

**AN EMPIRICAL INVESTIGATION ON FACTORS  
DETERMINING TRADE IN AN FTA: A CASE STUDY OF  
COMESA ' /**

**BY**

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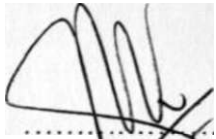
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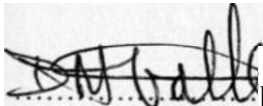
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## **ABSTRACT**

**This paper looks at an empirical analysis of the factors determining trade in an FTA taking the case of CONIESA and the trade effect of the recendy formed COMESA FTA using the gravity model. The analysis covers the years 2000-2004 in order to capture the period under the FTA.**

**Using a panel data set of nineteen COMESA member countries over the period of fives, the gravity results have shown that GDP, population, distance, common border and FTA are important determinants of trade in the COMESA region. The trade effects of the FrA, also turned out to be trade creating.**

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## **LIST OF ABBREVIATIONS**

<b>ACP</b>	<b>African, Caribbean and Pacific Countries</b>
<b>AGOA</b>	<b>African Growth and Opportunity Act.</b>
<b>CCIA</b>	<b>COMESA Common Investment Area</b>
<b>COMESA</b>	<b>Common Market for Eastern and Southern Africa</b>
<b>EAC</b>	<b>East African Community</b>
<b>ECOWAS</b>	<b>Economic Community of Western Africa States.</b>
<b>EPA</b>	<b>Economic Partnership Agreement</b>
<b>EU</b>	<b>European Union</b>
<b>FTA</b>	<b>Free Trade Area</b>
<b>GDP</b>	<b>Gross Domestic Product</b>
<b>MUB</b>	<b>Manufacturing Under Bond</b>
<b>PTA</b>	<b>Preferential Trade Area</b>
<b>SADC</b>	<b>Southern African Development Community</b>
<b>WTO</b>	<b>World Trade Organization</b>
<b>IS</b>	<b>Import substitution</b>

## **CHAPTER ONE**

### **1.0 INTRODUCTION**

While multilateral trade liberalization goes on within the World Trade Organization (WTO) framework, regionalism simultaneously gains momentum as an indispensable form of increasing trade amongst both developed and developing countries.

Although these are not conflicting or mutually exclusive phenomena's, these inclination towards regional blocs are shaped by fierce competition in political and economic systems. Mutual economic benefits and vested interests are driving forces behind this renewed regionalism. The success story of the European Union and its extension has created interest, among many countries, of forming such economic blocs.

In addition most of the African countries are too small on their own to negotiate with powerful trading blocs. Moreover initiatives such as the one between the EU and ACP countries tend to put emphasis on the regional dimension as a way to face the challenges of globalisation. Regional trade liberalization is also seen by its proponents as a means to contribute to the African development through fostering economic growth.

Africa has had economic integration experiments for quite a long time now - half a century. As a result Africa records around eleven economic blocs such as the Economic Community of Western Africa States (ECOWAS), the Common Markets of Eastern and Southern Africa (COMESA) and the Southern Africa Development Community (SADC). Separate blocs exist within the larger ones and most countries are members of more than one block. For instance Kenya and Uganda are both in COMESA and East Africa Community (EAC) with Tanzania, which is a member of the SADC.

This paper focuses upon the trade experience of one of the major economic groupings in Africa-COMESA, with Kenya being a member and a participant of the Free Trade Area. We specifically aim at investigating, empirically, the factors determining trade in the COMESA regional bloc.

## 1.1 ORIENTATION OF KENYA'S FOREIGN TRADE EXPERIENCES

Following independence in 1963, Kenya maintained an import substitution strategy inherited from the British in the colonial era which had a managed economic system with control on foreign exchange, high tariff barrier import licensing as well as controls on wages, retail and producer prices. The Kenyan economy performed well with GDP growth rates averaging 5.5 percent annually. The manufacturing sector grew at a rapid pace of 10 percent per annum fuelled by growth in domestic rural incomes and expansion of exports to Tanzania and Uganda under the common market created by the first EAC. Kenya developed a diverse industrial base including processed plastics, pharmaceuticals steel rolling and galvanising paper, vehicle assembly, textiles and garments, leather and tanning as well as food processing. These industries employed large numbers of Kenyans. By the end of 1970 Kenya was one of the most promising developing country in Africa.

In the late 1970's, the Kenyan economy faced a number of shocks, including the increasing volatility of the coffee market, the break-up of the original EAC in 1977 and the consequent lack of market access to neighbouring economies, plus the oil price increases of 1973 and 1979. These left the import substitution with excess capacity. From then on, this trade regime had a debilitating economic effect, which worsened over time. Due to a smaller market, the industries operated with an excess capacity leading to low quality products and higher costs that were passed on to consumers in terms of higher prices. It led to inefficiencies within the industries and in the utilization of the limited foreign exchange, which was used to sustain these industries instead of being allocated to productive areas. The increased costs for imported inputs for the Import substitution (IS) industrialization strategies coupled with deteriorating production in the export sector, adversely affected the balance of payments.

The need for outward oriented strategy was recognized in the 1979-83-development plan. This called for increased competitiveness, diversification of the exports and efficient industries in terms of quality and price in the world markets. To encourage investments and exports, Kenya introduced manufacturing under bond (MUB) scheme, which waived

import taxes on inputs for exports and allowed for establishment of export processing zones. These offered exporting firms ten-year tax holidays, unrestricted foreign ownership and employment and freedom to repatriate any amount of earnings. It was during this period that PTA now COMESA was formed. Kenya was among the first nine signatories of COMESA in December 1981. Restrictions on foreign exchange retention were removed in the 1984-1988-development plan. Strong emphasis was placed on export expansion in the sixth development plan 1989-93, where it stated that the achievement of target growth rates set for the industrial sector depended on rapid export production.

However, with this came other international reforms, which required Kenya to begin liberalising its trade regime. In return for various loans and debt relief packages, Kenya adopted the structural adjustment programmes (SAPs) in 1980. During the 1990's these reforms were compounded by further waves of liberalisation. As a member of WTO in 1995 Kenya agreed to bind its tariffs at 100% and make further reduction commitment under the Agreement on Agriculture.

The main road map for Kenya's future is now contained in the Economic Recovery Strategy for Wealth and Employment Creation (ERSWEC) 2003-2007. The ERSWEC states that Kenya's development strategy is largely externally facing -relying on building manufacturing and value added production to penetrate regional and international markets. It goes further to state the government's recent embarkement on a comprehensive reform of its trade system within the context of COMESA and EAC, emphasising on the Kenya government commitment to the development of the regional markets.

At present, Kenya exports to developed countries are largely primary agricultural products, whilst exports to COMESA are more value-added products. Sixty seven percent of Kenya's manufactured exports (excluding agro-processed products) went to COMESA markets in 2003, compared to 9 per cent to EU markets. Kenya's main exports to the COMESA countries are light industry products and re-exports including processed

petroleum oils, light oils and preparations, tea, cement, refined palm oil, plastic bags and cigarettes. Expanding and further development of regional markets will be of vital importance to Kenya continued export diversification. Kenya is currently undergoing serious negotiations with other nations including the European Union (EU) to come up with Economic Partnership Agreements (EPAs). The European Commission (EC) is proposing to replace the systems of non-reciprocal trade preferences that African Caribbean and Pacific (ACP) countries have enjoyed for the past thirty years under the Lome Conventions and with EPAs when the Cotonou Partnership Agreement (CPA) expires in December of 2007. Kenya is expected to negotiate under the Eastern and Southern Africa (ESA) group. The AGOA agreement expires in 2008 and Kenya also needs to renegotiate an agreement to replace it. The EU and the USA are major destinations for Kenya exports. However in the 2005 Economic Survey, Kenya's total exports to Africa expanded by 20.3 per cent, with the region's share of export being 47.5%, compared to Europe and US whose shares were 28% and 3% respectively, effectively consolidating the regions position as the leading market for Kenyan exports.

## 1.2 BACKGROUND TO REGIONALISM

International trade plays an increasing important role in our economic life. The volume of world trade has been on the increase not only in absolute volume and value but also in importance relative to GNP. In relative terms the role of international trade differs greatly from country to country. In some countries several commodities are not produced domestically at all and the entire country has to rely on imports to obtain these goods, which may be considered vitally important. Similarly exports play an important role in many countries' industries, which exports amounting to a substantive proportion of the total production of some industries. This sort of comparative advantages have seen the rise of regional groups in the international trade arena.

There are several possible forms of organizations that allow countries to discriminate against a select group of countries. Most prominent among these are free trade areas, customs unions and common markets. The main difference among these three principal

ways of organizing a preferential trade area lies in the degree of interdependence achieved by the member countries.

A free trade area consists of a group of countries that have abolished all tariff barriers among themselves but maintain their individual tariffs vis-a-vis the outside world. The COMESA bloc formed a regional FTA in 2000, although only eleven members out of the twenty are participating in the FTA.

A customs union differs from free trade area in that it has a common external tariff that applies to the imports by any member country from the outside world. Free movement of all products is assumed within the union. The COMESA bloc is working towards implementing a customs union by 2008.

On the other hand a common market not only allows for the free movement of products like the FTA and the customs union but also permits in addition the free movement of all factors of production. The common market represents the most complete concept of economic integration among the three. A good example of these is the EEC (European Economic Commission).

According to Robert Heller 1973, the countries likely to gain from a customs union are: if the countries forming such a union are initially similar the gains tend to be larger than if the countries are initially dissimilar. This is because in the latter case the countries are already specialized to a larger extent in the commodities in which they enjoy a comparative advantage. If however the countries are initially similar then the potential gains from specialization pursuant to the formation of the customs union also exist. The total anticipated gains are therefore larger.

