability of investment in this sector allowing for the extraction of mineral fuels in both these countries. An alternative explanation could be that this sector includes different sub sectors. The countries may be linked by an upstream-downstream relationship that is fueled by investment in both countries.

Tanzania

From Table 3.13 below, Tanzania's revealed comparative advantage has remained in the same sectors over 1990 to 2001 with a RCA>1 in food and live animals (SITC 0), crude materials (SITC 2), mineral fuels (SITC 3) and machinery and transport equipment (SITC 7). Out of the three EAC countries, Tanzania is the only one with a RCA>1 in

food and live animals and crude materials. Despite having four sectors with RCA>1, all these sectors declined in the late 1990's as can be observed by the changes in Table 3.13 below. This shows that Tanzania has had a reduced degree of RCA in each of these broad categories with the exception of manufactured goods (SITC 6) where there has been an improvement of 32 per cent (from 0.40 to 0.53).

Table 3.13: Average RCA values for Tanzania (1990-2001)

Tanzania RCA - 1 digit SITC	1990-1995	1996-2001	% Change
0 - Food and live animals	41.15	3.57	-91.32
1 - Beverages and tobacco			
2 - Crude materials, inedible, except fuels	8.80	8.74	-0.65
3 - Mineral fuels, lubricants and related materials	11.67	2.16	-81.53
5 - Chemicals and related products	0.42	0.16	-62.13
6 - Manufactured goods classified chiefly by material	0.40	0.53	31.92
7 - Machinery and transport equipment	4.01	3.27	-18.44
8 - Miscellaneous manufactured articles	0.66	0.56	-14.17

Source: Authors Calculation

Although Tanzania has maintained a RCA>1 in the production of food and live animals (SITC 0), the index has fallen sharply from 41.15 to 3.57 (a decline of approximately 90 per cent). This movement away from the agricultural sector towards a more diversified economy was observed in the export diversification index in the previous chapter. Food and live animals (SITC 0) has declined since 1990 where it had an RCA value of 129.88 to which dropped to a meager value of 3.56 in 2001. While certain years have been observed to have increased in RCA value (1994, 1997 and 2000); these values are no where close to the 1990 level. Overall, the decrease in the spread of the RCA shows that Tanzania has become more diverse in its export mix. This is opposite that the forces of comparative advantage would predict. However, this change is consistent with increases in human and physical capital that predicts movement into

different sectors, in this case, into manufactures. Tanzania's change in RCA's is also consistent with a decrease in relative prices of food and live animals relative to other sectors.

ii. RCA's by country (3 digit SITC level)

The results showed above are useful in providing the overall picture of changes in each country's RCA. However, they mask developments at the industry level therefore, using a further decomposition of the SITC, it is possible to observe the extent each country's RCA within each broad sector. The full list of the industries in each sector as well as the respective RCA values for each country is provided in Appendix A: Tables 4, 5 and 6. The average RCA values for each country for *pre*-EAC (1990-1995) and *post*-EAC (1996 -2001) are presented in Appendix A: Table 7. The following country observations are made;

Kenya

Kenya has the highest number of sectors with comparative advantage (i.e. RCA > 1) with a total of 31 industries in 1990-1995 and 29 industries in 1996-2001. Therefore Kenya experienced a decline in its competitiveness in some sectors but also has gained it in others, relative to the other two countries. On average, Kenya is highly competitive in a smaller number of sectors between the first and second period.

Sectors with that had an RCA>1 over 1990-1995 and were observed to have an increase in the RCA value over 1996-2001 are shown in Table 3.14. Three sectors stand out as consistently having RCA values >1 (and improving) for Kenya namely; chemicals and related products (SITC 5), manufactured goods (SITC 6) and machinery and transport equipment (SITC7).

Table 3.14: Improved sectors for Kenya with RCA>1

SITC	Improved with RCA>1
582	Plates, sheets, film, foil and strip of plastics
583	Monofilament
611	Leather
612	Manufactures of leather
665	Glassware
674	Iron and non-alloy steel flat-rolled products
692	Metal containers for storage or transport
711	Steam or other vapor generating boilers
716	Rotating electric plant
726	Printing and bookbinding machinery
727	Food-processing machines
752	Automatic data processing machines
762	Radio-broadcast receivers
776	Thermionic, cold cathode
786	Trailers and semi-trailers
821	Furniture and parts thereof
895	Office and stationery supplies

The Kenyan manufactured goods sector (SITC 6) has traditionally had a revealed comparative advantage over Uganda and Tanzania[56] as shown by the consistent RCA>1 for the period of 1990-2001. Improvements in this sector have been noted within leather, glassware and iron and non-alloy steel products. Iron and alloy steel products have the strongest RCA in this sector with an average RCA value of 123.56 for 1990-1995 which increases to 170.41 in the second period. This would suggest that during the period when the EAC began to be formalized, this sector experienced a growth in export performance, relative to the other EAC countries and this growth would be expected to continue. The rubber tires sector experienced a decline[57] in RCA from 37.23 to 12.46 between the two periods averaged. Despite this decline, this industry still maintained an RCA>1 relative to

[56] Kenyan exports in manufacturing to Uganda and Tanzania accounted for 53 and 59 per cent respectively of their total imports in 2001 (UN COMTRADE). For a breakdown of intra-EAC exports by commodity, see Table 3.4.

[57] Note that the RCA measure is relative to other industries within the country as well. This decline in RCA might be because the other EAC countries are becoming more competitive within this sector or it could be that other sectors in Kenya have become more competitive.

Uganda and Tanzania. The manufactures of leather remained at the same level over the two periods suggesting that this sector was at the time, unchanged by developments in regional integration

Sectors that deteriorated from having an RCA >1 to having a revealed comparative disadvantage (RCA<1) are mainly chemicals and related products (SITC 5) and the machinery and transport equipment (SITC 7). Within SITC 5, carboxylic acids (513), nitrogen compounds (514) and organo-inorganic compounds (515) have all experienced a declining RCA to the point of no longer having a comparative advantage in these industries, relative to Uganda and Tanzania. Organo-inorganic compounds (515) have especially deteriorated from an RCA value of 70.91 to 0.00. The telecommunications industry which gained an RCA value of 6.74 in 1995 (see Appendix A: Table 7) has not been able to sustain this comparative advantage in the region falling from an average RCA of 1.20 to 0.00 between the first and second periods.

Certain sectors are observed to have changed from RCA<1 in the first period to RCA>1 in the second period, reflecting a movement from a comparative disadvantage to a comparative advantage. These sectors are petroleum oils (334) and engines and motors (714). Petroleum oils (334) RCA has strengthened to a great degree (from 0.46 to 30.14, an improvement of 64 per cent). Changes in RCA for engines and motors (714) have been from 0.29 to 5.81. These movements reflect the ability of the RCA to capture changes in a country's ability to produce certain goods and improve its comparative advantage position.

Sectors with an average RCA >1 in 1990-1995 but no value recorded for 1996-2001 are crude animal materials (291), gas, natural or manufactured (341) and steam

turbines (712).Sectors with an average RCA > 1 in 1996-2001 but no value recorded for 1990-1995 are margarine and shortening (091), pearls and precious stones (667), metal structures and parts (691) and ships, boats (793). Cotton fibres and textiles (263) is a sector within which no change in comparative advantage was revealed over the two periods.

Uganda

Out of the EAC countries, Uganda has the lowest number of sectors with comparative advantage (i.e. RCA > 1) with a total of 10 industries in 1990-1995 and 17 industries in 1996-2001. However, Uganda has become competitive in a larger number of sectors in the *post*-EAC years compared to Kenya and Tanzania. Industries that demonstrate particularly high RCA's for Uganda in both periods are nitrogen-function compounds (514), civil engineering equipment (723) and telecommunications equipment (764). It can be observed (see Appendix A: Table 7) that the nitrogen-function compounds sector has had large increase in the RCA from 1.19 to 29.40 (an increase of almost 240%). This is the dominant industry in the chemicals and related products group (SITC 5) and it has grown even stronger in the latter period. For the machinery and transport equipment group (SITC 7), Uganda has experienced the largest increase within telecommunications equipment (764) from 3.85 to 10.82 (an increase of 18%).

As mentioned above, Uganda has increased the number of sectors in which it has a comparative advantage relative to Kenya and Tanzania. The following sectors are those in which Uganda has moved from having a comparative disadvantage (RCA<1) to an advantage (RCA>1) are shown in Table 3.15 below. Sectors within the machinery and transport equipment group (SITC 7) appear to be gaining comparative advantage for

Uganda especially within the aircraft and associated equipment (792) industry. This industry moved from an RCA of 0.00 to 28.06 over the post-EAC period.

Table 3.15: Sectors for Uganda with changes from RCA<1 to RCA>1

SITC	Improved with RCA>1 between 1990-1995 and 1996-2001
075	Spices
091	Margarine and Shortening
266	Synthetic fibres suitable for spinning
271	Fertilizers, crude
334	Petroleum oils and oils from bituminous minerals
582	Plates, sheets, film, foil and strip plastics
691	Metal structures and parts
711	Steam and other vapor generating boilers
722	Tractors
726	Printing and bookbinding machinery
727	Food-processing machines
752	Automatic data processing machines
762	Radio-broadcast receivers
792	Aircraft and associated equipment

Unlike Kenya which has a high comparative advantage within the manufacturing group (SITC 6), data for Uganda shows that this is a group in which is has a comparative disadvantage relative to its EAC partners. An improvement in this group is only observed for the metal structures and parts (691) where the RCA value is 6.06 in the post-EAC period. Likewise the miscellaneous manufactured group (SITC 8) does not reveal any comparative advantage for Uganda in both periods.

Sectors that are missing data for 1996-2001 are tobacco (121), oil seeds and oleaginous fruits (223) and crude animal materials (291). These sectors all display an RCA>1 the *pre*-EAC periods and are therefore areas that Uganda has traditionally had a comparative advantage relative to Kenya and Tanzania. Due to the lack of data, further prediction of the movements in these sectors is not possible.

Tanzania

Tanzania has shown the least amount of movement in RCA's between the pre and post EAC periods from the EAC countries with 22 and 23 industries having an RCA>1 in 1990-1995 and 1996-2001 respectively. From the movements in RCA observed (see Appendix A: Table 7), Tanzania appears to be undergoing a transformation from sectors that it has traditionally held comparative advantage to new sectors (this was mentioned at the 1-digit SITC level). Out of 12 sectors with RCA>1 in both periods, more than half have experienced a decline in the RCA in the post EAC period. For instance the RCA for spices (075) has fallen from 71.99 to 9.86 (a decline by 86%). Other sectors that experience a declining in their comparative advantage are hydrocarbons (511), miscellaneous non-ferrous metals (689), engines and motors (714), tractors (722) and TV receivers (761).

Despite the decreases in RCA mentioned above, there are some sectors that have maintained an increasing RCA values over both periods. These sectors are; civil engineering equipment (723) with an increase from 2.48 to 5.10; pumps (743) from 4.24 to 8.31; electric power machinery (771) from 5.44 to 214.05, an increase of 99 %; and lastly jewelry (897). Quite a number of sectors are observed to have gained a comparative advantage in the *post*-EAC period reflecting a movement from a comparative disadvantage to a comparative advantage. The sectors are shown in Table 3.16 below with the most improvement noted within the machinery and transport equipment group (SITC 7).

Table 3.16: Sectors for Tanzania with RCA<1 (1990-1995) and RCA>1 (1996-2001)

SITC	Sectors RCA<1 (1990-1995) and RCA>1 (1996-2001)
265	Vegetable textile fibres
514	Nitrogen-function compounds
625	Rubber tires
665	Glassware
716	Rotating electric plant
726	Printing and bookbinding machinery
727	Food-processing machines
762	Radio-broadcast receivers
772	Electrical apparatus
793	Ships, boats and floating structures

Sectors with no change in RCA (but with RCA>1) are found in vegetable textile fibres (265) and railway vehicles (791). Sectors that are missing data for 1996-2001 (with RCA>1 in the first period) are tobacco (121) and crude animals materials (291).

iii. Overall EAC RCA industry comparisons

So far, the changes in the RCA values for each country have been examined separately. The focus on changes in RCA values allows for the discussion in the changes in the pattern of exports that reflect the ability of each country to expand exports at rates faster than the other countries. A comparison of the changes for each industry at the SITC 3-digit level between the countries is shown in Table 3.17 below. The idea here is to observe the compare the overall pattern of changes in the RCA's between the members of the EAC. For instance, I would like to observe if Uganda, following the formation of the EAC, has become more dominant in a particular sector while its partners are declining in this same sector.

From Table 3.17, the most significant observations are made in chemicals (SITC 5), manufacturing (SITC 6) and machinery and transport equipment (SITC 7)[58]. Uganda dominates the chemicals and related products group (SITC 5) with an increase observed in 5 out of 7 sectors. Uganda's RCA has increased in plates (582) and insecticides (591) while both Kenya and Tanzania have experienced deterioration.

The manufactured goods group (SITC 6) is dominated by Kenya, even following the lowering of barriers with the EAC customs union. Kenya increases its RCA in this group in 5 out of 9 sectors. That said, it is interesting to observe that all three countries are improving in iron and non-alloy steel production (674) and metal containers (692).

Table 3.17: Overall changes in EAC RCA (average period's 1990-95 and 1996-01).

SITC		Kenya	Uganda	Tanzania
0	**Food and live animals**	↑	↑	↓
075	Spices	↑	↑	↓
091	Margarine and shortening	…	↑	↔
1	**Beverages and tobacco**	…	…	…
121	Tobacco, Un-Manufactured	na	…	…
2	**Crude materials, inedible, except fuels**	↑	↓	↓
223	Oil seeds and oleaginous fruits	na	…	…
263	Cotton textile fibers	↔	↓	↑
265	Vegetable textile fibers	↓	na	↑
266	Synthetic fibers suitable for spinning	↑	↑	↓
271	Fertilizers, crude	↑	↑	…
291	Crude Animals materials	…	…	…
3	**Mineral fuels, lubricants and related materials**	↑	↑	↓
334	Petroleum oils and oils from bituminous minerals	↑	↑	↓
341	Gas, natural and manufactured	…	↔	↓
5	**Chemicals and related products**	↑	↑	↓
511	Hydrocarbons	↑	↓	↓
513	Carboxylic acids and anhydrides	↑	↓	↑
514	Nitrogen-function compounds	↓	↑	↑
515	Organo-inorganic compounds	↓	↑	↔
582	Plates, sheets, film, foil and strip of plastics	↓	↑	↓

[58] In order to provide a clear synopsis of the observations made, groups where the overall change in RCA is indeterminate will not be discussed in depth. These include beverage and tobacco (SITC 1), crude materials (SITC 2) and mineral fuels and lubricants (SITC 3).

583	Monofilament	↑	↑	↓
591	Insecticides, fungicides, herbicides	↓	↑	↓
6	**Manufactured goods classified chiefly by material**	↑	↑	↑
611	Leather	↑	↑	↓
612	Manufactures of leather	↑	↔	↓
625	Rubber tires	↓	↑	↑
665	Glassware	↑	↓	↑
667	Pearls, precious and semiprecious stones	…	na	…
674	Iron and non-alloy steel flat-rolled products	↑	↑	↑
689	Miscellaneous nonferrous base metals	…	↓	↓
691	Metal structures and parts	…	↑	↑
692	Metal containers for storage or transport	↑	↑	↑
7	**Machinery and transport equipment**	↑	↑	↓
711	Steam or other vapor generating boilers	↑	↑	↑
712	Steam turbines and other vapor turbines	…	na	na
714	Engines and motors, non-electric	↑	↓	↓
716	Rotating electric plant	↑	↓	↑
722	Tractors	↓	↑	↓
723	Civil engineering equipment	↓	↑	↑
726	Printing and bookbinding machinery	↑	↑	↑
727	Food-processing machines	↑	↑	↑
742	Pumps for liquids	↓	↑	↑
743	Pumps (not for liquids), air or gas compressors and fans	↓	↓	↑
752	Automatic data processing machines	↑	↑	↓
761	TV receivers (including video monitors & projectors)	↓	↑	↓
762	Radio-broadcast receivers	↑	↑	↑
764	Telecommunications equipment	↓	↑	↓
771	Electric power machinery	↓	↓	↑
772	Electrical apparatus for switching/protecting electrical circuits	↓	↓	↑
776	Thermionic, cold cathode	↑	↔	↑
786	Trailers and semi-trailers	↑	↑	↓
791	Railway vehicles	↓	↔	…
792	Aircraft and associated equipment	↓	↑	↑
793	Ships, boats and floating structures	…	↑	↑
8	**Miscellaneous manufactured articles**	↓	↑	↓
821	Furniture and parts thereof	↑	↑	↑
895	Office and stationery supplies	↑	↓	↓
897	Jewelry, goldsmiths' and silversmiths' ware	↓	↔	↑

Source: Appendix A: Table 7. Change calculated as ((period2-period1)/period1)*100
Note: "↑" signifies an increase in the RCA recorded in 1990-1995 and 1996-2001. "↓" signifies a decrease in the RCA recorded in 1990-1995 and 1996-2001. "↔" represents no change in the RCA values. If no RCA value is computed in one period but not in the other, this is represented by "…". "na" represents fields with no data or RCA values missing.

The most interesting sector in terms of EAC comparisons is the machinery and transport equipment group (SITC 7). Tanzania dominates this sector with increases in 13 out of 21 sectors followed by Uganda with increases in 12 sectors. Meanwhile, Kenya is observed to be losing its comparative advantage in this group, registering deterioration in 10 out of 21 sectors. Tanzania's shift in comparative advantage in the *post*-EAC period is towards electrical apparatus and machinery. For Uganda, the telecommunication industry emerges as the dominant industry. Kenya has improvements in engines and motors. All the EAC countries experience an increase in their RCA within 711, 726, 727 and 762. The miscellaneous manufactured articles group (SITC 8) is dominated by Kenya, however all three countries have had a rise in their RCA in furniture (821) over the *post*-EAC period.

The next section provides an overall synopsis of the observations made trade patterns in the EAC and speculates on the future outcomes of the EAC on trade and productive activities.

3.4 Discussion

The empirical analysis of the trade patterns and composition of the EAC members presented in this chapter has laid the foundation for the understanding of the nature of trade in the EAC. 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. Intra-regional trade has intensified in the *post*-EAC years signifying a deeper level of integration between the three countries that has been supported by the formation of the EAC RTA. The EAC countries rely on a wider range of products than Canada which suggests that development is dominating the trade process. From the indices examined

comparing the EAC members to the rest of the world (and Canada), the EAC countries are highly similar reflecting their similar level of development.

Consistent with their low level of development, the EAC countries trade appears to reflect their natural endowments and not the specialization that comes with industrialization. However, intra-regional trade does appear to be moving towards higher levels of specialization in production following integration. From the observations made from intra-industry trade and the revealed comparative advantages, it is obvious that there have been changes in the distribution of resources and production within the region following the EAC. Intra-industry trade has been found to increase between the EAC members in the *post*-EAC period, particularly within the machinery and transportation equipment group (SITC 7). This is in line with the theory of comparative advantage whereby the lowering of trade barriers allows a country to specialize in a few industries where it possesses a comparative advantage over its trading partners. The prediction would be that this group would continue to experience even higher levels of intra-industry trade as the EAC countries realize economies of scale in production and geographic re-location of industries occurs.

One of the key questions consistently analyzed in each section of this chapter is the comparison between *pre* and *post*-EAC figures. So far, the effect of the "new" EAC is not evident (except in the IIT and RCA sections). This may be due to the high volume of trade that already occurred in the region such that there is no break in the trend of data with the "new" EAC. It may also be the case that the EAC needs more time for deeper integration to occur before a clear change in the data is observed.

Chapter 4: Gravity Model

4.1 Introduction

In this chapter, I analyze the trade effects of the EAC on member countries using a gravity model. The question here is whether the volume of trade within the EAC has grown as a result of the formation of the trade bloc, and if so, what is the magnitude of this growth. Equally important is whether the growth in trade from the formation of the EAC (if any) has occurred without distorting trade with the non-members. My objective is to provide answers to these questions by exploring the effects of the new EAC on intra-bloc and extra-bloc trade and subsequently, infer the overall welfare impacts of these effects. Estimation is carried out using bilateral trade data for 14 years that cover both *before* and *after* the establishment of the EAC. This chapter begins with a theoretical review of the gravity model, followed by the empirical results, interpretation and a discussion of the trade effects.

4.2 Theoretical Context

The gravity model is a macro model by nature since it is designed to capture volume, rather than composition of bilateral trade (Appleyard & Field, 2001). The model is used to explain the driving forces of exports such as what leads one country to export to another. With increased popularity in the 1990's, the gravity model has been found to work best for similar countries that have considerable intra-industry trade with each other (Helpman, 1999). The properties of the gravity model are particularly suitable in the case

of the EAC since the model captures the effects of distance on trade volume as well as the market size and income of each country. This paper provides a quantitative study of the trade effects of the regional trade agreement for the EAC using a gravity model.

Gravity model[59] estimation provides a useful multivariate framework for assessing the impact of RTAs on the level and direction of trade. The model is based on the idea that trade between two countries, like the gravitational force between two objects, is a function of the countries' "mass" (in this case population size and GDP) as well as the distance between them[60]. The gravity model states that the volume of trade can be estimated as an increasing function of the national incomes of trading partners, and a decreasing function of the distance between them. Gravity models assume that, in the absence of a regional trade agreement, members' trade will be proportional to the gross domestic product (GDP). Bilateral trade is also influenced by cultural similarities, historical ties and political factors that reduce the effect of distance.

Welfare effects for the EAC will be inferred from the regression estimates obtained from the gravity model. In order to analyze the aggregate effects of a RTA, one would need to sum up the effects across markets and across countries. Using the model estimates for intra EAC trade, overall bloc imports and exports, if the EAC -RTA causes more trade creation than trade diversion then the RTA is welfare improving. Conversely, if the EAC-RTA causes more trade diversion than trade creation then the RTA will be welfare reducing for a member country.

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[59] The gravity model was first applied to international trade by Tinbergen (1962) and Pöynöhen (1963), but has a long history in the social sciences. Since the latter half of the nineteenth century, it has been used to explain social flows, primarily migration, in terms of the "gravitational forces of human interaction." Its name is derived from its passing similarity to Newtonian physics in that large economic entities such as countries or cities are said to exert pulling power on people or their products.

[60] The authors associated with building the theory underlying the gravity model include Deardorf (1984), and Helpman and Krugman (1985). Frankel (1997) credits Helpman and Krugman as the source of the standard gravity model (Clarete *et al* 2002).

4.2.1 Gravity model specification

In this section, I outline the gravity model used in analyzing the effects of the EAC. 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. A country's absolute trade potential depends on its total economic size as well as other economic factors such as land area, population, geographical distance, cultural similarities, policy and political ties (Kirkpatrick & Wantabe, 2005). The size of the economy can be measured by the two variables of population and GDP. Frankel (1997) explains that countries with large populations tend to be more inwardly oriented than smaller countries because they are able to exploit scale economies in their large domestic population size. The GDP of the domestic country is believed to reflect the capacity to supply exporting goods. Likewise, the GDP of the country importing is believed to represent its demand for exports. That is an importer's demand is assumed to increase as its GDP increases (Kristjansdottir, 2005). While the GDP is a basic gravity variable, the income per capita of a country can be included in the gravity model as a proxy for the level of development and economic growth. The expectation is that as the income per capita increases, the level of trade should also rise[61]. This is possibly due to superior transportation infrastructure and other factors such as consumer preference for variety of goods. Whatever the reason, the basic idea behind this appears to be that higher income countries trade more in general.

[61] In economic literature (see for example Sachs & Warner, 1995), the reverse causation has been found whereby increased trade has led to increased (and convergence) of per-capita incomes among trade partners.

Transport costs play a central role in explaining trade patterns. Proxies for transport costs include land area and distances between economic centers. Physical land area is expected to reduce trade flows to the extent that countries with relatively small or limited natural resource endowments tend to be smaller and thus depend more on trade to compensate (Clausing *et al,* 2002). Distance directly increases exportation costs because of the transport costs of shipping goods, the time cost of shipping date sensitive products, the costs of contracting at a distance, and the costs of acquiring information about remote economies. Distance may also be correlated with the costs of searching for trading opportunities and the establishment of trust between potential trading partners (Head, 2003). Empirical estimation using the gravity model often shows that distance rapidly reduces the volume of trade (Overman *et al,* 2001). The "cultural distance" refers to the lack of familiarity by the citizens of a country about their trading partners (Drysdale & Garnaut, 1982). Proxies for cultural distance include the presence of shared borders, cultures and language. Countries sharing these proxies are more likely engage in trade relations.

Formal barriers to trade are also captured in the gravity model. If trading partners belong to the same RTA, formal trade barriers are reduced due to a harmonization/reduction of tariffs and other non-tariff barriers. The traditional variables (GDP, population, distance and culture) control the factors that are assumed to explain normal trade flows for RTA members. In the absence of a trading agreement, member countries trade would have the same relationship to the gravity variables as other countries that will be included in the sample.

Total exports are defined for the augmented gravity model as follows (Kirkpatrick & Wantabe, 2005):

$$trade_j^i = \beta_0 + \beta_1(Y_j) + \beta_2(Y_i) + \beta_3(D_j^i) + \beta_4(percap_j) + \beta_5(percap_i) + \beta_6(A_j) + \beta_7(A_i) + \beta_8(B_j^i) + \beta_9(L_{Tj}^i) + \beta_{10}(R_{kij}) + \varepsilon_j^i \quad (4.1)$$

Y_i, Y_j Represents the gross domestic product of country *i* and *j* respectively;

D_j^i Represents the distance between economic centers of *i* and *j* as the proxy for transportation costs;

$Percap_i$, Represents the GDP per capita of *i*

$Percap_j$ Represents the GDP per capita of *j*

A_i, A_j Represent the land areas of *i* and *j* respectively

B_j^i Represents a dummy which takes the value unity if *i* and *j* share a land border and zero otherwise

L_{Tj}^i Represents a dummy which takes the value unity if countries *i* and *j* use the same T^{th} language as the proxy for cultural affinities, one dummy for each one of the languages of English, French, Swahili and Arabic

R_{kij} Represents a dummy variable which represents the k^{th} preference relationship (i.e. RTA) between *i* and *j*—this variable takes the value unity if both *i* and *j* belong to a same RTA *k* and reflects the additional effect of an RTA on trade between member countries.