Also the greater the size of the customs union the greater the gains are likely to be. The larger the union the greater the chance that the world's lowest cost producer is a union member and that therefore all union members are afforded the advantage of being able to buy from the low cost producer. The chance of trade diversion playing a role decreases as the size of the union increases.

### 1.3 BACKGROUND TO COMESA

The Common Market for Eastern and Southern Africa (COMESA) was established on 8<sup>th</sup> December 1994 after being changed from the Preferential Trade Area (PTA), which had been in existence since December 1981. The PTA was formally established at a summit meeting of heads of state in Lusaka in December 1981 with only nine states (Comoros, Djibouti, Ethiopia, Kenya, Malawi, Mauritius, Somalia, Uganda and Zambia) signing the treaty with Angola, Botswana, Lesotho, Swaziland and Zimbabwe attending the signing ceremony but did not sign while Madagascar, Mozambique, Seychelles and Tanzania did not show up at all. However Lesotho, Swaziland, Zimbabwe, Tanzania, Rwanda and Burundi signed later thus bringing the total membership to fifteen. As of today COMESA has 20 member countries being Angola, Burundi, Comoros, DR Congo, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Sudan, Swaziland, Uganda Zambia, Zimbabwe.

COMESA is one of the largest regional groupings in Africa in terms of member states (it claims 20 members almost half of the total number of African countries) besides Southern Africa Development Community (SADC) and Economic Community of West African States (ECOWAS). For a number of countries that have limited opportunities for increasing their exports to Europe, the Americas and Asia, COMESA looms large as the way of the future. COMESA is the first African economic community to have in place a Free Trade Area, which was established in October 2000, the third in the world after the European Union and the North American Free Trade Agreement. It's in the process of implementing a custom union by 2008 and already established a Common Investment Area (CCIA) in June 2005.

#### 1.3.1 Aims of COMESA

According to COMESA brief of 1994, member states had recognized that unless a large enough economic space can be created to attract and give guarantees to domestic, cross

border and foreign direct investments, the transformation of these economies from extreme dependence to self reliance cannot be realized. It had also been recognized that countries with small GDP had been finding it difficult to attract foreign investment unless this is within the context of a wider common market. With this member states saw the specific objectives of COMESA to be:

- Attainment of sustainable growth and development of member states by promoting a more balanced and harmonious development of its production and marketing structures;
- Promotion of joint development in all fields of economic activity and the joint adoption of macroeconomic policies and programs, thus raising the standards of living of its people and fostering closer relations among its member states;
- Co-operation in the creation of an enabling environment for foreign, cross-border and domestic investment, including the joint promotion of research and adaptation of science and technology for development;
- Cooperation in the promotion of peace, security and stability among the member states in order to enhance economic development in the region;
- Cooperation in strengthening between COMESA and the rest of the world and the adoption of common positions in international fora;
- Working towards the establishment and realization of the objectives of an African Economic community;

The economic sizes of COMESA states' individual markets condemn them to join forces if they are to develop their industries and reap benefits of economies of scale, attract foreign investors by organizing a frontiers-free market with a critical mass of potential consumers and create the jobs their constantly expanding populations demand.

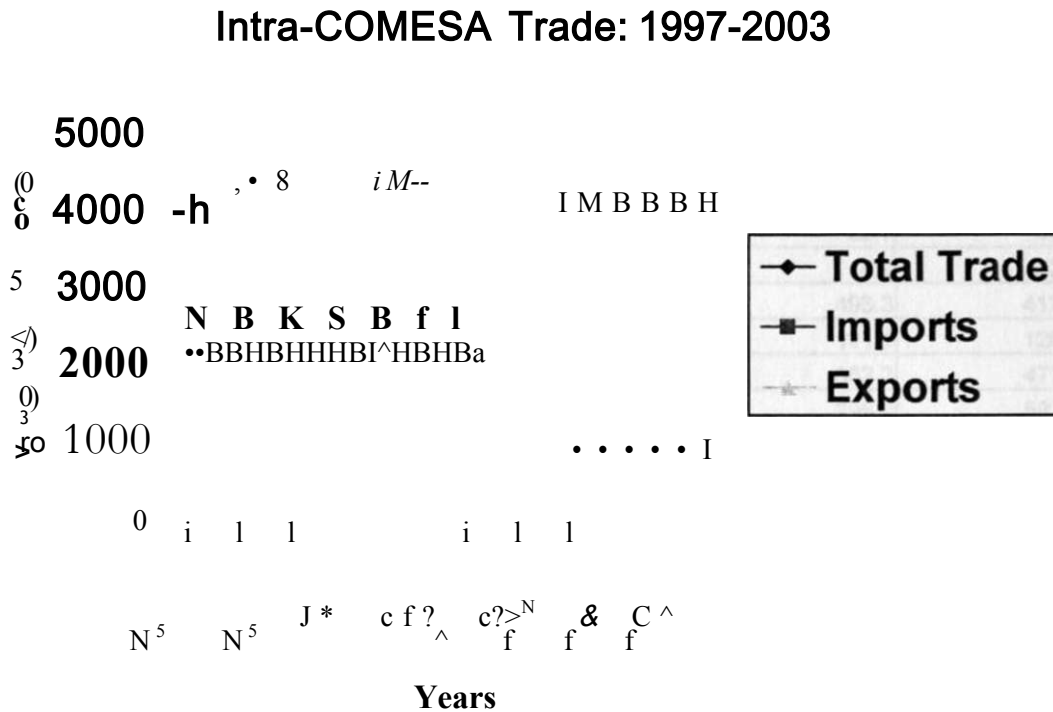
### 1.3.2 Recent Performance of Intra-COMESA Trade

The total trade in the region has been on an increasing trend as indicated in the figure below. According to COMESA Annual Report of 2004, intra- COMESA trade increased



by 5.8% reaching US \$4.8 billion in 2003, up from \$4.5 billion in 2002 the estimated growth in 2004 was about 5.9% with total intra-COMESA trade reaching US\$5billion.

**Figure 1: Intra-COMESA trade 1997-2003**



Source: COMESA annual report 2004

The reports assessment of member states trade revealed that for some countries such as Kenya, the COMESA market had become the most important one in their global trade. The table below shows the total trade of the nineteen member's trade with COMESA. In 2004 Kenya traded the most with COMESA.

Table 1: Total Intra-C OMESA Trade 2000-2004 by country in millions of USD.

COUNTRIES	2000	2001	2002	2003	2004
Angola	11	13.2	16.4	14.9	30.4
Burundi	24.6	58.5	32.4	51.5	54
Comoros	5.1	3.7	3.4	4.7	7.8
Congo	140.8	108.7	348.5	317.2	307.7
Djibouti	77.5	83.3	85.3	128.4	39.4
Egypt	237.6	304.9	620.3	321	316.9
Eritrea		1.7	2.1	8.3	3.8
Ethiopia	2627	221.7	246.6	186	66.1
Kenya	522.9	608.9	743	578.2	704.7
Madagascar	80.1	48.8	48	78.8	127.7
Malawi	92.2	130.1	113.3	152.7	175.3
Mauritius	135.2	155.5	188.8	148.3	143.3
Rwanda	61.9	43.4	27.2	32.7	60.4
Seychelles	14.7	15	27.4	14.2	22.8
Sudan	277.7	304.2	337.6	493.3	412.7
Swaziland	69.9	51.8	102	121.1	120.2
Uganda	236.8	223.2	192.5	352.3	471.4
Zambia	221.1	375.2	362.8	396.2	582.5
Zimbabwe	2193	135.8	323.3	150.7	213.9

Source COMESA website

For some commodities, there has been positive intra COMESA trade development. For instance Egypt, Malawi, Swaziland, Sudan and Zambia have become regular exporters of sugar to the Kenyan market. Prior to the launching of the FTA Kenya was importing sugar from outside the region. Tea trade has continued to increase especially after the formation of the FTA in 2000. Other major movers are industrial and intermediate products such as refined copper cathodes, steel and steel products, cooking oils, and cement and petroleum products. See Table 2 and 3 below.

**Table 2: Top ten intra COMESA Exports**

No.	Description	Value US\$
1	Coffee, tea, mate and spices	215, 358,328
2	Sugars and sugar confectionery	135,878,041
3	Essentials oils and Resinoids, perfumery, cosmetic or toilet preparations	121,889,749
4	Beverages, spirits and vinegar	112,082,730
5	Salt, sulphur, earths and stone, plastering materials, lime and cement	96,248,349
6	Iron and steel	76,650,115
7	Nuclear reactors, boilers, machinery and mechanical appliances	70,575,546
8	Tobacco and manufactured tobacco substitutes	38,367,024
9	Vegetable plaiting materials, vegetable products not elsewhere specified	62,185,295
10	Plastics and articles thereof	56,584,138

*Source: COMESA annual report 2004*

Table 3: top ten Intra COMEAS imports

No.	Description	Value US \$
1	Mineral fuels, mineral oils and products of their distillation, bituminous.	264,953,496
2	Salt sulphur earths and stone, plastering materials lime and cement	162,585,497
3	Beverages spirits and vinegar	123,969,919
4	Coffee, tea mate and spices	122,880,540
5	Nuclear reactors, boilers, machinery an mechanical appliances	108,889,687
6	Sugars and sugar confectionary	100,396,228
7	Iron and steel	87,290,002
8	Electrical machinery and equipment and parts thereof: sound recorders	81,786,548
9	Tobacco, and manufactured tobacco substitutes	74,550,737
10	Paper and paperboard, articles of paper pulp, of paper or of paperboard.	69,720,466

*Source: COMESA annual report 2004*

#### 1.4 STATEMENT OF THE PROBLEM

Increasing integration of the world economies has revived interest in regional integration schemes, with virtually all WTO members being parties of at least one FTA and many being parties of two or more. Currently there are about 11 regional economic groupings in Africa, with all African countries being members of at least one regional economic group. With this spread of FTAs in Africa and the world it's hard to characterize them as exceptions. In fact it is very important to understand not only the rationale behind the FTAs but also their likely effects on trade on the participating countries.