ε_j^i Represents the residual term

The estimated coefficient of R_{kij} is interpreted to be the sum of the trade-diversion and trade-creation effects of the RTA. Recent studies (Bayoumi & Eichengreen, 1997; Frankel, 1997) have added another set of dummies to separate trade diverting and trade creating effects in the estimates. The dummies take on the value of one if the importing country is a member of the RTA and the exporting country is a non-member; zero if otherwise. Following the gravity model from Kirkpatrick and Wantabe (2005), a set of RTA dummy variables will be introduced to equation (4.1) to capture;

- Overall imports by RTA members represented by R_{ki-j}
- Overall exports by RTA members represented by R_{k-ij}

These variables reflect the overall openness of an RTA to imports and exports from and to the rest of the world, providing information on trade creation and diversion effects of the RTA. The sum of the intra trade coefficient (R_{kij}) and overall imports coefficient (R_{ki-j}) shows how total intra RTA imports are different from the counterfactual levels predicted by the traditional gravity model variables. Thus with these two variables the gravity model is estimated using natural logs[62] as;

$$\ln(trade_j^i) = \beta_0 + \beta_1 \ln(Y_j) + \beta_2 \ln(Y_i) + \beta_3 \ln(D_j^i) + \beta_4 \ln(percap_j) + \beta_5 \ln(percap_i) + \beta_6 \ln(A_j) + \beta_7 \ln(A_i) + \beta_8 (B_j^i) + \beta_9 (L_{Tj}^i) + \beta_{10} (R_{kij}) + \beta_{11} (R_{ki-j}) + \beta_{12} (R_{k-ij}) + \varepsilon_j^i$$

(4.2)

Changes in the coefficients of intra-trade (R_{kij}) and overall bloc imports (R_{ki-j}) will determine whether trade diversion/creation has occurred following formation of the RTA. These effects are summarized in Table 4.1. Trade creation will be found when the change

[62] The multiplicative nature of the gravity equation means that we can use natural logs to obtain the relationship between log trade flows and the logs of economy size, per capita income, distance and area (Head K, 2003).

in both the intra-bloc coefficient (R_{kij}) and overall bloc imports (R_{ki-j}) is positive. Trade diversion will be identified when an increase in intra bloc trade coincides with a decrease in overall bloc imports from non-members. The third dummy variable R_{k-ij} will indicate the welfare effects of non-members in terms of imports (i.e. members' exports). A fall in the coefficient will indicate that the RTA has fewer exports than we would otherwise expect. This implies a negative impact on non-members welfare relative to the norm. That is, trade with non-members falls following the RTA.

Table 4.1: Summary of gravity model welfare effects

Variable	**Trade Creation**	**Trade Diversion**
Intra-EAC trade (R_{kij})	If d(R_{kij}) > 0	If d(R_{kij}) < 0
Overall bloc imports (R_{ki-j})	If d(R_{kij}); d(R_{ki-j})>0	If d(R_{kij}) > 0 but d(R_{ki-j}) < 0
Overall bloc exports (R_{k-ij})	If d(R_{kij}); d(R_{k-ij}) > 0	If d(R_{k-ij}) < 0

Note: Changes in the coefficients will be examined for post-EAC changes in order to see if the formation of the RTA has had any effects on trade.

4.2.2 Data and estimation issues

This study employs Ordinary Least Squares (OLS)[63] when estimating the gravity model following work by Clarete *et. al* (2002). The model is estimated in natural logarithms to make it less sensitive to extreme observations when applying OLS estimation. I measure the effects of the new EAC, not by the values of the dummy

[63] It has been suggested that the OLS method of estimation may result in biased output due to the truncation of trade data that is equal to zero. To counter this, Soloaga & Winters (2000) suggest using the Tobit maximum likelihood method whereby the dependent variable is censored at zero. They find that using the Tobit does not add much more to the more normal OLS estimation because with log transformation, truncation occurs at the minimum trade=0.0001. From the dataset used in this research, on average, only 6.63% of observations are recorded at this minimum value. In order to compare the two models, I estimate the gravity model with a Tobit method as well. Results (not shown here) did not change when the model was estimated by Tobit estimation and all coefficient signs were consistent with the OLS estimation. Thus, I will retain the OLS estimation results in this study.

coefficients per se, but by their movements through time. This recognizes that pairs of countries may have 'abnormal' trade relationships for a variety of reasons. Provided that these do not change significantly through time, these will not affect the evolution of the coefficients through time (Soloaga & Winters, 2000). Based on Equation (2), I estimate the results from a set of 14 separate regressions–one for each year–for the annual data 1990-2004. From these I seek to identify not only the 'level' effect on trade of RTAs, but also the variation of this effect through time.

Table 4.2 provides an overview of the sample used in this research with the statistics for the variables both before and after they have been treated with the logarithm functions.

Table 4.2: Summary statistics for basic sample (data for 2000)
Countries=35

Variable	Units	Obs	Mean	Std. Dev
Trade volume from (j) to (i)	Billions (USD)	1153	3.468	12.190
GDP exporter (j)	Trillions (USD)	1225	0.797	1.788
GDP importer (i)	Trillions (USD)	1190	0.797	1.788
Distance btwn ij	Kilometers	1190	7,051	4,094
Area exporter (j)	Sq. kilometers	1225	1,609,900	2,905,400
Area importer (i)	Sq. kilometers	1190	1,622,200	2,880,700
Population exporter(j)	Individuals	1225	112,790,000	-
Population importer (i)	Individuals	1190	110,460,000	-
Log trade from (j) to (i)	natural log	1153	19.638	2.6409
Log GDP exporter (j)	natural log	1225	26.120	1.6507
Log GDP importer (i)	natural log	1190	26.123	1.644
Log distance btwn (i)(j)	natural log	1190	8.5929	0.88127
Log Percapita (j)	natural log	1225	8.9379	1.6084
Log Percapita (i)	natural log	1190	8.9387	1.599
Log Area exporter (j)	natural log	1225	12.508	2.4324
Log Area importer (i)	natural log	1190	12.562	2.4106

Sources: World Bank database, UN COMTRADE database, Haveman

The export data used in estimating the gravity model comes from the UN Commodity Trade Statistics (UN COMTRADE) database. Thirty-five countries (the EAC countries included) are included in the regression analysis and bilateral exports for every

pair are extracted from the COMTRADE database for the years 1990 to 2004. The selection of the countries is based on the quantity of trade recorded (both imports and exports) between Kenya, Uganda, Tanzania and the rest of the world. Table 8 in Appendix B shows the full list of countries used and the regional groupings that are considered in the gravity model. The number of observations varies per year, and because the model is estimated in logarithms, instances of zero trade between two countries were dropped from the dataset used in the estimations (Clarete *et.al*.2002). By dropping these cases, this implies that the results will be interpreted as capturing the effects of the RTAs on trade flows among trading countries, conditional upon the decision to trade having been made[64]. Population and GDP data are obtained from World Bank database (2004) while data on distances are collected from Haveman[65].

It should be acknowledged that there are several reasons why the available African trade data must be interpreted with caution. It is generally recognized that high African trade barriers and restrictive exchange controls provide incentives to falsify customs vouchers that are used for the tabulation of trade statistics (Yeats 1998). Also, it is generally acknowledged that some African trade goes through "unofficial" channels and is not recorded in the available statistics. For example, Hardy (1992) found that more than half of Uganda's exports take place outside of official channels. This implies that a high degree of caution is required when analyzing the statistics in this study.

[64] It should be noted that this study is not interested in the exact level of trade induced by the RTAs per-se. The main purpose of the study is to examine the changes in the levels of trade over time in order to identify any structural breaks in the data that may be due to RTAs.

[65] Distances from Jon Haveman's website: http://www.macalester.edu/research/economics/PAGE/HAVEMAN/Trade.Resources/Data/Gravity/dist.txt

4.3 Empirical results and interpretation

4.3.1 Testing exclusion restrictions

Before presenting the full regression results for all years, I first test the robustness of the inclusion of certain groups of variables in the model. The purpose of this testing is to determine if additional variables, beyond those assumed under the basic gravity model (GDP and distance), have a non-zero partial effect on the dependent variable (trade volume). The regressions and the variables used are shown in Table 4.3 while results from the testing are shown in Table 4.4. The tests are carried out using 2000 as the sample representative year. There are essentially four levels under review as shown in the table below.

Table 4.3: Summary of regressions equations tested

Regressio	**Equation used**
1	Basic gravity variables
	$\ln(trade_j^i) = \beta_0 + \beta_1 \ln(Y_j) + \beta_2 \ln(Y_i) + \beta_3 \ln(D_j^i) + \varepsilon_j^i$
2	Inclusion of Development variables
	$\ln(trade_j^i) = \beta_0 + \beta_1 \ln(Y_j) + \beta_2 \ln(Y_i) + \beta_3 \ln(D_j^i) + \beta_4 \ln(percap_j) + \beta_5 \ln(percap_i) + \varepsilon_j^i$
3	Inclusion of Exportation costs variables
	$\ln(trade_j^i) = \beta_0 + \beta_1 \ln(Y_j) + \beta_2 \ln(Y_i) + \beta_3 \ln(D_j^i) + \beta_4 \ln(percap_j) + \beta_5 \ln(percap_i) + \beta_6 \ln(A_j) + \beta_7 \ln(A_i) + \beta_8 (B_j^i) + \beta_9 (L_{Tj}^i) + \varepsilon_j^i$
4	Inclusion of Trade policy variables
	$\ln(trade_j^i) = \beta_0 + \beta_1 \ln(Y_j) + \beta_2 \ln(Y_i) + \beta_3 \ln(D_j^i) + \beta_4 \ln(percap_j) + \beta_5 \ln(percap_i) + \beta_6 \ln(A_j) + \beta_7 \ln(A_i) + \beta_8 (B_j^i) + \beta_9 (L_{Tj}^i) + \beta_{10} (R_{kij}) + \beta_{11} (R_{ki-j}) + \beta_{12} (R_{k-ij}) + \varepsilon_j^i$

From Table 4.4, the parameters used in 1 are statistically significant and explain 72 per cent of the variation in (logged) trade volumes. The basic gravity equation works quite

well. The results show that a 1% rise in the exporters GDP raises exports by just over 1% while a 1% rise in the importers GDP raises these exports by just under 0.82 percent. These are very close to results found in other papers (See Kirkpatrick & Wantabe, 2005; Soloaga & Winters, 2000). The effect of distance is strong with trade falling by 0.88 percent for every 1% increase in distance. This is also close to other estimated models.

When I add development characteristics represented by the per capita income (regression 2), the effect of GDP and distance becomes smaller. The higher the per capita income of the exporter, holding their GDP constant, raises exports. Similarly, the higher the per capita income of the importer, the greater the trade observed.

Recall that one explanation for the trade impeding effects of distance was additional costs caused by the inability to communicate and cultural distances. If so, it is expected that countries that share a language would trade more. Examining the dummy variables for area and language confirm this proposition. In regression (3), the effect of GDP is now higher than the previous regression 2 while distance becomes even smaller. The coefficients for the dummies for area and common border are statistically significant and display the expected signs. Languages English and Swahili are significant and positive as would be expected.

The last regression (4) includes the policy variables represented by the presence of a trade agreement. This model works quite well and explains 83 per cent of the variation in trade flows. The results show that GDP, distance, per capita income, area and English coefficients are still statistically significant and display expected signs. Some RTAs have intra-bloc coefficients that have an impact on the trade flows such as the EAC, ASEAN. These trade policy variables will be examined in more detail in the next

section. The point of this step-wise regression was to test for stability of coefficients and to see which theoretical variables are statistically important. Ultimately, I use regression 4 since it includes the policy variables I am interested in reviewing.

Table 4.4: Exclusion restriction models results

Gravity variables	**1**	**2**	**3**	**4**
Intercept	**-21.089*** **	**-20.188*** **	**-23.745*** **	**-22.118*** **
Log GDP exportar (j)	**1.029*** **	**0.937*** **	**1.139*** **	**0.948*** **
Log GDP importer (i)	**0.819*** **	**0.752*** **	**0.914*** **	**0.949*** **
Log distance btwn (i)(j)	**-0.878*** **	**-0.820*** **	**-0.682*** **	**-0.684*** **
Development Variables				
Log Percapita (j)		**0.177*** **	-0.007	**0.087** **
Log Percapita (i)		**0.130*** **	-0.012	0.012
Transaction Costs				
Log Area exporter (j)			**-0.188*** **	**-0.093*** **
Log Area importer (i)			**-0.152*** **	**-0.131*** **
Dummy Var. for Border			**0.500** **	-0.087
Lij English			**0.413*** **	**0.829*** **
Lij French			-0.206	0.233
Lij Spanish			0.710	0.782
Lij Swahili			**2.486*** **	0.803
Lij Arabic			-0.137	0.140
Policy Variables				
Rkij EAC intra bloc				**2.278*** **
Rki-j EAC overall imports				-0.193
Rk-ij EAC overall exports				**-0.642*** **
Rkij EU intra bloc				0.179
Rki-j EU overall imports				**-0.271*** **
Rk-ij EU overall exports				**-0.237** **
Rkij NAFTA intra bloc				0.263
Rki-j NAFTA overall imports				-0.124
Rk-ij NAFTA overall exports				**-0.660*** **
Rkij ASEAN intra bloc				**2.591*** **
Rki-j ASEAN overall imports				**0.804*** **
Rk-ij ASEAN overall exports				**1.226*** **
Rkij COMESA intra bloc				0.439
Rki-j COMESA overall imports				-0.120
Rk-ij COMESA overall exports				**-1.296*** **
Rkij GCC intra bloc				0.336
Rki-j GCC overall imports				**0.386*** **
Rk-ij GCC overall exports				**-0.865*** **
Adjusted R squared	**0.725**	**0.737**	**0.762**	**0.836**

N = 1153. Statistical significance: ***1%, **5%, *10%.

Trade agreements: EAC- East African Community; EU- European Union; NAFTA- North American Free Trade Agreement; ASEAN- Association of South East Asian Nations; COMESA- Common Market for Eastern and Southern Africa; GCC- Gulf Cooperation Council.

4.3.2 Results and interpretation

The empirical results are discussed next starting with Table 4.5. This summarizes the estimation coefficients for the basic gravity model variables for years 1990, 1995, 2000 and 2004. The full set of results for the 15 annual regressions is presented in Table 9; Appendix B summarizes the estimated effects of the EAC trade agreement on trade flows. Across the 15 annual model estimates, between 81 and 83 per cent of the variation of trade flows was explained by the variables included in the gravity model, including the variables that captured the effects of RTA membership.

Most of the central variables display the expected signs and are statistically significant as reported in Table 4.5 below. The coefficients for GDP of exporter (j) and importer (i) are both positive and statistically significant at the 5 per cent level. A 1 percent rise in exporter's GDP raises exports by almost 1 percent. This is consistent with the notion that an increase in GDP is associated with an increase in trade volume. Per capita income can be interpreted in a similar way. If trade is based on a desire for increased variety, then anything that will increase demand for product variety will likely increase the density of international trade (Helliwell, 1998). Thus, an increase in per capita incomes should lead to deeper trade networks and increased volume. For this sample, the coefficient on exporter's per capita income is significant and positive and thus an increase in exporter's per capita income tends to raise the volume of trade.

Table 4.5: Gravity model estimates for selected years

Basic gravity variables	**1990**	**1995**	**2000**	**2004**
Intercept	-20.711***	-18.442***	-22.118***	-25.267***
Log GDP exporter (j)	0.978***	0.890***	0.948***	1.047***
Log GDP importer (i)	0.956***	0.891***	0.949***	0.979***
Log distance btwn (ij)	-0.788***	-0.718***	-0.684***	-0.599***
Log Per-capita exporter (j)	0.170***	0.116***	0.087**	0.012
Log Per-capita importer (i)	-0.068	-0.080*	0.012	-0.033
Log Area exporter (j)	-0.127***	-0.026	-0.093***	-0.080***
Log Area importer (i)	-0.215***	-0.185***	-0.131***	-0.142***
Dummy for shared border	-0.012	-0.144	-0.087	0.200
Lij English	0.184	0.471***	0.829***	0.609***
Lij French	-0.418	-0.240	0.233	0.743
Lij Spanish	0.511	0.898	0.782	1.004
Lij Swahili	-0.114	1.265	0.803	0.622
Lij Arabic	0.000	0.000	0.140	
Rkij EAC intra bloc	3.202***	2.341***	2.278***	2.641***
Rki-j EAC overall imports	-0.017	-0.271	-0.193	0.143
Rk-ij EAC overall exports	0.596***	0.213	-0.642***	-1.059***
Rkij EU intra bloc	-0.358	-0.018	0.179	-0.229
Rki-j EU overall imports	-0.134	-0.393***	-0.271***	-0.485***
Rk-ij EU overall exports	-0.442***	-0.123	-0.237**	-0.461***
Rkij NAFTA intra bloc	0.815	0.965	0.263	-0.192
Rki-j NAFTA overall imports	0.637***	0.261	-0.124	-0.192
Rk-ij NAFTA overall exports	-0.136	-0.352*	-0.660***	-0.983***
Rkij ASEAN intra bloc	1.907***	1.692***	2.591***	2.990***
Rki-j ASEAN overall imports	0.887***	0.614***	0.804***	0.766***
Rk-ij ASEAN overall exports	0.900***	1.226***	1.226***	1.337***
Rkij COMESA intra bloc	-1.948***	-0.092	0.439	0.821
Rki-j COMESA overall imports	0.075	-0.027	-0.120	-0.279
Rk-ij COMESA overall exports	-1.395***	-1.610***	-1.296***	-0.242
Rkij GCC intra bloc			0.336	
Rki-j GCC overall imports	-	-	0.386***	-
Rk-ij GCC overall exports	-	-	-0.865***	-
	-	-		-
Adjusted R squared	**0.812**	**0.828**	**0.836**	**0.862**
N	**825**	**912**	**1153**	**921**

Ordinary least squares estimates on annual data. Each year was run separately.
Dependent variable is Log (trade).
Statistical significance: ***1%, **5%, *10%.

The distance between *i* and *j* is significant and negative supporting conventional theory that distance is an important factor in determining trade flows. A 1 per cent increase in the distance coefficient decreases the volume of trade by almost 0.8 per cent in the early nineties. In 2004, a 1 per cent rise in the distance coefficient decreases the

volume of trade by only 0.6 per cent. This could reflect improvements in transportation for all countries in the sample.

The coefficients for land area of both the importer and exporter are negative (consistent with past studies; see, e.g., Kirkpatrick & Wantabe, 2005) and significant for most years. Borders represent costs that are associated with international trade. It is assumed that forming an RTA should reduce the barriers to trade and therefore increase trade volumes. The coefficients for common land borders for the importer and exporter show no consistent sign pattern and are not significant at the 5 per cent level. The inconsistencies in the border coefficient could be because the relevant costs are captured by distance or by the policy variables. Possibly, the border dummy is an imperfect proxy for other costs that neighboring countries share. The language (L_{ij}) dummy variables are expected to be positive as countries that share a common language are likely to have shared history, values and lower the costs of enforcing the RTA. As can be seen from Table 4.5, the coefficients for shared languages tend to be positive in almost all the years examined. English, however, is the only statistically significant shared language and has a positive impact on trade volume.

The estimated intra bloc variable (R_{kij}) represents the additional effect of a regional trade agreement on trade between member countries. If the intra bloc coefficient has a value of zero, this implies that trading relations between RTA members are as dense, but no more, than as those between the RTA members and non-members. If the intra bloc coefficient is negative then trade between RTA members and non-members is stronger than among RTA members. Conversely, a positive coefficient implies that trade linkages among RTA members are tighter than with non-members. The extent of the

RTA on trade volume is shown by the magnitude of the intra bloc coefficient. The magnitude is calculated as the anti-log of the coefficient (Helliwell, 1998). It shows the level of intra-EAC trade as a fraction of the EAC trade with non-members when other variables such as size and distance are accounted for.

The coefficients for regional intra-bloc trade (R_{kij}) are found to be positive and statistically significant for the EAC and ASEAN regional trading agreements. The EAC intra trade coefficient of 3.202 which implies that trade is 24.5 times larger after accounting for other trade influencing factors (in-depth analysis of the EAC coefficients will follow later). This indicates that the EAC and ASEAN trade more than expected in general as a result of their membership in an RTA compared to any other RTA in the sample estimation. NAFTA and the GCC also have positive intra-bloc trade coefficients; however these are not statistically different from zero. The intra-bloc trade coefficients for the EU and COMESA are found to be negative and insignificant for most years suggesting that members of these RTAs have traded less than expected. Looking at the coefficients for overall bloc imports and exports, only the ASEAN RTA is found to have positive and statistically significant coefficients. This means that ASEAN promotes both trade within the RTA (among members) and outside the RTA (with non-members) and is, from a theoretical standpoint, an ideal trading bloc.

4.3.2.1 Regional integration coefficients for the EAC

Intra-bloc trade (R_{kij})

The intra-bloc trade coefficients and magnitudes of the coefficients for the EAC are shown in Table 4.6 below. The evolution of the EAC is categorized according to three time periods; (i) *pre*-EAC between 1990 and 1995; (ii) 1996-1998 which represents

period when the tripartite commission was established and (iii) 1999-2004 which represents the formation of the EAC and customs union. The coefficients for intra-bloc trade are positive and statistically significant over the period examined depicting a positive relationship between the EAC membership and the overall volume of trade.

Table 4.6: Coefficients for the EAC intra-bloc variable (1990 – 2004)

Year	Intra Bloc	% change coefficient	Magnitude effect
1990	3.202*** (0.745)		24.578
1991	1.796*** (0.660)	-43.911	6.025
1992	2.434*** (0.632)	35.543	11.407
1993	2.411*** (0.610)	-0.966	11.141
1994	2.568*** (0.682)	6.519	13.037
1995	2.341*** (0.666)	-8.827	10.393
1996	2.882*** (0.616)	23.115	17.855
1997	3.269*** (0.721)	13.405	26.276
1998	2.491*** (0.697)	-23.782	12.077
1999	2.323*** (0.655)	-6.774	10.202
2000	2.278*** (0.665)	-1.939	9.752
2001	2.483*** (0.698)	9.033	11.980
2002	1.474 (0.926)	-40.642	4.367
2003	2.116** (0.872)	43.522	8.294
2004	2.641*** (0.799)	24.856	14.032

Statistical significance: ***1%, ** 5% and * at 10%, standard errors in parenthesis.
Magnitude calculated by taking the exponential coefficient.

The first year for which data is reported (1990) has a high intra-bloc coefficient of 3.202 implying that intra- EAC trade is 24 times larger than would be expected as shown by the magnitude effect. Change in the magnitude of the intra-trade bloc coefficient is observed to be positive in 1992, 1994, 1996, 1997, 2000, 2002 and 2003 signifying trade creation

in the EAC. The average coefficient for intra-bloc trade is highest over the period 1996 to 1998 with a value of 2.881. This means that trade within the EAC is on average 18.4 times of what would otherwise be expected over this period. These are key years in the timeline of EAC formation and would suggest that the EAC experienced more trade than expected due to a "ramping up" effect in anticipation of trade liberalization.

Formal testing for the significance of changes in the estimated coefficients for intra-bloc trade both *before* and *after* EAC formation is carried out using an F-test to determine if the coefficients of intra-bloc trade between years[66] are statistically similar. Testing intra-bloc trade from *before* and *after* bloc creation, I have found no statistically significant change in the propensity for intra-bloc trade. Since there is no jump in the coefficients in the years following the formation of the EAC RTA, the EAC has not necessarily boosted intra-regional trade to level higher than would be expected. It should be noted that the formation of the EAC has not led to a decline in the intra-regional trade; it is still on the whole a trade creating RTA. Note also, if world trade has uniformly increased, then even if the EAC trade has increased, one would only find a change in the intra-bloc coefficient if the rise in the EAC trade was "exceptional". If the change is only average, then there will be no change in the coefficient. Hence, the failure of the EAC coefficient to fall in the face of higher international trade in general can be perceived as good news. At least the EAC is "doing no harm".

[66] Testing was based on the null hypothesis that: H_0: R_{kij} in $year_t$ = R_{kij} in $year_{t+1}$
Comparing yearly coefficients, I fail to reject the null hypothesis that the coefficients for intra-bloc trade were the same from one year to the next (except for 1991-1992 and 1996-1997). Results from the testing are presented in Appendix B: Table 10 including those for overall bloc imports and exports for the EAC.

Overall bloc imports (Rki-j) and exports (Rk-ij)

These variables reflect the overall openness of an RTA to imports and exports from and to the rest of the world. Table 4.7 reports the coefficients results and magnitude effects of the overall bloc imports and exports for the EAC. Beginning with the overall bloc imports, the coefficients are mainly negative and insignificant (not different from zero). Trade in imports to the EAC from non-members has been falling and is on average 0.1 times smaller than expected over the entire period. Between 1990 and 1997, overall bloc imports decrease in value with trade to the EAC falling from 0.983 in 1990 to 70 per cent of what would be expected in 1997 as shown by the magnitude effect. This implies that trade to EAC members from non-members fell below what would be expected and would suggest that import diversion is occurring. The period, 1996 to 2004 is important as it signifies the integration process and formation of the EAC-RTA. From 1998, the overall bloc import coefficient begins to rise and is positive for 2003 (0.008) and 2004 (0.143). The magnitude effect rises from 0.777 in 1998 to 1.15 times what would be expected in 2004. This implies that imports to the EAC from non-members are rising and thus the import diversion observed in 1990-1996 is decreasing. This is a good sign as it means that since the formation of the EAC, bloc imports from the rest of the world are also growing.

Table 4.7: Coefficients for the EAC Overall bloc imports and exports (1990 – 2004)

Year	Overall bloc imports	% change	Magnitude effect	Overall bloc exports	% change	Magnitude effect
1990	-0.017		0.983	0.596***		1.815
1991	-0.113	552.031	0.893	0.689***	15.575	1.992
1992	0.201	-277.605	1.223	0.748***	8.558	2.113
1993	-0.146	-172.491	0.864	0.807***	7.816	2.240
1994	-0.284	94.973	0.753	-0.145	-118.011	0.865
1995	-0.271	-4.402	0.762	0.213	-246.721	1.238
1996	-0.279	2.772	0.757	0.384**	80.038	1.468
1997	-0.346	24.035	0.707	-0.583*	-251.951	0.558
1998	-0.252	-27.119	0.777	-0.475**	-18.594	0.622
1999	-0.176	-30.369	0.839	-0.610***	28.555	0.543
2000	-0.193	10.019	0.824	-0.642***	5.130	0.526
2001	0.010	-105.008	1.010	-0.558**	-13.094	0.573
2002	-0.155	-1703.211	0.856	-0.623**	11.758	0.536
2003	0.008	-104.914	1.008	-1.153***	85.093	0.316
2004	0.143	1779.497	1.154	-1.059***	-8.163	0.347

Statistical significance: ***1%, ** 5% and * 10%.
Magnitude calculated as the exponential of the coefficient.