It is because of this growing importance of free trade agreements and the ambiguity regarding their impact on intra- regional trade that this paper aims at empirically identifying the most important determinants of trade in an FTA taking the case of COMESA. The paper will also provide an assessment of the trade potentials in the COMESA bloc, (if the bloc is trade creating or diverting). Most previous studies on COMESA (Alemayehu and Haile (2000), Muuka G N and Harrison G E (1998), Lucian Cernat (2003)) were done before the COMESA FTA was established in 2000, and gave very contradicting results on the trade potentials of COMESA.

#### 1.5 OBJECTIVES OF THE STUDY

The main objective of the study is to investigate determinants of trade and trade potentials within an FTA taking the case of COMESA.

The specific objectives:

1. Empirically identify the most important determinants of intra-regional trade in an FTA.

2. To assess the trade potential (Trade creating or diverting) in the COMESA bloc using the gravity model estimates. If the FTA dummy variable for participating countries is positive then the FTA is trade creating if negative its trade diverting.<sup>1</sup>

## 1.6 SIGNIFICANCE OF THE STUDY

The exemption on the WTO clause on Most Favoured Nation (MFN), which allows for creation of free trade areas and customs unions, has seen the creation of many regional blocs. Currently the COMESA market is more important to Kenya than the EU accounting for around 36 per cent of total exports while the EU accounts for about 30% of Kenya's total exports. The present study investigates the factors determining trade in the COMESA regional bloc and the trade potential of the bloc's FTA so as to reinforce the need for increased integration and the establishment of a customs union. Although Kenya seems to have taken advantage of the opportunities existing in the bloc it would benefit more if a customs union is established.

<sup>1</sup> Trade creation occurs when you replace relatively high-cost domestic production with lower cost imports from the partner country. Trade diversion takes place when a country switches its source of imports from a more efficiently- producing country to a less efficiently producing country because of the customs union. Trade creating is welfare increasing while trade diversion is welfare decreasing (Sodersten B O, Geoffrey reed 1994)

## **CHAPTER TWO**

### 2.0 LITERATURE REVIEW

This section discusses the literature relevant to the present study. Section 2.2 provides a discussion on the successes and failures of COMESA regional economic grouping one of the largest bloc in the developing countries. Section 2.3 discusses the empirical literature, which brings out strengths and weaknesses of previous studies upon which an appropriate methodology is adopted in Chapter 3.

### 2.1 REGIONAL PESSIMISM AND OPTIMISM

The increasing integration of the world economies has revived interest in regional integration scheme, hence the fear of marginalisation together with the fact that, most of African countries are too small, on their own, to negotiate with powerful trading blocs. This has led them to increase interest towards regional integration. Moreover initiative such as the one between the EU and ACP countries tend to put emphasis on the regional dimension as a way to face the challenges of globalisation. Finally regional trade liberalization is also seen by its proponents as a means to contribute to the African development through fostering economic growth through more trade creation (Sophie Chauvin, Guillaume Gaulier 2002 pg 9)

Alemayehu and Haile (2000) argues that regional integration draws its rationale from the standard trade theory, which states that free trade is superior to all other trade policies. As an extension of this basic principle, free trade among two or more countries will therefore improve the welfare of the member countries as long as the arrangements lead to a net trade creation in the Vinerian sense (Sodersten B O, Reed G 1994 pg 322-326). That is, though as the theory of the second best indicates, regional agreements do not guarantee an improvement in the welfare of member countries, they could do so provided trade diversion is minimal and/or trade creation tilts the balance such that we have a net trade creation effect.

For many years, the general opinion was that any economic integration that represents a movement towards freer trade should therefore be beneficial and welfare enhancing (Cernat L 2003). This opinion was challenged in 1950 when Viner showed in his "customs union issues" that the net impact of a regional trade agreement on welfare is uncertain and depends on a number of economic circumstances. This early theoretical and empirical literature that started in the 1950's with Viner's seminal work (Viner 1950) opened up new ground of advancing the idea that the net welfare effects stemming from formation of an FTA are ambiguous. In a simple partial equilibrium model under perfect competition, an FTA will increase the level of trade between members at the expense of less efficient domestic producers (trade creation) but also of more efficient third countries (trade diversion). The net effect of an FTA on trade (as a proxy for welfare) depends thus on the relative size of these two effects. (Cernat L 2003). (Balassa B. 1961) in support of Viner added that trade creation represents a movement toward the free trade position since it entails a shift from high-cost to low cost sources of supply, while trade diversion, a shift of purchase from low cost to higher cost producers acts in the opposite direction.

Africa has several economic blocs such as Economic Community of Western African states (ECOWAS), the Common Market for Eastern and Southern African (COMESA), the Southern Africa Development Community (SADC) and the East African Community (EAC) among others. Progress on African regional integration has nevertheless been slow due to several factors: overlapping membership, lack of authority and bureaucratic sophistication to deal with bigger powers, political turmoil in some countries. All of these factors have contributed to slow down the process. Therefore African alliances have concentrated more on liberalizing trade within the region than with the rest of the world. Thus protectionism has been easy to justify in so far as less developed, less diversified economies are also less able to weather the transition to free trade. For this reason separate blocs exist within the larger ones and most countries are members of more than one block for instance Kenya and Uganda are members of COMESA and EAC. Tanzania on the other hand is a member of the EAC and not a member of COMESA but of SADC. When it comes to extra- African trade agreements, these multiple memberships cause

problems especially when there is need for negotiations (Chauvin S. 2002). Such as the ongoing EPAs where there is an overlap in Southern and Eastern Africa between COMESA and SADC members as a result of which the Eastern and Southern bloc ESA negotiating bloc contains both SADC and COMESA, while Tanzania is negotiating under the SADC despite being in the EAC common external tariff, this has been seen to cause confusion in the establishment of customs union in both the EAC and COMESA.

The Common Market for Eastern and Southern Africa (COMESA) is one of the largest blocs in the region. COMESA launched the COMESA free trade area in 2000 and is currently preparing for a customs union, which is expected in January 2008. The COMESA region, in June 2005, completed working towards a COMESA Common Investment Area Agreement (CCIA). The aim of the CCLA is to attract intra and extra COMESA investment into the region. These developments are expected to act as catalysts for increased regional integration and to facilitate trade and investment.

However many regional trading arrangements in Africa including COMESA have not been marked by any significant gain in exports, output or other measurable economic benefits (Langhammer and Hiemenz, 1990 and de Melo and Panagariya 1993). This has been mainly due to unsatisfactory economic performance in terms of economic growth in most of these countries. Recently however this has not been the case most of these countries are enjoying continued economic growth and exports. An aggregate annual GDP growth rate of 4.5 % was estimated in 2004 and is expected to rise to 4.8-5% in 2005. Compared to the 1970 and 1980 when the GDP remained practically flat and COMESA regional bloc was seen to be under performing.

One of the most vital criteria for assessing the success of integration deals with the question of whether a trade creation effect within COMESA or simply a trade diversion effect has occurred. Trade creation occurs when we replace relatively high-cost domestic production with lower cost imports from the partner country. Trade diversion takes place when a country switches its source of imports from a more efficiently- producing country to a less efficiently producing country because of the customs union. Trade creating is



welfare increasing while trade diversion is welfare decreasing (Sodersten B O, Geoffrey reed 1994). In theory an RIA such as COMESA can both create and divert trade or is purely trade diverting. Bhagwati and Panagariya (1996) Panagariya (1998) argue that developing countries lose from an regional integration agreements. On the other hand de Melo et al. (1993) noted that the case of pure trade diversion and welfare worsening is too extreme a model to characterise actual regional integration agreements.

According to (Muuka, G N and Harrison G E 1998) review of the COMESA market performance for the period of 1985-1993, there had been no increase in intra-COMESA trade creation or any evidence yet of dynamic benefits as a result of integration. This they attributed to dependency on a few primary exports, capital-intensive methods of production instead of labour intensive methods and the lack of governments commitments among others. However this has evolved dynamically in the recent past with most countries especially Kenya having most of their industrial exports especially edible oils going to the COMESA market besides other primary exports. The COMESA governments have also been very committed to the bloc. This has seen the recent establishment of the FTA and the promise of a customs union by 2008 January.

(Alemayehu and Haile 2002) suggested that intra COMESA trade was not significantly different from its trade with non-member countries. Because most of the governments in the bloc failed to implement the treaties they signed, which suggested a lack of political commitments in practice and non complimentarity nature of the intra-REC(regional economic communities) trade. However as shown by Weeks and Subasat (1998) this aggregate primary commodity category hides the huge potential trade in agricultural commodities, in particular in grain that does exist in Africa This potential might even be higher if one is able to account for unrecorded cross-border trade.

The findings of Harrison G E (1998) and Alemayehu and Haile (2002) indicated that almost all the standard gravity model variables-distance, GDP, GDP per capital were main determinants of bilateral trade.

Alemayehu and Haile (2002) also added infrastructure, culture and geographic, policy and finally political. (Cernat L 2003) also found the conventional determinants of bilateral trade flows to be relevant to Africa.

Karingi S N et al (2002) found the net effect of regional integration initiative under COMESA to be trade creating and recommended the faster move to liberalise to realise the gains. (Cernat L 2003) concluded that CARICOM, COMESA, ECOWAS and SADC all showed significant trade creation effects with no evidence of trade diversion and moderate trade expansion effects. Trade between COMESA members was more than twice the level as a result of the trade creation effect. Trade expansion was also quite significant among COMESA countries.