Overall bloc exports from the EAC tell a different story. The coefficients for $R_{k\text{-}ij}$ are significantly positive over most of the period at the 5 per cent significance level. Between 1990 and 1993, the EAC exports are positive and increasing with overall EAC exports to non-members on average 1.7 times larger than expected and rising. A turning point is observed from 1996 to 1997 where the coefficient becomes statistically significant but negative. Exports from the EAC to the rest of the world are on average 0.4 times smaller than would be expected between 1997 and 2004. This magnitude is much lower than that observed in the first period (1990-1995). Since 1996-2004 represents the EAC RTA formation, the EAC has been diverting regional exports from the rest of the world towards itself.

Note that the export diversion observed may also be due to an increase in overall world exports such that world trade is growing much faster than EAC trade. EAC exports to the rest of the world would appear to be falling and therefore, diverted. The inclusion of the ASEAN trade bloc may be contributing to the surge in world trade as ASEAN has positive and growing trade in both its imports and exports to the rest of the world.

4.4 Discussion

The basic gravity model variables presented above display the expected signs and are significantly different from zero. The estimated coefficients for GDP are close to the predicted value of one and the distance coefficients support the conventional theory that distance is inversely related with trade flows. The development variable of per capita income for the exporter is positive and significant.

Estimates from the gravity model reveal that trade linkages between the EAC members are quite dense. The dummy variable for intra-bloc trade is positive and significant over the entire period analyzed implying that the formation of the EAC has had a positive impact on trade volumes and maintained the strong regional trade ties. Between 1996 and 1998, the coefficient for intra-bloc trade is almost double what would be expected displaying the “ramping up” effect in anticipation of regional integration. While there is evidence of trade creation, this evidence is at best weak and has not been found to directly coincide with the formation of the new EAC. I have found no statistically significant change in the propensity for intra-bloc trade and so it can be concluded that, while intra-EAC trade has grown, this trade creation has not necessarily been boosted by the formation of the EAC.

While overall bloc imports are statistically insignificant, the percentage changes in this coefficient show an increase in the latter years suggesting that the EAC is becoming more open to imports from non-bloc members. Overall bloc exports clearly tell another story going from strictly positive to strictly negative between 1990 and 2004. Hence there is compelling evidence that exports from the EAC to the world are falling indicating a trade diversion effect.

Chapter 5: Conclusion and Discussion

This purpose of this research is to examine the effects of the establishment of regional trade agreements (RTAs) among developing nations on trade, welfare and production activities with a focus on the "new" East African Community (EAC) formed between Kenya, Uganda and Tanzania. Essentially, the idea is to identify, what effect, if any, the signing of the RTA has had on the direction, volume and composition of trade between the members of the EAC and non-members.

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 three partners have increased in the *post*-EAC years signifying a deeper level of integration between the three countries that has been supported by the formation of the EAC RTA. The EAC countries have been found to rely on a wide range of products for export which suggests that development is dominating the trade process. From the indices comparing the EAC members to the rest of the world (and Canada), the EAC countries are highly similar reflecting their similar level of development. The effect of the "new" EAC is not evident from the trade intensity, export dispersion, Herfindahl and geographic concentration indices. This may be due to the high volume of trade that already occurred in the region such that there is no break in the trend of data with the "new" EAC.

This research also explored the changes to productive activities as indicated by the industry composition of exports using a measure of intra-industry trade (IIT) and revealed comparative advantage (RCA). Trade within the EAC was primarily characterized by inter-industry trade in the early 1990's. This is consistent with their low level of development, such that trade appears to reflect their natural endowments and not specialization that comes with industrialization. However, in the *post*-EAC years, intra-regional trade does appear to be moving towards higher levels of specialization particularly within the machinery and transportation equipment group (SITC 7). The revealed comparative advantage measures also show changes in the structure of production in these countries over the years. While Kenya still has a comparative advantage in the manufacturing sectors, Uganda and Tanzania are undergoing changes to their productive activities and orienting themselves towards the manufacturing sector. Within the machinery and transportation group, Tanzania's shift in comparative advantage in the *post*-EAC period is towards electrical apparatus and machinery. For Uganda, the telecommunication industry emerges as the dominant industry while Kenya registers improvements in engines and motors.

The movement towards intra-industry trade for the EAC members, which are small, developing economies, is quite interesting and could bear macroeconomic significance. A large part of intra-firm trade is in finished goods with foreign affiliates engaged in marketing and distribution providing opportunities for foreign direct investment. This would suggest that the trend towards intra-industry trade partly reflects the importance of the internationalization of production (OECD Economic Outlook, 2002). Equally interesting is the potential for economies of scale to be exploited within

the EAC following the increase in intra-industry trade. This is a possible area for future research: to determine the extent to which trade liberalization in the EAC will lead to re-distribution of resources, economies of scale and ultimately play a role in accelerating industrialization in the region. Policy implications could include the role of the EAC governments in promoting sectors based on their RCA and supporting the growth of larger firms with increasing returns to scale.

In the final section of this research, I estimated a gravity model of bilateral trade involving thirty-five countries from 1990 to 2004. Using several sets of dummy variables, I estimated the effect of the EAC-RTA on trade and welfare on members and non-members. The estimated coefficients of the basic determinants of the gravity model such as GDP, distance between economic centre's of trading partners, per capita income and area explain cross-country trade flows well and displayed the expected signs. My findings suggest that the EAC RTA has not had an impact on the dynamisms of intra-regional trade. While the intra-bloc coefficient is not found to increase significantly in the *post*-EAC period, there is weak evidence of trade creation. As mentioned in Chapter 4, the failure of the EAC coefficient to fall in the face of higher international trade means that at least the EAC is "doing no harm". Comparing overall bloc imports and exports, import diversion is decreasing while export diversion is rising for the EAC. Overall, the EAC has not experienced a change in the intra bloc trade and appears to have reduced overall trade with the world. Plausible reasons for this could be that the EAC countries have had a history of high trade volumes such that trade liberalization would have a minimal effect in raising the overall trade volumes. Also, the diversion effect observed

for the EAC exports may be due to a surge in world trade such that the EAC trade is unable to keep up.

Due to the nature of the trade creation/diversion effects, welfare gains from the new EAC appear to be small. This suggests that the dynamic welfare gains could be of more importance to the EAC and thus should be monitored in order to discern the economic merit of this RTA.

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APPENDIX A

Figure 1: Structure of Output for Kenya (2003)

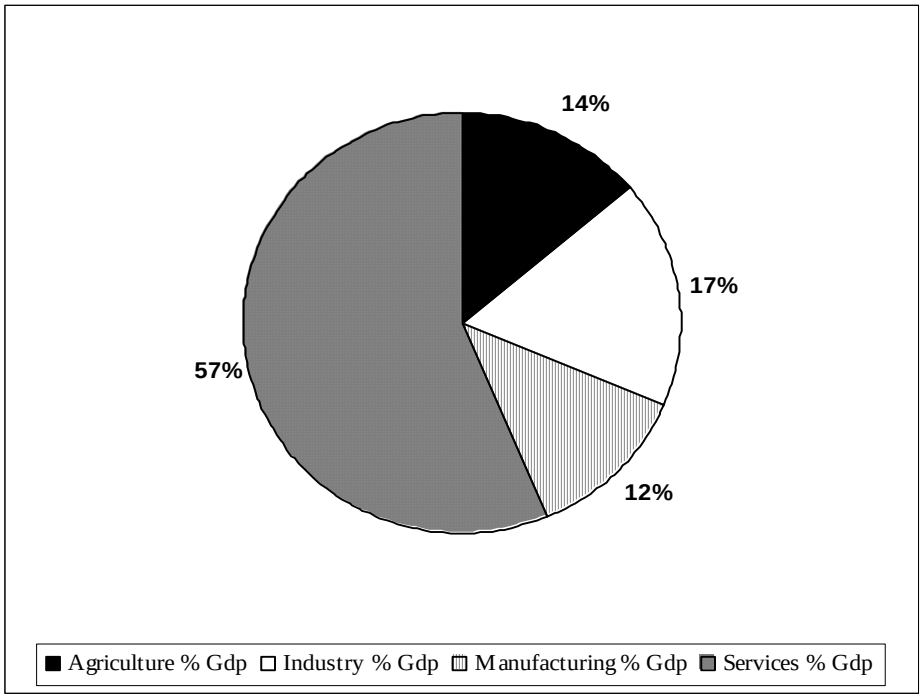


Figure 2: Structure of Output for Uganda (2003)

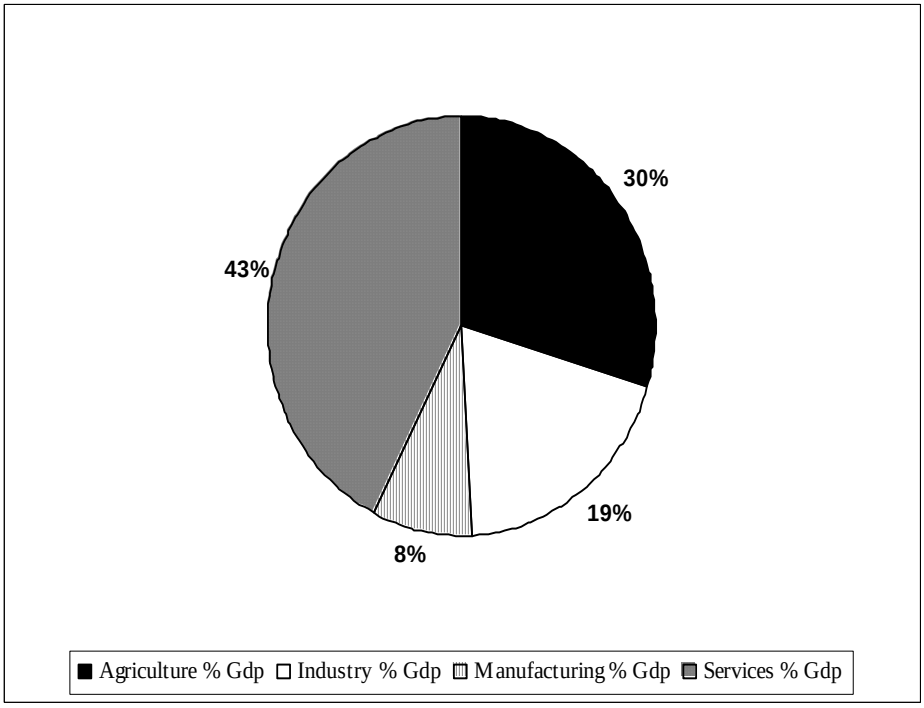
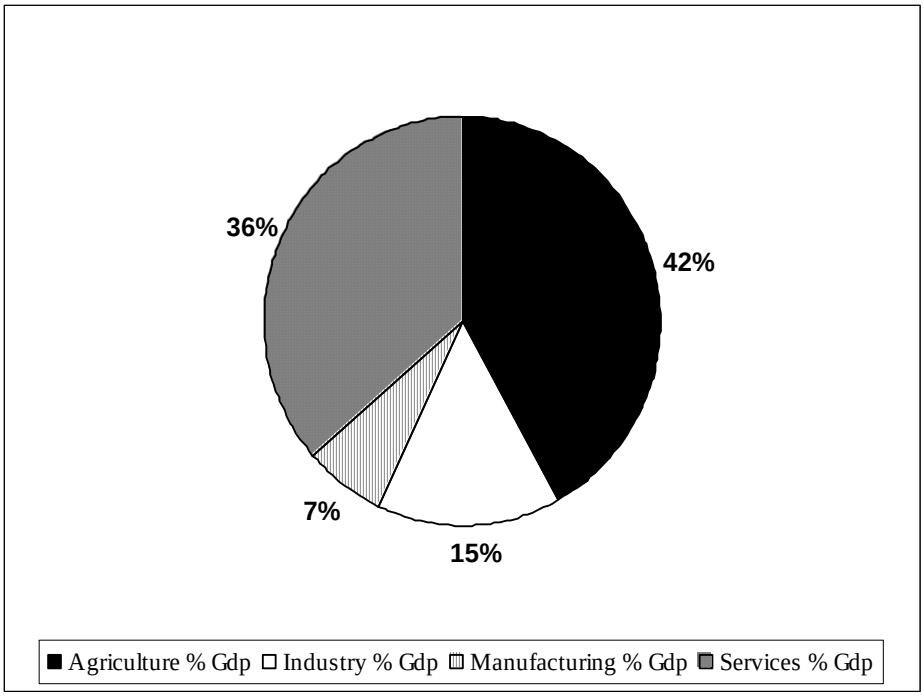


Figure 3: Structure of Output for Tanzania (2003)



Source: World Development indicators, 2005

Table 1: Trade Intensity/Concentration Index for EAC (1990-2001)

Year	TI:KE->TZ	TI:KE->UG	TI:TZ->UG	TI: TZ-> KE	TI:UG->TZ	TI:UG->KE
1990	71.52	1073.42	55.81	45.68	-	-
1991	94.60	574.44	83.75	34.36	-	-
1992	88.22	465.43	89.88	35.21	-	-
1993	179.63	690.83	98.98	35.56	-	-
1994	316.01	807.34	81.47	70.29	6.52	89.92
1995	366.23	748.30	56.78	62.73	14.91	50.92
1996	510.43	860.25	73.63	33.17	38.30	141.61
1997	517.24	992.86	82.98	65.52	58.55	96.15
1998	388.79	740.08	76.63	75.02	54.68	157.76
1999	350.90	892.87	96.45	117.43	41.48	128.85
2000	292.06	978.49	259.08	106.13	54.72	344.67
2001	252.52	637.59	43.91	75.76	52.41	200.28
2002	289.87	1287.54	36.80	82.71	46.87	274.69
2003	266.16	851.76	213.93	146.80	16.20	299.19
2004	284.52	957.32	207.08	121.79	67.90	237.89

Source: UN COMTRADE database with augmentation from Direction of Trade Statistics yearbooks
Note: KE – Kenya, TZ- Tanzania, UG- Uganda.

Table 2: Standard International Trade Classification (SITC) Descriptors

SITC 1-Digit Level		SITC 3-Digit Level
0 - Food and live animals	075	Spices
	091	Margarine and shortening
1 - Beverages and tobacco	121	Tobacco, un-manufactured
2 - Crude materials, inedible, except fuels	223	Oil seeds and oleaginous fruits
	263	Cotton textile fibers
	265	Vegetable textile fibers
	266	Synthetic fibers suitable for spinning
	271	Fertilizers, crude
	291	Crude Animals materials
3 - Mineral fuels, lubricants and related materials	334	Petroleum oils and oils from bituminous minerals (other than crude)
	341	Gas, natural and manufactured
5 - Chemicals and related products	511	Hydrocarbons
	513	Carboxylic acids and anhydrides
	514	Nitrogen-function compounds
	515	Organo-inorganic compounds
	582	Plates, sheets, film, foil and strip of plastics
	583	Monofilament
	591	Insecticides, fungicides, herbicides
6 - Manufactured goods classified chiefly by material	611	Leather
	612	Manufactures of leather
	625	Rubber tires
	665	Glassware
	667	Pearls, precious and semiprecious stones
	674	Iron and non-alloy steel flat-rolled products
	689	Miscellaneous nonferrous base metals
	691	Metal structures and parts
	692	Metal containers for storage or transport
7 - Machinery and transport equipment	711	Steam or other vapor generating boilers
	712	Steam turbines and other vapour turbines
	714	Engines and motors, non-electric
	716	Rotating electric plant
	722	Tractors
	723	Civil engineering equipment
	726	Printing and bookbinding machinery
	727	Food-processing machines
	742	Pumps for liquids
	743	Pumps (not for liquids), air or gas compressors and fans
	752	Automatic data processing machines
	761	TV receivers (including video monitors & projectors)
	762	Radio-broadcast receivers
	764	Telecommunications equipment
	771	Electric power machinery
	772	Electrical apparatus for switching/protecting electrical circuits
	776	Thermionic, cold cathode

	786	Trailers and semi-trailers
	791	Railway vehicles
	792	Aircraft and associated equipment
	793	Ships, boats and floating structures
8 - Miscellaneous manufactured articles	821	Furniture and parts thereof
	895	Office and stationery supplies
	897	Jewelry, goldsmiths' and silversmiths' ware

Table 3: EAC Revealed Comparative Advantage (1-digit SITC level)

Kenya RCA - 1 digit SITC	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**
0 – Food and live animals	0.01	0.04	0.04	0.05	0.06	0.04
1 - Beverages and tobacco						
2 - Crude materials, inedible, except fuels	0.19	0.13	0.07	0.09	0.14	0.17
3 - Mineral fuels, lubricants and related materials		**5.57**	0.06	0.03	0.27	**2.01**
5 - Chemicals and related products	**26.97**	**1.43**	**4.15**	**8.86**	**3.38**	**22.27**
6 - Manufactured goods classified chiefly by material	**5.00**	**5.96**	**2.57**	**3.36**	**4.49**	**6.23**
7 - Machinery and transport equipment	0.47	0.13	0.19	0.22	**2.03**	**1.17**
8 - Miscellaneous manufactured articles	**10.51**	**426.24**	**983.93**	**244.18**	**12.10**	0.72
Uganda RCA - 1 digit SITC	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**
0 – Food and live animals	0.02	0.10	0.27	0.72	0.41	0.49
1 - Beverages and tobacco						
2 - Crude materials, inedible, except fuels	0.60	0.98	**1.96**	0.83	0.32	0.23
3 - Mineral fuels, lubricants and related materials	0.00	0.00	0.86	0.00	0.00	0.00
5 - Chemicals and related products	0.06	0.00	0.07	0.11	0.06	0.03
6 - Manufactured goods classified chiefly by material	0.09	0.04	0.16	0.12	0.03	0.04
7 - Machinery and transport equipment	0.03	0.76	**1.91**	0.59	0.06	0.24
8 - Miscellaneous manufactured articles	0.02	0.00	0.00	0.01	0.06	0.00
Tanzania RCA - 1 digit SITC	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**
0 – Food and live animals	**129.88**	**40.73**	**28.09**	**16.18**	**16.80**	**15.17**
1 - Beverages and tobacco						
2 - Crude materials, inedible, except fuels	**6.03**	**7.10**	**8.47**	**9.93**	**11.05**	**10.20**
3 - Mineral fuels, lubricants and related materials	0.00	0.32	**13.76**	**45.60**	**9.06**	**1.29**
5 - Chemicals and related products	0.04	1.25	0.33	0.14	0.66	0.09
6 - Manufactured goods classified chiefly by material	0.29	0.28	0.51	0.42	0.51	0.38
7 - Machinery and transport equipment	**3.37**	**8.14**	**4.22**	**5.45**	**1.13**	**1.73**
8 - Miscellaneous manufactured articles	0.15	0.00	0.00	0.00	0.15	**3.64**

Note: Figures in bold reflect RCA>1

Source: Authors computation based on data from World Trade Analyzer and UN COMTRADE

EAC Revealed Comparative Advantage (1-digit SITC level) continued

Kenya RCA - 1 digit SITC	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
0 - Food and live animals	0.55	0.34	0.46	1.22	0.07	0.20
1 - Beverages and tobacco						
2 - Crude materials, inedible, except fuels	0.11	0.07	0.24	0.13	0.13	0.22
3 - Mineral fuels, lubricants and related materials	0.21		**2.16**	**120.17**		**1.28**
5 - Chemicals and related products	**22.40**	**79.93**	**5.20**	**4.94**	**3.11**	**15.98**
6 - Manufactured goods classified chiefly by material	**4.27**	**15.25**	**4.56**	**2.75**	**1.29**	**2.71**
7 - Machinery and transport equipment	0.54	0.05	0.24	0.34	0.52	**7.03**
8 - Miscellaneous manufactured articles	**1.62**	**24.95**	**5.56**	**1.96**	**30.62**	**10.55**
Uganda RCA - 1 digit SITC	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
0 - Food and live animals	0.51	0.48	0.69	0.92	**1.25**	**1.34**
1 - Beverages and tobacco						
2 - Crude materials, inedible, except fuels	0.31	0.85	0.24	0.71	0.86	0.04
3 - Mineral fuels, lubricants and related materials	0.00	0.00	**1.52**	0.03	0.00	**3.52**
5 - Chemicals and related products	0.07	0.05	0.46	0.23	0.24	0.23
6 - Manufactured goods classified chiefly by material	0.11	0.19	0.11	0.17	0.52	0.40
7 - Machinery and transport equipment	0.65	**1.92**	0.97	0.27	**2.91**	0.41
8 - Miscellaneous manufactured articles	0.01	0.03	0.09	0.03	0.07	0.32
Tanzania RCA - 1 digit SITC	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
0 - Food and live animals	**2.87**	**4.31**	**2.94**	**0.82**	**6.92**	**3.56**
1 - Beverages and tobacco						
2 - Crude materials, inedible, except fuels	**12.15**	**10.55**	**7.60**	**7.03**	**6.50**	**8.61**
3 - Mineral fuels, lubricants and related materials	**12.94**	0.00	0.00	0.00	0.00	0.00
5 - Chemicals and related products	0.06	0.00	0.10	0.29	0.48	0.02
6 - Manufactured goods classified chiefly by material	0.51	0.02	0.41	0.70	**1.04**	0.48
7 - Machinery and transport equipment	**2.59**	**6.36**	**4.30**	**5.41**	0.86	0.09
8 - Miscellaneous manufactured articles	**1.68**	0.07	0.34	**1.22**	0.03	0.04

Note: Figures in bold reflect RCA>1

Source: Authors computation based on data from World Trade Analyzer and UN COMTRADE

Table 4: EAC RCA for Kenya (3-Digit SITC level)

SITC	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
75	0.00	0.02	0.01	0.01	0.06	0.03	0.02	0.00	0.00	0.07	0.03	0.19
91									**129.31**	**72.07**	0.81	0.94
263	0.04	0.00	0.00	0.00	0.01	0.04	0.00	0.00	0.00	0.00	0.01	0.05
265	**3.09**	**2.49**	**2.87**	**3.31**	**2.79**	**3.04**	**2.35**	**1.17**	**1.26**	**1.03**	**0.99**	**1.11**
266	0.08						0.00			0.18	0.00	0.24
271	0.00								0.31			
291		0.00	0.00	0.00	0.44							
334		0.00	0.00	0.00	0.27	2.03	0.00		0.00	**119.31**		**1.26**
341						0.93						
511			0.06		0.02						0.07	
513					**8.11**				0.47			
514	**1.92**	1.11	0.83	0.48	**17.20**				0.06	0.02	0.03	**2.79**
515			0.00		**212.73**	0.00	0.00					
582		**6.86**	0.77	0.26	**4.24**		**10.89**		**4.29**	**1.22**	0.64	**15.37**
583	**12.04**	**20.52**	**29.71**	**25.08**	0.38	**29.92**	**83.06**	**29.75**	**11.32**	**33.01**	**39.52**	**16.94**
584						0.00						
591		**1.28**		**159.93**			**41.16**		**39.89**	**6.24**		**68.01**
611	**6.34**	**10.66**	**6.56**	**7.83**	**15.27**	**8.60**	**3.41**	**5.00**	**16.83**	**62.69**	**5.15**	**13.18**
612				0.10	**10.54**		**3.27**				**4.28**	**9.07**
625	**40.65**		**7.49**		**87.28**	**13.50**	**65.78**	**4.45**	0.74	**2.06**	0.24	**1.48**
652												
653												
665		0.64	0.71	**28.92**	**23.16**	**34.40**	**48.30**	**96.15**	**2.33**	0.11	0.12	0.19
667	0.00	0.00	0.00	0.00	**10.99**	**2.09**						
674	**148.95**	**6.77**	**254.75**		**21.86**	**185.46**	**639.45**	**359.38**	**9.37**	**8.24**	**2.30**	**3.72**
689	0.08	0.48	0.09	0.01	0.02	0.06	0.11					
691									**3.20**	**4.04**	0.06	0.38
692	**24.21**			**17.83**	**3.04**	**5.75**	**256.77**	**62.03**	**3.14**	**1.64**	**16.23**	**3.46**
711				0.00	2.25		6.74			0.90		0.04
712		**1.88**										
714	0.01	0.00	0.00	0.01	**1.53**	0.18	0.01	**14.75**	0.00	0.06		**14.24**
716	**3.31**	**1.87**	**1.33**	0.11	0.62	**7.18**	**1.30**	0.00	0.02	0.04	0.97	**63.54**
722	0.19			0.00		0.00			0.03	0.00	0.00	0.15
723		0.30	0.08	0.82	**1.46**	0.06	0.07	0.00	0.00	0.00	0.00	**1.34**
726	**3.24**		0.00				**5.30**	0.30	0.05			**2.61**
727				**2.07**		**3.22**	**8.10**		**1.21**	**4.59**	0.08	**1.05**
742	**4.80**	**3.35**	**2.69**	**11.81**	0.72	**1.56**	**7.24**	**3.43**	0.31	**1.48**	**6.95**	**1.09**
743		0.24	**3.59**	0.07		**1.24**	0.83		0.17	0.16		3.11
752	0.92	0.33	0.00	0.28	**29.42**	**18.05**	**1.04**	0.05	0.18	0.24	0.62	**85.45**
761	0.25					**6.77**		0.00	0.00	0.47		**6.73**
762	**1.34**						0.00	0.00	0.03	0.00		**15.87**
764	0.00	0.00	0.00	0.00	0.48	**6.74**	0.00	0.00				
771		0.00	0.97	0.08	0.38	**1.28**	0.00	0.00	0.05	0.01	0.17	0.42
772	**7.34**	**1.50**	0.00	**1.63**	**7.71**	**6.67**	**4.35**	0.08	0.85	0.64	0.60	**3.09**
776		0.00	0.00		**77.24**		0.00	0.00	**5.34**			**151.27**
778			0.00									
786		**11.14**	**12.33**	**9.61**	**2.59**	0.03			**9.02**	**1.25**	**10.57**	**12.22**
791				0.75		0.00	0.00		0.00	0.00		
792	0.32	0.37	0.15	0.23	**1.19**	**1.78**	0.01	0.02	0.00	0.08		**2.95**
793									0.69	0.44		0.08
821	**6.16**	**4.29**	**7.74**	**10.54**	**2.49**	**7.99**	**27.90**	**15.82**	**2.61**	**1.22**	**54.92**	**2.79**
895			**14.18**		**3.40**			**64.67**	**34.75**	**34.09**	**18.45**	**40.99**
897	**4.33**	**1576**	**2760**	**350.71**	**120.29**	0.28	0.11		**142.45**		**21.87**	

Table 5: EAC RCA for Uganda (3-Digit SITC level)