It is however important to note that despite the consensus on the determinants of bilateral trade as evidenced by the empirical studies, the trade effects of COMESA have diverse findings. Most of the recent studies seem to be in favour of the blocs trade creating effects, which can be attributed to the FTA formed in 2000. Although none of them included the FTA as a variable, their findings were similar on the other standard gravity model variables being distance, GDP, GDP per capita and common border as the major determinants of bilateral trade

## 2.2 EMPIRICAL LITERATURE

This section reviews the empirical studies relating to regional trade agreements performance and the factors determining trade in regional blocs with a special concentration on developing countries. Most of these studies have adopted the gravity model for their analysis. The gravity model is used to predict movement of people, information and commodities between cities and even continents. In its basic form, the gravity equation explains the level export from country *i* to country *j* by using the GDP of exporting country, GDP of importing country and the distance between them.

Tinbergen (1962) and Poyhonen(1963) were the first authors to apply the gravity equation to analyse international trade flows. Since then the model has become a popular

instrument in empirical foreign trade analysis. The model has been used successfully applied to flows of varying types such as migration, foreign direct investment and more specifically to international trade flows. According to this model, exports from country / to country  $j$  are explained by their economic sizes (GDP or GNP), their population, direct geographical distances and a set of dummies incorporating some type of institutional characteristic common to specific flows.

Theoretical support for research in this field was originally very poor, but since the second half of the 1970's several theoretical developments have appeared in support of the gravity model. Anderson (1979) made the first formal attempt to derive the gravity equation from a model that assumed product differentiation. Bergstrand (1985, 1989) also explored the theoretical determination of bilateral trade in a series of papers, in which gravity equations were associated with simple monopolistic competition models. Helpman (1987) used a differentiated product framework with increasing returns to scale to justify the gravity model. Deardorff (1995) showed that the gravity equation works also in a neoclassical world and proved that the gravity equation characterises many models and can be justified from standard trade theories. However the theoretical and macroeconomic foundation of this model have never been made entirely secure despite several authors, as indicating above attempts to provide the model with a proper economic theory. The success of the gravity model stems from the empirical robustness and the intuitive appeal (Rasken J 1998)

According to the generalized gravity model of trade, the volume of exports between pairs of countries,  $X_{ij}$  is a function of their incomes (GDPs) their populations, their geographical distance (distance between the economic capitals) and a set of dummies.

$$X_{ij} = P_0 Y_i^{p_1} Y_j^{p_2} N_i^{p_3} N_j^{p_4} D_{ij}^{p_5} A_{ij} / V_{ij} \quad 1.$$

Where  $Y_i$ , ( $Y_j$ ) indicates the GDPs of the exporter (importer),  $N_i$ , ( $N_j$ ) are exporters (importer) populations,  $D_{ij}$  measures the distance between the two countries capitals (or economic centres) and  $A_{ij}$  represents any other factors aiding or preventing trade between

pairs of countries such as language, customs union.  $U_{ij}$  is the error term. An alternative formulation of the above equation uses per capita income instead of population,

$$X_{ij,t} = \alpha_0 Y_i^{\alpha_1} Y_j^{\alpha_2} H_i^{\alpha_3} H_j^{\alpha_4} D_{ij}^{\alpha_5} A_{ij}^{\alpha_6} U_{ij,t} \quad (2)$$

Where  $H_i$  is the exporter **GDP** per capita and  $H_j$  importers **GDP** per capita. The two models are equivalent. The second specification is usually chosen when the gravity model is applied to estimate bilateral exports for specific products, whereas the specification given by the one is often used to estimate aggregated exports. This study will use aggregated exports and imports so the first model will be adopted.

Rasken J (1998) built the gravity model to determine some of the determinants of African exports to the EU. His initial equation was as follows, which is similar to the one above.

$$X_{ij,t} = \alpha_0 Y_i^{\alpha_1} Y_j^{\alpha_2} H_i^{\alpha_3} H_j^{\alpha_4} D_{ij}^{\alpha_5} A_{ij}^{\alpha_6} U_{ij,t} \quad (3)$$

And after logarithmic transformation the gravity equation is changed to:

$$\ln X_{ij,t} = \ln \alpha_0 + \alpha_1 \ln(Y_i) + \alpha_2 \ln(Y_j) + \alpha_3 \ln(H_i) + \alpha_4 \ln(H_j) + \alpha_5 \ln(D_{ij}) + \alpha_6 \ln(A_{ij}) + U_{ij,t} \quad (4)$$

He extended the model with a number of variables giving the following equation-

$$\ln X_{ij,t} = \ln \alpha_0 + \alpha_1 \ln(Y_i) + \alpha_2 \ln(Y_j) + \alpha_3 \ln(H_i) + \alpha_4 \ln(H_j) + \alpha_5 \ln(D_{ij}) + \alpha_6 E_{ij,t} + \alpha_7 F_{ij,t} + \alpha_8 A_{ij,t} + \alpha_9 \text{LOCK}_{ij,t} + \alpha_{10} \text{PRIM}_{ij,t} \quad (5)$$

$X_{ij,t}$  = Export from countries  $i$  and  $j$  at time measured in US dollars

$Y_j$  = **GDP** for country  $i$

$Y_j$  = Indicates the **GDP** of country  $j$  respectively.

$H_i$  = denote the population of country  $i$ .

$H_j$  = denote the population of country  $j$ .

$D_{ij}$  = great circle distance between countries  $i$  and  $j$

$A_{ij}$  = dummy taking the value of one if the two countries  $i$  and  $j$  are neighbours, zero otherwise

$E_{ij}$  = dummy taking the values of trading countries share of the same official foreign language

$LOCK_{ij}$  is a dummy taking the value of one if the exporting country  $i$  doesn't have direct access to the sea, zero otherwise.

$PRIM_{ij}$  is a dummy taking the value of one if the exporting country  $i$  have primary product as their main exports, zero otherwise

a.  $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}$ , are the parameters of the model.

His findings gave expected results with GDP positively affecting the exports while the population and the distance between the two countries negatively affected the exports between the countries. This he justified by the fact that a larger country enjoys greater self-sufficiency under the assumption of economies of scales and larger natural endowments.

Hassan K. M. (1998) using the gravity model related bilateral trade to income, population (or per capita income) and distance between the trading partners for OIC (Organization of the Islamic conference) countries in 1999. The results found GDP, GDP per capita, and distance to be highly significant statistically at the 1 percent level of significance. The GDP per capital turned out positive which Hassan K explained to be indicating that as the GDP per capital of a country improves, it trades more with its block member. The estimated coefficient of the log of the product of the countries' GDP increased with size but less than proportionately indicating that smaller countries' (in GDP) tend to be more dependent on trade than larger more diversified ones. He also found the estimated coefficient on the product of per capita GDP to be low indicating that poorer countries trade less with each other. Distance as in other cases showed trade to fall as distance increased; a common border indicated a three-fold increase in trade. He later extended his model by including dummy variables for trade blocs. The dummy variables were statically significant with positives signs indicating the trade creating effects of regional blocs.

Martinez I. Z (2000) using a panel data set of 47 countries over a period of 20 years carried out an investigation using the basic gravity equation to estimate bilateral trade flows among 47 countries in order to analyse its determinant and to estimate trade potentials for certain economic blocs and countries. Using Ordinary least squares method (OLS) for year by year estimation, between estimators for an average of five years results and the within estimators, the models indicated that the variables traditionally included in the gravity equation presented the expected signs and highlighted the role played by intra-bloc effects. GDP and common language both had positive signs and were significant showing their positive influence in increasing trade. The country size was also directly related to trade, pointing out that larger countries have a greater capacity to absorb imports than do their smaller counterparts.

Alemayehu and Haile (2002) evaluated the determinants of bilateral trade flows and the impact of COMESA regional group. Estimating the standard gravity using a Tobit formulation for 1980-1997 imports and exports data, he found bilateral trade to be influenced by standard variables in a conventional gravity model, while regional groupings had insignificant effect on the flow of bilateral trade. The variables considered were GDP, GDP per capita, Distance, Infrastructure including policy and political and language. The findings were consistent with others findings being that, GDP was positively related to trade while GDP per capita and distance were negative influence to trade. However the findings were inconsistent with others, for instance language dummies were negative, in general the empirical work for Africa reported a positive coefficient for English and French (Foroutan and Prichet 1993, Elbadawi 1997). The model also found good macroeconomic policies to be important determinants to trade in Africa and political instability to be having a negative effect on trade.

Chauvin S and Gaulier G. (2002) used the basic gravity model including GDP, population, distance between the countries, and a dummy representing the common border for SADC. His findings were consistent with the rest in that GDP positively affecting trade, and population and distance negatively affected trade. Population because

larger countries tend to be more self-sufficient or alternatively poorer countries (countries with larger populations for a given level of GDP) trade less than richer countries. However he considered the use of geographic distance to be problematic as it's used as a proxy for transaction cost ignoring the specificities of transport network and the geography (deep forests and deserts) increasing the common border trade. He concludes that intra Africa trade tends to be highly concentrated geographically due to infrastructure and institutional constraints. This led him to improve the model by adding remoteness of which they found remoteness to be significant and positive which means that isolated countries do not trade less on average: what is relevant is the relative distance.

Cernat L (2003) using the gravity model, that included GDP's of both countries, distance and dummy variables for each of the RTA's, he showed that with the exception of the Andean community and MERCOSUR which seemed to have reduced trade with non members, the other five south- south RTA's examined including COMESA are not only trade creating but also trade expanding, increasing overall trade, even with third world countries sometimes quite significantly. His findings showed that trade between COMESA was more than twice between the level as a result of the trade creation effect and that imports from third countries were on average 30 percent higher than predicted levels.

### **2.3 OVERVIEW OF LITERATURE**

Most of the literature reviewed on the determinants of trade includes Alemayehu and Haile (2002) and Cernat L (2003) and Rasken J (1998), report that there is a positive relationship between trade and GDP, GDP per capita or population and common border and a negative relationship between trade and distance (between the capital) among others. They unanimously found trade to be positively related to the countries GDPs. However they varied on the other variables they included in the model where Alemayehu and Haile (2002) included other variables such as infrastructure, language and civil war. The significance of the parameters for the similar variables also varied from one study to the other.

On the effects of regional blocs studies gave different conclusions of the performance of COMESA. Among the studies reviewed Karingi S N et al (2002) and Cemat L (2003) found the bloc to be trade creating and expanding. Alemayehu and Haile (2002) on the other hand found the regional integration arrangements to have failed to positively affect intra-regional trade. According to them, intra-COMESA trade is not significantly different from its trade with non-member countries. Muuka, G N and Harrison G E 1998 through a descriptive study found the bloc to be experiencing neither trade creation nor trade diversion.

There is a clear variation of the findings of the performance of COMESA trade bloc as indicated above, hence the need for this study to carry out an investigation. Most of these studies used the basic variables in the gravity model being GDP, Population and distance. None of them considered the impact of the recently formed FTA in 2000 with 11 countries in COMESA region being members. These studies have also assessed the determinants of trade by considering exports only or imports and exports separately (Alemayehu and Haile (2002)).

This study differs from others on coverage and variables included in the model. The Free Trade Area (FTA) soon to be a Customs Union (CU) variable ignored in other studies will be included in the study as a dummy variable. The time under consideration will also favour the period the regional bloc has been enjoying the FTA (soon to be a CU). The study will also consider the determinants of total trade including exports and imports in the analysis not either of them as has been the case with the other studies. The results of this study are likely to be more credible than any other findings in explaining the determinants of regional trade and assessing the performance of the COMESA regional bloc in terms of its trade creating effects considering the inclusion of the FTA as a variable, which according to the COMESA 2004 annual report has contributed to the growth of 20% of intra FTA trade from US\$2.1 billion in 2002 to US\$2.6 billion in 2003.



## CHAPTER THREE

### STUDY METHODOLOGY AND DATA

This section includes the conceptual framework for this study in 3.2, the specification of the model adopted in 3.3, the type and source data in 3.4 and the limitation of the study in 3.5.

#### 3.1 CONCEPTUAL FRAMEWORK

This study takes intra-COMESA trade to be influenced by the following factors:

- Gross domestic product of the trading countries, which indicate the potential supply and demand for exports.
- The population of the trading countries.
- Distance, which captures the distance between capital cities of trading countries.
- Common border will be a dummy variable for trading countries sharing a common border.
- The FTA will be a dummy representing the participation of trading countries in COMESA Free Trade Area arrangement.
- Language dummy variable for trading countries sharing the same official foreign language.

So that we have trade as the dependent variable and the above listed factors as the independent variables. Our model will hence take the following format.

$$T_{ijt} = \rho_0 (Y, Y, /' (N/N, / ^2 D / ^3 B^{fM} A / ^5 U f^6$$

The study also assumes that the dummy variable A will determine how much the regional bloc (FTA) COMESA influences the pattern of trade determining the trade potentials of the bloc. This is because of the difficulty associated with estimating free trade agreement data.

### 3.2 THEORETICAL FRAMEWORK.

The model for analysis in this study is the gravity model of trade. This relates trade between pairs of countries to the trading countries GDPs, Populations, and their geographical distances and a set of dummies, which in this case included dummies for common border, common language and Free trade Agreement.

A high level of GDP in the exporting and importing country indicates high levels of supply and demand hence high levels of trade. Population on the other could have different effects of trade depending on whether the country exports or import less when it's big (absorption effect) or whether a big country exports more than small country (economies of scale). Distance is expected to have negative effect on trade, as it is a proxy of all possible trade costs. The dummy for common language has been taken into consideration due to the fact that COMESA has four main languages, English, French, Arabic and Portuguese. It is expected that countries sharing the same official foreign language will trade more. The same is expected for countries sharing a common border and participating in the FTA.

#### 3.2.1 MODEL SPECIFICATION

The model for the analysis was adopted from Rasksen J (1998). It constituted a typical gravity model relating bilateral trade to income, population, and distance between the trading partners:

$$T = p_o Y^{\alpha} Y^{\beta} N^{\gamma} N^{\delta} D / V p_y \quad 2$$

However in this study dummy variables A and L were included to capture the FTA in COMESA and common official foreign language between the trading countries, the study also used population instead of per capita GDP to avoid the multi-collinearity effects of

GDP and per capita GDP when used together as independent variables in the model. So that the final model took the form indicated above in (1)

$$T = P_0 Y_i^{\beta_1} Y_j^{\beta_2} N_i^{\beta_3} N_j^{\beta_4} D_{ij}^{\beta_5} B_{ij}^{\beta_6} A_{ij}^{\beta_7} L_{ij}^{\beta_8}$$

Linearizing the equation (1) through a logarithmic transformation and extending the model with a number of variables, the following equation was obtained:<sup>2</sup>

$$\log T_{ijt} = p_0 + p_1 \log(Y_{it}) + p_2 \log(Y_{jt}) + p_3 \log(N_{it}) + p_4 \log(N_{jt}) + p_5 \log(D_{ij}) + p_6(B_{ij}) + p_7(A_{ij}) + p_8(L_{ij}) \quad 4$$

Where  $p_1, p_2, p_3, p_4, p_6, p_7, p_8$  are expected to be positive while  $p_5$  will be negative. That is positive impact for GDP, common border, common language and FTA and a negative impact for Distance between the economic capitals of the trading countries. The population impact may be positive or negative, (I Martinez- Zarzoso 2000) depending on whether the country trades less when it's big (absorption effect) or whether a big country trades more than a small country (economies of scale).

$T_{ijt}$  = Bilateral trade between countries i and j at time t measured in US dollars

$Y_{it}$  = Indicate the GDP of country i in period t

$Y_{jt}$  = Indicate the GDP of country j in period t

$N_{it}$  = Denote the of the population of country i in period t

$N_{jt}$  = Denote the of the population of country j in period t

\* The logarithms give us the elasticities of the variables, which in this case are GDPs, populations and Distance of the trading countries. The dummy variables are not logged.



### **3J DATA SOURCE AND TYPE**

#### **3J.1 Data Type**

The study used annual time series trade data for the period of 2000-2004 to capture the commencement of COMESA FTA and cross sectional data covering the 19 member states of COMESA. This pooled data set, time series-cross sectional data hence panel data set has 95 observations (19x5) in other words the 19 COMESA countries were followed for 5 years and sampled annually. The reason for using only 19 states instead of the 20 current member states is because Libya only joined the bloc in 2005 hence there was no data on its Intra COMESA trade during the period of study.

The mixture of cross-sectional and time series analysis hence the panel data set allows us to get out of the constraints of minimal observations of time series data and to introduce dynamic element to cross sectional series. Panel data analysis endows regression analysis with both spatial and temporal dimension. The spatial dimension pertains to a set of cross-sectional units in this case the nineteen countries. The temporal dimension pertains to periodic observation of set variables characterizing these cross-sectional units over the five year time span.

#### **Dependent variable**

The dependent variable used in the regressions is the value of trade measured in dollars, which is the sum of imports and exports within COMESA for the period under study.

#### **Independent variable**

In this study six variables were included in the models as explanatory variable to assess the factors that determine regional trade. The variables were, GDP, Population, distance, dummy for common border, dummy for common language and a dummy for FTA.

### **3.4.2 Data Source and Nature**

The data was obtained from domestic, regional and international statistics. The domestic sources included issues of economic survey for the years 2000-2004. The regional sources included COMESA annual reports and bulletins for the last five years; the international sources included UNDP for the GDPs and the populations of the country all the five years and the distances between the countries economic capitals were taken from direct distances 1986, Cornell University and is measured in kilometres.

Most of the data underwent computation into log forms, so as to have it in a form consistent with the nature of the variables as in the model. The dummy variables were not logged. The trade and GDP data was expressed in millions of US dollars for consistency considering the diversity of currencies in the countries under review.

### **3.4 Model estimation**

The model was estimated by applying several methodologies. The simple pooled Ordinary Least Squares method was used after which it was corrected for heteroscedasticity. Four other regressions were run, to test for random effects, fixed effects (within estimator), between effects and random maximum likelihood estimators.

The most basic estimator of panel data sets is the pooled OLS estimators. However pooled OLS ignores the panel structure of the data and treats observations as being serially uncorrelated for a given individual with homoscedastic errors across individuals; and time periods. In this case the intercept there is one fixed intercept. This might not result in either efficient or unbiased parameter estimate. Hence the need for a fixed effects model that allows us to use all the data while the intercept is allowed to vary across firms and/or time is estimated.

The fixed effects also known as the within estimator is based on the time demeaned variables, the unobserved effects in the model disappear. The model uses the time

variation in the dependent and independent within each cross-sectional observation so that the slopes are constant but intercepts differ according to the cross-sectional units, in this case countries. While the intercept is cross-sectional group specific and in this case differs from country to country it may or may not differ overtime.

The between estimator exploits the between dimensions of the data, it is determined as the OLS estimator in a regression of individual averages of the dependent variable on individual averages of the explanatory variables and a constant. In this case the estimator was used to evaluate the importance of the differences between trading partners in this model.

The random coefficients model on the other hand allows the parameters to vary over the cross sectional units. This model allows both intercept and slope parameters that vary around common means. The random parameters can be considered outcomes plus an error term representing a mean deviation for each individual. The random effect estimator is a weighted average of the estimated produced by the between and the fixed estimators

Descriptive statistics and correlations between the variables were obtained using STATA version 8.0.

### **3.4.1 Hausman specification test**

A Hausman specification test was conducted to test if whether fixed or random effects model should be used. The research question is whether there is significant correlation between the unobserved (unit of observation) specific random effects and the regressors. If there is no such correlation then the random effects model may be more powerful and parsimonious. If there is such a correlation the random effects model would be inconsistently estimated and the fixed effects model would be the model of choice. The test was conducted using STATA version 8.0.