SITC	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
75	0.02	0.10	0.29	0.76	0.41	0.49	0.86	0.75	**1.22**	**2.80**	**0.98**	**1.30**
91	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.02	0.05	**5.16**	**4.80**
121	0.00			2.02								
223		**114.90**	**34.77**									
263	0.77	**1.28**	**2.32**	**1.01**	0.40	0.28	0.37	**1.02**	0.40	**0.99**	**1.21**	0.05
266	0.00	0.00		0.00	0.00	0.00	0.00			**5.07**	0.00	**8.39**
271	0.00						0.00	0.00	**10.56**	0.00		0.00
291		**4.32**	**1.05**	**1.65**	**7.05**							
334		0.00	0.97	0.00	0.00	0.00	0.00			0.03		**3.59**
341	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
511	0.00	0.00	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.03	0.00
513	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00		0.00
514	0.00	0.00	**6.97**	0.00	0.18	0.00	0.00	0.00	**52.81**	**1.20**	**120.79**	**1.62**
515					0.01	0.00		0.00	0.00	0.00	0.00	0.00
582	0.00	0.00	0.00	**2.87**	0.09	0.00	0.00	0.00	0.42	**1.79**	**5.67**	0.28
583	0.19	0.00	0.00	0.07	0.00	0.03	0.00	0.12	0.06	0.02	0.07	0.18
591	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.11	0.00	0.00
611	0.15	0.02	0.20	0.26	0.04	0.07	0.30	0.67	0.04	0.05	0.30	0.14
612	0.00	0.00	0.00	0.71	0.30	0.00	0.98	0.00	0.00	0.00	0.00	0.00
625	0.00	0.00	0.00	0.00	0.00	0.24	0.05	0.07	0.15	0.06	0.45	0.18
665	0.00	0.00	0.81	0.00	0.00	0.10	0.00	0.00	0.01	0.03	0.00	0.00
674	0.00	0.33	0.02	0.00	0.00	0.00	0.01	0.01	0.16	0.36	0.91	**1.13**
689	0.00	0.00	0.14	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
691	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.59	**29.67**	**5.25**
692	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.04	0.10	0.40
711				0.00	**1.38**		0.00		0.00	**3.73**	0.00	**112.38**
714	0.03	0.01	**6.43**	0.05	0.00	0.46	**2.07**	0.25	0.00	0.00		0.32
716	0.37	0.00	0.00	**24.90**	0.55	0.46	0.00	0.00	0.66	0.00	4.30	0.07
722	0.00			0.00		0.00	0.00		**1.19**	0.00		**30.75**
723	0.00	**2.93**	**1.51**	0.00	0.00	**9.81**	0.00		**2.25**	0.45	**19.43**	**3.36**
726	**1.71**	0.00	0.00	0.00	0.00	0.00	0.00	**11.94**	0.00		0.00	**1.73**
727	0.00	0.00	0.00	**2.32**	0.00	0.00	0.00	0.00	2.08	0.05	0.65	**4.32**
742	0.00	**1.24**	**2.16**	0.00	0.83	0.00	0.32	**1.06**	0.95	**1.08**	0.60	**1.82**
743	0.00	**3.43**	**1.62**	0.00	0.00	0.00	0.00		0.00	0.00		0.91
752	0.49	0.48	**1.00**	**2.44**	0.06	0.11	0.28	**66.20**	0.00	0.20	**6.75**	0.05
761	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.67
762	0.00	0.00	0.00	0.00	0.00			**10.01**	0.76	0.46	0.00	0.28
764	0.00	**22.49**	0.00	0.00	0.13	0.49	**10.82**					
771	0.00	0.00	**5.98**	0.00	0.05	0.15	0.00	0.02	0.00	0.00	0.00	0.02
772	0.00	**2.11**	**153.67**	0.00	0.04	0.27	0.74	**1.20**	0.00	**3.47**	0.00	0.47
776			0.00	0.00	0.00	0.00			0.00	0.00		0.03
786	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.39	0.37
791	0.00			0.00	0.00	0.00	0.00		0.00	0.00		
792	0.00	0.27	0.47	0.24	0.04	0.04	**1.03**	**165.51**	0.00	0.29	0.00	**1.53**
793	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.71**
821	0.12	0.32	0.00	0.00	0.15	0.00	0.02	0.01	0.14	0.01	0.01	**1.12**
895	0.00	0.00	0.00	0.00	0.92	0.00	0.00	0.06	0.05	0.10	0.23	0.08
897	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6: EAC RCA for Tanzania (3-Digit SITC level)

SITC	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
75	**241.32**	**73.80**	**58.95**	**25.38**	**16.80**	**15.72**	**9.67**	**20.79**	**11.10**	**2.96**	**10.92**	**3.74**
91	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.01	0.00	0.00	0.00
121				**12.98**								
223		0.20	**1.03**									
247												
263	**14.40**	**17.69**	**15.44**	**26.04**	**29.54**	**23.05**	**25.82**	**16.12**	**32.88**	**10.97**	**10.87**	**35.30**
265	0.52	0.72	0.51	0.48	0.88	0.86	**1.17**	**1.76**	**1.86**	**2.40**	**2.00**	**1.81**
266	**20.06**	0.00		0.00	0.00	0.00				**1.03**		0.46
271							0.00	0.00	0.00	0.00		0.00
291		**5.25**	**34.19**	**15.86**	0.00							
334			**36.95**		**9.06**	**1.28**			0.00	0.00		0.00
341	0.00	0.00	0.00	0.00		**2.79**	0.00	0.00	0.00	0.00	0.00	0.00
511	0.00	0.00	**23.72**	0.00	**16.95**	0.00	0.00	0.00	0.00	0.00	**25.94**	0.00
513	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**4.92**	0.00		0.00
514	0.84	**1.60**	0.00	**3.30**	0.00	0.00	0.00	0.00	0.00	**8.33**	0.00	0.00
515			0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00
522												
551												
582	0.00	0.26	**1.90**	**4.87**	0.00	0.00	0.25	0.00	0.00	0.42	0.00	0.00
583	0.08	0.09	0.05	0.04	6.40	0.07	0.03	0.00	0.16	0.06	0.02	0.04
591	0.00	**1.39**	0.00	0.01	0.00	0.00	0.07	0.00	0.05	0.30	0.00	0.03
611	0.20	0.16	0.17	0.12	0.13	0.24	0.45	0.03	0.11	0.00	0.21	0.08
612	0.00	0.00	0.00	**9.75**	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.22
625	0.04	0.00	0.19	0.00	0.03	0.00	0.00	0.41	**2.78**	**1.11**	**5.62**	**1.16**
665	0.00	2.80	**1.57**	0.05	0.11	0.00	0.06	0.02	0.99	**21.04**	**16.80**	**10.36**
667					0.22	**1.25**						
674	0.01	0.11	0.00	0.00	0.11	0.01	0.00	0.00	0.13	0.03	0.31	0.03
689	**21.12**	**3.72**	**14.19**	**158.11**	**93.11**	**45.85**	**24.42**	0.00	0.00	0.00	0.00	0.00
691	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.13	0.25	0.55
692	0.07	0.00	0.00	0.09	0.81	0.45	0.01	0.00	0.68	**1.44**	0.07	0.34
711					0.00		0.41		0.00	0.00	0.00	0.00
712	0.00	0.95										0.00
714	**116.55**	**1694.51**	**5.59**	**113.08**	**1.61**	**7.41**	**4.38**	0.00		**42.30**		0.00
716	0.34	0.95	**1.10**	0.36	**2.48**	0.00	**2.11**		**17.27**	**70.02**	0.00	0.00
722	8.49						0.00		**9.39**		0.00	0.00
723	0.00	**1.80**	**8.74**	**1.92**	**1.69**	**0.75**	**41.39**	0.00	**5.95**	**24.84**	0.74	0.00
726	0.00	0.00		0.00	0.00	0.00	0.52	0.00	**43.21**		0.00	0.00
727	0.00	0.00	0.00	0.04	0.00	0.81	0.34	0.00	0.20	0.49	**10.58**	0.00
742	0.34	0.00	0.00	0.13	**1.71**	**1.67**	0.09	0.00	**3.49**	0.51	0.00	0.52
743	0.00	1.95	0.00	**21.37**	0.00	**2.10**	**3.33**		**13.90**	**15.84**		0.17
752	**1.38**	**4.22**	**35.81**	**2.39**	0.03	0.05	**1.93**	0.00	**13.10**	**7.93**	0.00	0.00
761	6.53	0.00	0.00	0.00	0.00	0.39	0.00	0.00		**5.27**	0.00	0.00
762	1.20	0.00	0.00	0.00	0.00		0.00	**1.67**	**14.15**	**24.02**	0.00	0.00
764		1.01			4.52	0.00	0.88	0.00				
771	0.00		0.00	**19.23**	**6.26**	**1.72**		**755.28**	**43.84**	**254.56**	**11.86**	**4.69**
772	0.22	0.17	0.23	0.97	0.28	0.15	0.00	**7.66**	**2.75**	0.33	**3.29**	0.37
776		0.00		0.00	0.03	0.00	0.00	0.00	0.44	0.00		0.00
778					0.00							
782												
786	0.00	0.16	0.12	0.16	0.95	**78.12**	0.00	0.00	0.22	**1.98**	0.00	0.00
791	0.00			**2.12**	0.00							
792	**4.99**	**4.20**	**8.19**	**5.99**	**2.00**	**1.39**	**8.52**	0.00		**15.79**	0.00	0.00
793	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**3.39**	**5.66**	0.00	0.00

821	0.22	0.26	0.19	0.15	0.80	0.33	0.08	0.12	0.74	**2.00**	0.03	0.15
895	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.01
897	0.37	0.00	0.00	0.00	0.02	**9.19**	**25.05**	0.00	0.02	0.00	0.09	0.00

Note: Figures in bold denote sectors with RCA>1.

Table 7: Average RCA's for EAC countries (1990-2001)

		Kenya		**Uganda**		**Tanzania**	
SITC		**1990-1995**	**1996-2001**	**1990-1995**	**1996-2001**	**1990-1995**	**1996-2001**
0	**Food and live animals**						
75	Spices	0.02	0.05	0.35	**1.32**	**71.99**	**9.86**
91	Margarine and shortening		**50.78**	0.00	**1.67**	0.00	0.00
1	**Beverages and tobacco**						
121	Tobacco, Un-Manufactured			1.01		**12.98**	
2	**Crude materials, inedible, except fuels**						
223	Oil seeds and oleginous fruits			**74.84**		0.62	
263	Cotton textile fibers	0.01	0.01	**1.01**	0.67	**21.03**	**21.99**
265	Vegetable textile fibers	**2.93**	**1.32**			0.66	**1.83**
266	Synthetic fibers suitable for spinning	0.08	0.10	0.00	**3.36**	**4.01**	0.74
271	Fertilizers,crude	0.00	0.31	0.00	**2.11**		0.00
291	Crude Animals materials	0.11		**3.52**		**13.82**	
3	**Mineral fuels, lubricants and related materials**						
334	Petroleum oils and oils from bituminous minerals	0.46	**30.14**	0.20	**1.21**	**15.76**	0.00
341	Gas, natural and manufactured	0.93		0.00	0.00	0.56	0.00
5	**Chemicals and related products**						
511	Hydrocarbons	0.04	0.07	0.10	0.01	**6.78**	**4.32**
513	Carboxylic acids and anhydrides	**8.11**	0.47	0.06	0.00	0.00	0.98
514	Nitrogen-function compounds	**4.31**	0.73	**1.19**	**29.40**	0.96	**1.39**
515	Organo-inorganic compounds	**70.91**	0.00	0.01	0.00	0.00	0.00
582	Plates, sheets, film, foil and strip of plastics	**3.03**	**6.48**	0.49	**1.36**	**1.17**	0.11
583	Monofilament	**19.61**	**35.60**	0.05	0.08	**1.12**	0.05
591	Insecticides, fungicides, herbicides	**80.61**	**38.82**	0.00	0.02	0.23	0.07
6	**Manufactured goods classified chiefly by material**						
611	Leather	**9.21**	**17.71**	0.12	0.25	0.17	0.15
612	Manufactures of leather	**5.32**	**5.54**	0.17	0.16	**1.62**	0.11
625	Rubber tires	**37.23**	**12.46**	0.04	0.16	0.04	**1.85**
665	Glassware	**17.56**	**24.53**	0.15	0.01	0.75	**8.21**
667	Pearls, precious and semiprecious stones	**2.18**				0.73	
674	Iron and non-alloy steel flat-rolled products	**123.56**	**170.41**	0.06	0.43	0.04	0.08
689	Miscellaneous nonferrous base metals	0.12	0.11	0.03	0.00	**56.02**	**4.07**
691	Metal structures and parts		**1.92**	0.00	**6.06**	0.00	0.17
692	Metal containers for storage or transport	**12.71**	**57.21**	0.00	0.11	0.24	0.42
7	**Machinery and transport equipment**						
711	Steam or other vapor generating boilers	**1.13**	**2.56**	0.69	**23.22**	0.00	0.08
712	Steam turbines and other vapour turbines	**1.88**				0.47	0.00
714	Engines and motors, non-electric	0.29	**5.81**	**1.16**	0.53	**323.12**	**11.67**
716	Rotating electric plant	**2.40**	**10.98**	**4.38**	0.84	0.87	**17.88**
722	Tractors	0.06	0.04	0.00	**7.99**	**8.49**	**2.35**
723	Civil engineering equipment	0.54	0.24	**2.37**	**5.10**	**2.48**	**12.15**