### **3.5 LIMITATIONS OF THE STUDY**

The model has used six variables including three dummy variables to capture the influences of common border, common language and FTA on trade; however the model might not have captured all the variables influencing trade in the regional bloc. This is likely to make the dummy variables serve as catch basins for other omitted factors not identified in the model adopted in this study. Another limitation with this study was the measurement of distance. The underlying theory appeals to transaction costs to trade, and in empirical implementation it is posted that such costs should arise with distance. But economic and geographic distances are not the same. This can lead to the mis-measurement of the economic distance effects of which may be loaded into other variables intended to capture the effects of regionalism.

Another problem which can arise with the model is the choice of using data in value terms such that countries selling Gold or diamonds which do not require large transportation infrastructure will be misrepresented by the model as the value is large while the costs of transport might be very low. However most of the available trade data statistics is in value terms.



## CHAPTER FOUR

### ANALYSIS OF EMPIRICAL RESULTS

This chapter presents the descriptive and empirical analysis of variables estimated in the model. The descriptive statistics gives the mean and the standard deviations of the observed variables while the empirical analysis gives the regression results of the estimated model.

#### 4.1 DESCRIPTIVE ANALYSIS

##### 4.1.1 Standard Deviations and Means

In this section we give a summary of the main variables that have been used in estimation of the model as shown in the table 4 below.

**Table 4.1: Summary of descriptive statistics**

Variable	observations	Mean	Std deviation	Min	Max
Ln trade	95	4.454742	1.469427	0.5306283	6.610696
Ln GDP	95	8.04908	1.415521	5.220356	11.5455
Ln population	95	1.870805	1.744463	-2.561356	1.95837
Ln distance	95	138.7795	4.333108	132.6181	148.6016
Language	95	1.894737	0.9164418	1	4
FTA	95	0.5789474	0.4963472	0	1
Border	95	2.210526	1.917971	0	6

*Source:* Authors computation

From the table all the variables have all the observations indicating that there no missing observations in the primary variables used to calculate the variable of estimation or unexplainable values in the calculation of the variable itself. This data set was hence a balanced panel.

The minimum value for FTA and border are zero. This means that there are some countries that do not have a common border with any country in the bloc, this country are especially the small island countries such as Comoros, Mauritius and Seychelles. Six borders are the most a country has in the bloc. The zero for FTA means that their countries in the bloc that are not currently participating in the COMESA FTA. The minimum common language between the countries is 1 with some countries having a maximum of four common languages.

As indicated in the table, the mean average for trade in COMESA is 4.455. With dispersion around the mean of 1.469. The standard deviation of 1.469 is considerably high indicating a variation of intra-COMESA trade among the countries. Some countries like Kenya, Egypt, Zambia and Uganda trade more with COMESA than countries like Comoros and Eritrea as indicated in Table 1 in page 9 of this study.

The mean GDP is 8.049 with a standard deviation of 1.415 meaning that the countries levels of development although not quite similar in nature are not very different. This is an indication that the members states of the bloc are likely to benefit from the FTA due to there close to similar levels of development.

The countries populations tend to vary more than their GDPs; this is explained by the high standard deviation of 1.7 around the countries populations' average of 1.87. This can be attributed to the different geographic sizes of these countries, with some countries like Egypt and Ethiopia being relatively larger than Seychelles and Comoros.

The distance, which in this model indicates the transaction cost of countries, has the highest standard deviation of 4.3, which means the transaction costs differ greatly. However the average transaction cost is 138.7795 with the highest being 148.6 and the lowest 132.6. This can be attributed to the fact that the countries occupy quite an expansive land area in terms of square kilometres (13million km squared) increasing the cost of moving goods from one area to the other.

#### **4.1.2 Correlation of the Variables.**

A test for correlation as indicated in table 4.2 below was run to test both the existence of correlation between the variables at 5% level of significance. Trade and GDP were found to be highly correlated although their correlation was not significant to affect the results of the model. Population was also highly correlated to the GDP and trade with no significance hence not affecting the results of the model.

**Table 4.2 Correlation of the variables**

	1	t	lntrad	lngdp	lnpop	lndist	lang	fta
Ln Trade	1							
		0.0776	1.0000					
	1	0.4547						
	1	.95	.95					
Ln GDP	1							
		0.0686	0.6779	1.0000				
	1	0.5086	0.0000					
	1	.95	.95	.95				
Ln population	1							
		0.0180	0.5298	0.7405	1.0000			
	1	0.8629	0.0000	0.0000				
	1	.95	.95	.95	.95			
Ln Distance	1							
		0.0000	-0.0355	0.3439	-0.2139	1.0000		
	1	1.0000	0.7328	0.0006	0.0374			
	1	.95	.95	.95	.95	.95		
Language	1							
		0.0000	0.0414	0.4283	0.0676	0.4536	1.0000	
	1	1.0000	0.6905	0.0000	0.5150	0.0000		
	1	.95	.95	.95	.95	.95	.95	
FTA	1							
		0.0000	0.4640	0.2719	0.3020	-0.1316	-0.2154	1.0000
	1	1.0000	0.0000	0.0077	0.0029	0.2037	0.0360	
	1	.95	.95	.95	.95	.95	.95	.95
Border	1							
		-0.0000	0.3742	0.2693	0.4606	-0.2988	-0.1386	-0.0735
	1	1.0000	0.0002	0.0083	0.0000	0.0033	0.1805	0.4789
	1	.95	.95	.95	.95	.95	.95	.95
	1							

**Source: Authors computation**

Although distance had little correlation with trade, the results indicated very high significance of the correlation of above 70%, this also seemed to be the case with most of the dummy variables especially language which has significant correlation with trade and population. FTA has a relative high correlation with distance, while border has a high

correlation with FTA. This as we will see below affected the results of the fixed effects estimator of the model.

## 4.2 REGRESSION RESULTS

Four regressions were run and the results are described in the following sections. The section on further discussion of the results gives an in-depth interpretation of the results/findings.

### Pooled OLS

The Ordinary Least Squares regressions results are as indicated in the Table 4.3 below. The total number of regressed observations was 95 representing nineteen countries over a period of five years.

**Table 4.3: Pooled OLS Regression results**

Number of obs = 95  
 F(6, 88) = 35.92  
 Prob > F = 0.0000  
 R-squared = 0.7101  
 Adj R-squared = 0.6903  
 Root MSE << .81775

Lntrad I 1	Parameter. Estimate	Std. Err.	t	P> t	[95% Conf. Interval]	
Lngdp I	1.354948	0.1601619	8.46	0.000	1.03666	1.673236
Lnpop	-0.5698658	0.1114504	-5.11	0.000	-.79135	-.3483816
Lndist	-0.1549686	0.0329711	-4.70	0.000	-.2204918	-.0894455
Lang	-0.3044934	0.1238991	-2.46	0.016	-.5507168	-.0582701
FTA	0.6696274	0.2094877	3.20	0.002	.2533146	1.08594
Border	0.1440694	0.0556376	2.59	0.011	.0335013	.2546375
Intercept	15.99208	3.928266	4.07	0.000	8.185471	23.79868

**Source: Authors computation**

The simple pooled model behaved very well with all the variables being highly significant at a 5% level. The  $R^2$  of 71% was also very impressive; the adjusted  $R^2$  of 69% was well above 50%. The constant value of 15.99 was also very significant. The coefficients signs behaved also as expected a part from language, which gave a negative sign. Thus from these results it is evident that GDP, population, distance, FTA and border are important determinants of bilateral trade in the COMESA bloc.

$$t/Q \quad f:::NYA7TA \quad MEMDRWL$$

$$. \quad fpn/\wedge v$$

When the model was corrected for heteroscedasticity as indicated in annex 1, the coefficients values did not change neither did the signs, however the robust standard error reduced slightly for instance the GDP standard error reduced from 0.16016 to 0.1540379. The significance of the variables improved making all of them very significant at the 5% level of significance.

However the pooled OLS estimators as discussed in chapter three of this study ignores the panel structure of the data, it treats observations as being serially uncorrelated for a given individual, with homoscedastic errors across individuals and time periods. This means that the economic agents behave the same across a year that is there is neither significant country nor significant temporal effects.

### **Random effects estimation**

We find that although the model stayed strong with an  $R^2$  of 68.9%, the variables significance and coefficients reduced, however they all maintained there original signs.

The random effect regression results are as illustrated in the table below.

**Table 4.4 Random effects estimation**

Number of obs	=	95				
Number of groups	=	19				
R-sq: within	=	0.0854				
between	=	0.7267				
overall	=	0.6891				
Random effects	$u_i \sim$ Gaussian			Wald chi2(6)		40.62
corr( $u_i$ , X)	= 0 (assumed)			Prob > chi2		0.0000
	Lntrade	Coefficient.	Std. Err.	z	P> z	[95% Conf. Interval]
	LnGDP	.9151355	.2307013	3.97	0.000	.4629694 1.367302
	Lnpopulation	-.301455	.2068177	-1.46	0.145	-.7068103 .1039003
	Lndistance	-.0893282	.0662082	-1.35	0.177	-.2190938 .0404374
	Language	-.1559493	.2810309	-0.55	0.579	-.7067598 .3948612
	FTA	.8696001	.4863345	1.79	0.074	-.0835979 1.822798
	Border	.1769999	.1328805	1.33	0.183	-.083441 .4374408
	Intercept	9.45043	8.466791	1.12	0.264	-7.144177 26.04504
	sigma_u	.87207457				
	sigma_e	.37468807				
	rho	.84416657	(fraction of variance due to $u_i$ )			

Source: Authors computation

From the results population, distance, language and border turned out to be highly insignificant at the 5% level. The FTA was slightly better but still not significant. However the GDP remained highly significant at the 5% level of significance. The constant was also highly insignificant besides the reduction in value. The coefficients sign also did not change for any of the variables being estimated. This indicates that the unobserved effect both country and temporal could be relatively important reducing the asymptotic bias of the random effects (RE) estimator.