726	Printing and bookbinding machinery	**1.62**	**2.07**	0.29	**2.73**	0.00	**8.75**
727	Food-processing machines	**2.64**	**3.00**	0.39	**1.18**	0.14	**1.93**
742	Pumps for liquids	**4.15**	**3.42**	0.70	0.97	0.64	0.77
743	Pumps (not for liquids), air or gas compressors and fans	**1.29**	**1.06**	0.84	0.23	**4.24**	**8.31**
752	Automatic data processing machines	**8.17**	**14.60**	0.77	**12.25**	**7.32**	**3.83**
761	TV receivers (including video monitors & projectors)	**3.51**	**1.80**	0.00	0.13	**1.15**	**1.05**
762	Radio-broadcast receivers	**1.34**	**3.18**	0.00	**2.30**	0.24	**6.64**
764	Telecommunications equipment	**1.20**	0.00	**3.85**	**10.82**	**1.84**	0.44
771	Electric power machinery	0.54	0.11	**1.03**	0.01	**5.44**	**214.05**
772	Electrical apparatus for switching/protecting electrical circuits	**4.14**	**1.60**	**26.02**	0.98	0.34	**2.40**
776	Thermionic, cold cathode	**25.75**	**39.15**	0.00	0.01	0.01	0.09
786	Trailers and semi-trailers	**7.14**	**8.27**	0.00	0.14	**13.25**	0.37
791	Railway vehicles	0.37	0.00	0.00	0.00	0.71	
792	Aircraft and associated equipment	0.67	0.61	0.18	**28.06**	**4.46**	**4.86**
793	Ships, boats and floating structures		0.40	0.00	0.28	0.00	**1.51**
8	**Miscellaneous manufactured articles**						
821	Furniture and parts thereof	**6.53**	**17.54**	0.10	0.22	0.32	0.52
895	Office and stationery supplies	**8.79**	**38.59**	0.15	0.09	0.02	0.01
897	Jewelry, goldsmiths' and silversmiths' ware	**802.14**	**54.81**	0.00	0.00	**1.60**	**4.19**
	Total number of sectors with RCA >1	**31.00**	**29.00**	**10.00**	**17.00**	**22.00**	**23.00**

Note: Figures in bold denote sectors with RCA>1. Average values were computed using values presented in Tables 4, 5 and 6

APPENDIX B

Table 8: Sample countries for gravity model

Country	Bloc	Language
Argentina	na	Spanish
Australia	na	English
Bahrain	GCC	Arabic
Belgium	EU	Dutch
Canada	NAFTA	English
China	na	Chinese
Hong Kong, China	na	English
Denmark	EU	Danish
Egypt, Arab Rep.	COMESA	Arabic
Finland	EU	Finnish
France	EU	French
Germany	EU	German
India	na	English
Indonesia	ASEAN	Bahasa
Ireland	EU	English
Israel	na	Hebrew
Italy	EU	Italian
Japan	na	Japanese
Kenya	EAC,COMESA	English
Malaysia	ASEAN	Malay
Netherlands	EU	Dutch
Pakistan	na	Urdu
Korea, Rep.	na	Korean
Saudi Arabia	GCC	Arabic
Singapore	ASEAN	Malay
South Africa	na	English
Spain	EU	Spanish
Sweden	EU	Swedish
Switzerland	na	German
Thailand	ASEAN	Thai
Uganda	EAC,COMESA	English
UAE	GCC	Arabic
UK	EU	English
United Rep. of Tanzania	EAC	English
USA	NAFTA	English

Note: "na" represents countries for which a bloc affiliation was not considered in the regression
Blocs: ASEAN- *Association of South East Asian Nations*; EU- *European Union*; GCC- *Gulf Cooperation* Council; COMESA- *Common Market for Eastern and Southern Africa*; EAC-*East African Community*; NAFTA- *North American Free Trade Area*.

Table 9: Gravity Model Estimation

Basic gravity variables	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**
Intercept	-20.71***	-19.98***	-19.80***	-18.43***	-17.54***	-18.44***	-19.82***	-22.87***
Log GDP exporter (j)	0.978***	0.993***	0.978***	0.931***	0.906***	0.890***	0.882***	0.911***
Log GDP importer (i)	0.956***	0.924***	0.943***	0.900***	0.882***	0.891***	0.903***	0.957***
Log Percapita (j)	0.170***	0.104***	0.066	0.070*	0.070	0.116***	0.140***	0.088**
Log Percapita (i)	-0.068	-0.066	-0.080*	-0.085**	-0.060	-0.080	-0.022	-0.085**
Log Area exporter (j)	-0.127***	-0.113***	-0.113***	-0.076***	-0.038	-0.026	-0.006	-0.054**
Log Area importer (i)	-0.215***	-0.208***	-0.214***	-0.192***	-0.180***	-0.185***	-0.142***	-0.174***
Log distance btwn (i)(j)	-0.788***	-0.790***	-0.773***	-0.735***	-0.805***	-0.718***	-0.760***	-0.430***
Dummy Var. for Border	-0.012	-0.060	0.018	-0.017	-0.337	-0.144	-0.093	0.289
Lij English	0.184	0.322**	0.354***	0.362***	0.453***	0.471***	0.557***	0.537***
Lij French	-0.418	-0.161	-0.193	-0.408	-0.430	-0.240	-0.289	0.238
Lij Spanish	0.511	0.544	0.642	0.755	0.917	0.898	0.946	0.781
Lij Swahili	-0.114	1.064	0.594	1.026	1.091	1.265	0.451	1.427
Lij Arabic	0.000	0.000	0.000	0.000	0.000	0.000	-0.218	-0.275
Rkij EAC intra bloc	3.202***	1.796***	2.434***	2.411***	2.568***	2.341***	2.882***	3.269***
Rki-j EAC overall imports	-0.017	-0.113	0.201	-0.146	-0.284	-0.271	-0.279	-0.346*
Rk-ij EAC overall exports	0.596***	0.689***	0.748***	0.807***	-0.145	0.213	0.384	-0.583*
Rkij EU intra bloc	-0.358	-0.293	-0.192	-0.058	-0.070	-0.018	-0.071	0.703***
Rki-j EU overall imports	-0.134	-0.218*	-0.243**	-0.285***	-0.333***	-0.393***	-0.303***	-0.294***
Rk-ij EU overall exports	-0.442***	-0.360***	-0.240**	-0.109	-0.056	-0.123	-0.053	0.038
Rkij NAFTA intra bloc	0.815	0.748	0.883	0.979	1.030	0.965	0.527	1.135
Rki-j NAFTA overall imports	0.637***	0.528***	0.510	0.456**	0.394	0.261	-0.066	0.077
Rk-ij NAFTA overall exports	-0.136	-0.205	-0.084	-0.257	-0.328	-0.352*	-0.435**	-0.333*
Rkij ASEAN intra bloc	1.907***	2.020***	1.990***	1.827***	1.908***	1.692***	2.011***	2.551***
Rki-j ASEAN overall imports	0.887***	0.760***	0.713***	0.622***	0.705***	0.614***	0.780***	0.715***
Rk-ij ASEAN overall exports	0.900***	1.080***	0.995***	1.055***	1.112***	1.226***	1.140***	1.086***
Rkij COMESA intra bloc	-1.948***	-0.078	-0.446	-0.482	-0.252	-0.092	-0.289	0.209
Rki-j COMESA overall imports	0.075	0.021	-0.060	-0.012	-0.039	-0.027	0.049	0.033
Rk-ij COMESA overall exports	-1.395***	-1.036***	-1.082***	-1.203***	-1.498***	-1.610***	-1.524***	-1.137***
Rkij GCC intra bloc								
Rki-j GCC overall imports								
Rk-ij GCC overall exports								
Adjusted R squared	**0.812**	**0.833**	**0.836**	**0.843**	**0.833**	**0.828**	**0.846**	**0.832**
Number of Observations	**825**	**836**	**898**	**900**	**911**	**912**	**937**	**1007**

Ordinary least squares estimates on annual data. Each year was run separately
Statistical significance: ***1%, **5%, *10%
Source: Authors computation.

Gravity Model Estimation (continued)

Basic gravity variables	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Intercept	-20.65***	-20.30***	-22.11***	-24.13***	-26.44***	-25.98***	-25.26***
Log GDP exporter (j)	0.881***	0.899***	0.948***	0.954***	1.040***	0.978***	1.047***
Log GDP importer (i)	0.911***	0.922***	0.949***	0.993***	0.984***	0.974***	0.979***
Log Percapita (j)	0.114**	0.059	0.087**	0.088**	0.079	0.079	0.012
Log Percapita (i)	0.020	-0.003	0.012	0.018	-0.024	0.001	-0.033
Log Area exporter (j)	-0.025	-0.034	-0.093***	-0.071***	-0.028	0.027	-0.080***
Log Area importer (i)	-0.135***	-0.139***	-0.131***	-0.134***	-0.129***	-0.131***	-0.142***
Log distance btwn (i)(j)	-0.680***	-0.715***	-0.684***	-0.640***	-0.623***	-0.560***	-0.599***
Dummy Var. for Border	-0.016	-0.334	-0.087	-0.218	0.271	0.024	0.200
Lij English	0.636***	0.500***	0.829***	0.861***	0.791***	0.684***	0.609***
Lij French	0.158	0.277	0.233	0.422	0.380	0.595	0.743
Lij Spanish	0.860	0.967	0.782	0.751	1.080	0.605	1.004
Lij Swahili	0.751	1.220	0.803	0.910	1.319	1.403	0.622
Lij Arabic	-0.642	0.115	0.140	0.563	-	2.405**	-
Rkij EAC intra bloc	2.491***	2.323***	2.278**	2.483***	1.474	2.116**	2.641***
Rki-j EAC overall imports	-0.252	-0.176	-0.193	0.010	-0.155	0.008	0.143
Rk-ij EAC overall exports	-0.475**	-0.610***	-0.642***	-0.558**	-0.623**	-1.153***	-1.059***
Rkij EU intra bloc	0.101	0.355**	0.179	0.259*	-0.027	-0.052	-0.229
Rki-j EU overall imports	-0.310***	-0.352***	-0.271***	-0.396***	-0.311**	-0.397***	-0.485***
Rk-ij EU overall exports	-0.105	-0.038	-0.237**	-0.211**	-0.232	-0.347***	-0.461***
Rkij NAFTA intra bloc	0.499	1.006	0.263	0.199	-0.577	0.076	-0.192
Rki-j NAFTA overall imports	0.037	0.052	-0.124	-0.282	-0.233	-0.186	-0.192
Rk-ij NAFTA overall exports	-0.513***	-0.382**	-0.660***	-0.779***	-1.210***	-1.389***	-0.983***
Rkij ASEAN intra bloc	2.792***	2.674***	2.591***	2.791***	3.591***	3.300***	2.990***
Rki-j ASEAN overall imports	0.662***	0.761***	0.804***	0.897***	0.981***	0.933***	0.766***
Rk-ij ASEAN overall exports	1.481	1.451***	1.226***	1.331***	1.436***	1.398***	1.337***
Rkij COMESA intra bloc	0.016	0.683	0.439	0.467	1.860	0.873	0.821
Rki-j COMESA overall imports	0.051	0.030	-0.120	0.050	-0.327	-0.157	-0.279
Rk-ij COMESA overall exports	-1.304***	-1.206***	-1.296	-1.346***	-0.653**	-0.572**	-0.242
Rkij GCC intra bloc	-	1.042	0.336	0.353	-	-	-
Rki-j GCC overall imports	-	0.329**	0.386	0.299*	-	-	-
Rk-ij GCC overall exports	-	0.006	-0.865	-0.983***	-	-	-
Adjusted R squared	**0.817**	**0.829**	**0.836**	**0.823**	**0.855**	**0.835**	**0.862**
Number of Observations	**1008**	**1141**	**1153**	**1179**	**748**	**953**	**921**

Ordinary least squares estimates on annual data. Each year was run separately
Statistical significance: ***1%, **5%, *10%
Source: Authors computation.

Table 10: Coefficient F-Tests for EAC gravity model variables.

		Intra-bloc		**Overall imports**		**Overall exports**	
Year t	Year t+1	F-statistic	Probability	F-statistic	Probability	F-statistic	Probability
1990	1991	0.008	0.928	0.243	0.622	6.234	0.013*
1991	1992	8.872	0.003*	1.202	0.273	0.395	0.530
1992	1993	0.595	0.440	0.015	0.902	1.771	0.183
1993	1994	0.083	0.773	0.083	0.773	35.155	0.000*
1994	1995	0.081	0.776	0.263	0.608	1.033	0.310
1995	1996	0.026	0.872	3.127	0.077	0.479	0.489
1996	1997	6.284	0.012*	0.016	0.900	0.073	0.787
1997	1998	3.400	0.065	0.000	0.998	3.960	0.047*
1998	1999	0.016	0.898	0.003	0.959	0.003	0.957
1999	2000	0.007	0.935	0.483	0.487	0.463	0.496
2000	2001	0.025	0.875	0.849	0.357	0.014	0.906
2001	2002	0.002	0.964	1.076	0.300	0.424	0.515
2002	2003	0.027	0.869	0.302	0.582	2.539	0.111
2003	2004	0.562	0.454	0.049	0.825	0.368	0.544
1990	1996	2.547	0.110	0.202	0.6530	0.108	0.741
1990	2004	3.459	0.063	0.607	0.436	14.169	0.000*
1996	2004	0.168	0.681	0.001	0.965	16.079	0.000*

Results based on Wald Coefficient testing if EAC regional bloc coefficients in $year_t = year_{t+1}$
*denotes years when the coefficients were statistically different from each other evaluated at P=0.05