On running the random effects with MLE, as indicated in annex 2, the model improved slightly compared with the RE estimator, with an improved  $R^2$  of 70.17%. The results in terms of the signs and magnitude of the estimated coefficient remained fairly similar to those obtained in the random estimations. However their significance at the level of 5% improved slightly, with GDP being the only highly significant variable.

### **Fixed Effects (Within-Groups) Estimators**

The fixed effect regression testing for constant slopes but intercepts that differ according to the cross sectional group unit, countries gave the following results.

**Table 4.5: Fixed effect Regression results**

Number of obs	=	95				
Number of groups	=	19				
Obs per group: min	=	5				
R-sq: within	=	0.1085				
between	=	0.3519				
overall	=	0.3343				
F(2, 74)	=	4.50				
corr(u_i, Xb)	=	-0.9191				
Prob > F		0.0143				
Lntrade		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
LnGDP		.4582023	.3236791	1.42	0.161	-.1867424 1.103147
Lnpopulation		1.736071	1.426086	1.22	0.227	-1.105468 4.57761
Lndistance	I	(Dropped)				
Language	I	(Dropped)				
FTA	I	(Dropped)				
Border	I	(Dropped)				
Intercept	I	-2.481195	2.315626	-1.07	0.287	-7.095181 2.13279
F test that all u <sub>i</sub> =0:		F(18, 74) =	19.18			Prob > F = 0.0000

*Source: Authors computation*

The results as shown in the table above indicate a relatively weak model with an  $R^2$  of 33% and all the variables being statistically insignificant. The signs of the GDP coefficient remained positive but the population coefficient sign changed to positive. The intercept obtained above is an average of individual country intercepts.

The weak model can be attributed to the significant correlation which has resulted into the dropping of the variables distance, language, FTA and border. The variables were significantly correlated in our analysis on section 4.2.2. This confirms the existence of correlation of these regressors with individual country specific effects probably caused by omitted variable. The dummies in this case have become catch basins for other explanatory variables not included in the model.

### **Between effects estimators**

The between effects gave regression results using the respective means of the variables with respect to time. The results are as indicated in the table below.

**Table 4.6: Between effects regression results**

Number of obs	=	95				
Number of groups	-	19				
Obs per group: min	=	5				
R-sq: Within	=	0.0837				
Between	=	0.7527				
Overall	=	0.7099				
sd(u_i + avg(e_i.))= .8880272			F (6,12)	=	6.09	
			Prob > F	=	0.0040	
Lntrade I	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
LnGDP	1.405747	.4034377	3.48	0.005	.5267323	2.284763
Lnpopulation I	-.599135	.2772349	-2.16	0.052	-1.203178	.0049079
Lndistance I	-.1624469	.0815851	-1.99	0.070	-.3402055	.0153117
Language I	-.3225856	.3033988	-1.06	0.309	-.9836347	.3384636
FTA I	.6442211	.5117763	1.26	0.232	-.4708436	1.759286
Border I	.1395038	.1355096	1.03	0.324	-.1557463	.434754
Intercept 1	16.73486	9.664881	1.73	0.109	-4.323105	37.79283

*Source: Authors computation*

The  $R^2$  of 75.2% was closer to that of the other estimators, the signs remained the same but the magnitude of the estimated coefficients changed slightly. Only three variables remained significant the GDP, Population and Distance. The signs of the coefficients remained the same as in the other estimators. Notably the FTA coefficient stayed positive though not significant indicating the trade creating effects of the FTA

**Hausman test results**

Hausman as described in our chapter 3 was used to test if the individual effects were correlated with the regressors and hence make a conclusion on the superior model between the fixed and random effects model.

Under the null hypothesis e.g.  $H_0$  : Orthogonality, i.e., no correlation between individual effects and the explanatory variables. Both random effects and fixed effects estimators are consistent, but the random effects estimator is efficient, while fixed effects are not.

Under the alternative hypothesis e.g.  $H^a$  : Individual effects are correlated with the X's. In this case, random effects estimator is inconsistent, while fixed effects estimator is consistent and efficient.

Greene (1997) recalls that, under the null hypothesis, the estimates should not differ systematically. Thus the test is based on following equation:

$$H = \frac{(b^{TM} - b^{RE})' (b^{TM} - b^{RE})}{V(b^{RE} - b^{TM})} \ll \text{Chi - square}(k)$$

where  $k$  is the number of the regressors in X (excluding constant).

The results of the estimation of equation above are presented in the table below.



**Table 4.7 Hausman specification test**

1 Ln trade I	Coefficients		Difference
	Fixed Effects	Random Effects	
Ln GDP	.4582023	.9151355	-.4569333
Ln population I	1.736071	-.301455	2.037526
Test: Ho: difference in coefficients not systematic			

**Source: Authors computation**

$$\chi^2(2) = (b-B)'[S^{-1}](b-B), S = (S_{fe} - S_{re})$$

$$= 4.10$$

$$\text{Prob} > \chi^2 = 0.1290$$

Based on the above, we can see that the test statistic (4.10) is less than the critical value of a Chi-Squared (2df, 5%) = 5.99 (the value 5.99 has been read from the chi-square tables). Therefore, we accept the null hypothesis and given this result, the preferred model is the **random effects model**.

### **Further discussions of the Results**

In the following sections we go into more details about each parameter estimate and a brief discussion of the underlying meaning.

#### **Gross Domestic Product**

From the results of the pooled OLS, random and between effects there is a strong positive income effect on trade with elasticity exceeding unity in most cases; this means an increase in GDP would increase trade by above unity. The parameter is a significant determinant of intra regional trade at the 5% level (apart from the within effect case where the significance is very low.) This means that increased income in the COMESA countries causes an increased demand and increased exports of goods hence increased intraregional trade in the bloc.

#### **Population**

The coefficient estimates for population is negative in all cases (apart from the fixed effect regression - which is inefficient from the Hausman test) implying that the countries

trade less when they are big indicating absorption effects or more self-sufficiency hence trading less. It can also be interpreted to mean that the larger countries reach or surpass the minimum market size for efficient domestic production in more lines of production than smaller country does. This gives a negative correlation between the size of the population and the trade indicated by the negative population effect.

#### Distance

The Distance coefficients as expected is negative, a proxy for all possible costs hence impacting negatively on trade. The distance variable in this case covers all transactional impediments to trade, in which case the regression results shows a convincing negative at 5% level of significance. This can be explained by the poor road network between the trading countries which result into wear and tear hence increasing the price of transportation. The move by COMESA to initiate a COMESA infrastructure and compensation fund is then very welcome as it would work toward reducing the costs of transport hence increasing intraregional trade.

#### Language

The language dummy was introduced in the model seeking to explain extraordinary trade flows between countries sharing similar languages. The results gave an unconvincing and, unexpected negative effect at the 5% level of significance. This means that countries sharing a common language do not obviously have some cultural and linguistic ties that boost the way they trade in the region. Language is hence not a significant determinant of intraregional trade in COMESA.

#### FTA

The FTA dummy introduced to explain the extraordinary trade flows between the eleven countries participating in the COMESA free trade area gave a positive effect on intra COMESA trade in all the regressions except in fixed effect in which case it was dropped. However the significance at 5% level differed from case to case. However it was highly significant in the pooled OLS and relatively significant in the random effects estimation. This means that the COMESA countries currently participating in the FTA enjoy more trade than those not participating and the FTA is trade creating as the estimate has a positive sign. What this means is that COMESA trade will benefit more if all the members participate in the FTA and later the formation of a Customs Union.

### Border

Common border influence on intra COMESA trade showed a positive effect with a coefficient in all the cases except in fixed effects. Tested on a 5% level it is significantly different from zero though not very convincing in the pooled OLS and very unconvincing in the other cases. This means that across border trade plays a role in trade in this bloc although not significantly. This outcome can be attributed more to the unrecorded cross border trade between the countries.

### **4.3 CONCLUSION**

The aim of this study was to estimate the determinants of trade in the COMESA bloc and assess the trade potentials of the recently formed FTA. Our tests revealed trade in the COMESA bloc to be influenced largely by the GDP of the trading countries, then populations, distance between their economic capitals, participation in the FTA and less significantly by the border. Language didn't appear to influence trade in the COMESA bloc.

Taking the results of the study our best fit model would then be:

$$T = p_0 Y_1^{p_1} Y_2^{p_2} N^{p_3} N_1^{p_4} D_1^{p_5} B^{p_6} A^{p_7}$$

Similar to model 3 in chapter three but without the language variable.

GDP, FTA and common border have a positive impact on the trade in the bloc while population and distance have negative impacts on trade in COMESA.

The positive FTA parameter estimates indicate the trade creating effects of the recently COMESA free trade area.

## **CHAPTER FIVE**

### **CONCLUSION AND RECOMMENDATION**

#### **5.1 CONCLUSION**

The aim of this investigation was to estimate the gravity equation for trade flows among the 19 COMESA member states in order to analyze the determinants and to estimate trade potentials of the economic bloc. The variables included in the model as the determinants of the trade were: GDP, population, distance between the economic capitals, common language, common border and FTA.

The results indicate that the variables traditionally included in the gravity equation present the expected signs and highlight the role played by intra-bloc effects. The estimated coefficients had in most cases (apart from language) the expected signs and magnitudes. Their significance at 5% levels was also very impressive.

The common language dummy, behaved quite unexpectedly with the coefficient sign being negative in all the regressions, this means that countries sharing a common language do not obviously have some cultural and linguistic ties that boosts the way they trade. However this can be explained by the bilingual nature of these countries. For instance Burundi although a French speaking country also speaks Kiswahili a common language with Kenya and Uganda, Sudan also speaks English and Arabic and so is Egypt. It's also argued that countries with comparative advantage cannot be prohibited to trade due to language barriers, for instance most Small Island countries trade with Japan and have bilateral agreements on trade in fish and yet they cannot speak Japanese.

The estimated coefficients for the trading countries GDPs is positive indicating a high strong economic growth effect on trade, with an elasticity exceeding unity. In all the cases GDP was a powerful determinant of trade with a positive effect on it such that when the GPD of the trading countries increase so does the trade.

Population effects on trade in this bloc is negative meaning that larger countries in the bloc tend to be more self sufficient -absorption effects. In other words population diminishes the openness ratio and hence the negative effect. This is likely to be the case considering that most of these economies in the region tend to be agricultural economy such that most of their produces are consumed locally and very little is targeted for export.

Distance between the economic capitals behaved as expected, its coefficient presents a negative sign with an elasticity of around 0.15. This reflected the negative effects of transaction cost between the trading countries. The dummy for common border though not significant has a positive coefficient indicating that countries sharing a common border are likely to trade more.

Interpretation of the FTA dummy indicates that intra-COMESA is significantly determined by the FTA. The coefficient is positive in all the cases. What this means is that the 11 countries currently participating in the FTA tend to trade more than the others not currently participating in the FTA.

Estimated trade potential for the COMESA FTA suggests high trade creating effects of the recently formed FTA. There should be high expectations for the near future derived from the application and consolidation of the COMESA customs union if it takes effect on January 2008.

## **5.2 RECOMMENDATIONS AND POLICY OPTIONS.**

Regional economic groupings such as COMESA aim to accelerate the economic growth and development of the countries in the scheme. An FTA is the second lowest level of integration after the preferential trade areas. Currently COMESA is in this second lowest level. The model has suggested that there are benefits accruing to the bloc due to trade creating effects of the FTA; these definitely suggest the need to accelerate the formation

of the customs union and preferably soon after a common market should be formed. A common market is preferable due to the following:-

- Allows for free flow of not only the goods across countries but also the services and the factors of production such as capital labour and entrepreneurship.
- A common external tariff policy against third parties and the abolishment of all tariff on each others exports.

However for these benefits to accrue this scheme necessitates the coordination of commercial, industrial, financial and economic policies to increase trade facilitation and in actual sense reduce the transaction costs currently captured in our distance variable. COMESA is currently in the process of writing policy documents on harmonization of agricultural policies, gender policy, competition policy, common investments and monetary cooperation. These policies process should be concluded and implemented soon for the region to enjoy more benefits.

The total number of COMESA country is 20 with Libya having joined late 2005. But by year 2004 only eleven countries were participating in the FTA: Burundi, Djibouti, Egypt, Kenya, Madagascar, Malawi, Mauritius, Rwanda, Sudan, Zambia and Zimbabwe. Recently Libya and the union of Comoros joined the FTA making them a total of 13 countries. This means that there are still 7 countries not participating in the FTA. There is need for this countries join the FTA for their own benefit and that of the people of the region.

From the analysis of this study the potentials of the regional market is quite promising, probably much more than we think. It is important that the policy makers of these countries put as much emphasis on the regional markets as they do on the international markets. There is need for the establishment of regional markets promotion strategy both at the regional and national levels. The NGOs in these countries also need to engage there governments in knowing exactly what is being done to promote the regional markets.

## REFERENCE:

Alemayehu G. and Haile K. (2000) 'Regional Economic integration in Africa: A review of problems and prospects with a case study of COMESA' University of London and University of Oxford.

Anderson J.E and Eric W. (2001). 'Gravity with Gravitas: A solution to the border puzzle' NBER working paper series, Working paper 8079.

Anderson J. E. (1979) "A theoretical Foundation for the gravity equation" American Economic Review. 69(1) pp. 106-116.

Balassa, B (1961) 'The theory of economic integration' By Richard D. Irwin, INC. USA.

Balassa, B (1975) "Trade creation and trade diversion in the European common market" Economic journal. 77(305): 1-21.

Baldwin R. (1993). 'A domino theory of regionalism' NBER working paper No. W4465, New York.

Bergstrand, J. H. (1985) "The gravity equation in international trade: some microeconomic Foundations and empirical evidence", The review of economic and statistics. 67:3 August 474-481.

Bhagwati, J and Panagariya A. (1966) 'The economics of preferential trade agreements' Washington DC AEI Press

Bhagwati. J. N, (1968) 'Trade liberalization among LDC's, trade theory, GATT rules in J.N. Wolfe(ed), value, capital and growth'. Edinburgh university press.

Bhagwati. J. N, (1988) 'Export-promoting trade strategy: Issues and evidence', World Bank research observer.

COMESA Annual reports various issues.

Dannie E. H. and James P. M. (1998) "Impediments to economic integration in Africa the case of COMESA", Journal of business in developing countries Vol. 2 Article 3

Deardoff, A.V. (1999) 'Determinants of bilateral trade: does gravity work in a neoclassic world?' NBER working paper 99-01 OA.

Development Plans Various Issues.

- EcoNews Africa and Traidcraft. (2005). 'EPAs: Through the lens of Kenya'
- Economic survey various issues.
- Foutan, Faezeh and Lant Pritchett (1993) "Intra-sub-Saharan African Trade: Is it too little?" Journal of African economies. 2(1): 74-105
- Government Of Kenya (2004), 'Investment programme: for the Economic Recovery Strategy For Wealth And Employment Creation; 2003-2007'.
- Greene, W. H. (1997). *Econometric Analysis* (3rd ed.). Upper Saddle River, New Jersey: Prentice Hall.
- Hassan K. M. (1998). 'An Empirical investigation of economic cooperation among the OIC member countries' Economic Research Forum (ERF). Working paper 0212.
- Heller. R. H. (1973) *International trade: Theory' and empirical evidence*. Prentice Hall USA
- Helpman, E. (1987) "imperfect competition and international trade: Evidence from fourteen industrial countries", Journal of the Japanese and international economics. 1.
- Inmaculada M. Z. (2000) 'Gravity model: An application to trade between regional Blocs' Paper presented to the international Atlantic conference in Paris.
- Karingi S. N., Mahinda S and Ronge. E. E. (2002) "Implications of the COMESA Free Trade Area and the proposed customs union: An empirical investigation" Paper presented to the 5<sup>th</sup> Annual conference on global Economic analysis, 5-7 June , Taipei, Taiwan.
- Koenker R and Lamarche C 'Applied Econometrics' Econ 508- Fall 2005 E tutorial 12 Panel data I-Basics, University of Illinois
- Koutsoyianis A. (1993). *Theory of econometrics*, 2<sup>nd</sup> Macmillan Education Ltd.
- Langhammer R J and Hiemenz, U (1990). 'Regional integration among developing countries: opportunities, obstacles and options.' Westveiw press, boulder.
- Lucian C. (2003). 'Assessing South-south regional integration same issues. Many metrics' Policy issues in international trade and commodities study series No. 21. UNCTAD, Geneva, Switzerland.
- Lyakurwa, William, Andres M, Ng'eno N. and Kennes W. (1997), 'Regional integration in Sub-Saharan: A review of Experiences and Issues' London Macmillan.



Oliver S. S. (1991) 'Joining the future: economic integration and co-operation in Africa', Acts press Kenya

Poyhone, P. (1963) 'A tentative Model for the volume of trade between countries,' Weltwirtschaftliches Archive, 90.

Rasksen J (1998). 'African export: A gravity model approach' Paper presented at the international trade, environment and development seminar, held on 2<sup>nd</sup> of November.

Sodersten and Reed G. (1994). International Economics 3<sup>rd</sup> Edition Macmillan press Ltd.

Sophie C. and Guillaume G. (2002), 'Regional trade integration in Southern Africa' CEPII working paper No. 2002-12 October.

Tinbergen, J (1962) 'Shaping the World economy. Suggestion for an international Economic policy' New York.

Viner J. (1950). The customs union issue. London: Stevens and sons ltd.

Weeks, John and Subasat T. (1998) 'The potential for Agricultural trade among Eastern and Southern African countries, food policy', 23(1).

Yaffe A. R. (2003) ' A Primer for Panel Data Analysis' Harvard University

## ANNEXES

### Annex 1 Ordinary OLS after removing hetercedasticity

```
reg lntrad lngdp lnpop lndist lang fta border,robust
```

Regression with robust standard errors

```
Number of obs -      95  
F( 6,      88) -    58.29  
Prob > F      =    0.0000  
R-squared     =    0.7101  
Root MSE     =    .81775
```

	1		Robust				
lntrad		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lngdp	I	1.354948	.1540379	8.80	0.000	1.04883	1.661066
lnpop		-.5698658	.1023696	-5.57	0.000	-.7733039	-.3664277
lndist		-.1549086	.0274266	-5.65	0.000	-.2094733	-.100464
lang		-.3044934	.0840744	-3.62	0.000	-.4715736	-.1374133
fta	I	.6696274	.2256036	2.97	0.004	.2212877	1.117967
border		.1440694	.04522	3.19	0.002	.0542042	.2339346
_cons	I	15.99208	3.129241	5.11	0.000	9.773366	22.21078

## Annex 2 Random effects estimation with MLE

Fitting constant-only model:

Iteration 0	log likelihood	-102.90519
Iteration 1	log likelihood	-92.480886
Iteration	log likelihood	-86.844416
Iteration	log likelihood	-85.636109
Iteration	log likelihood	-85.488964
Iteration	log likelihood	-85.484473
Iteration	log likelihood	-85.484467

Fitting full model:

Iteration 0	log likelihood	-73.607992
Iteration 1	log likelihood	-73.28848
Iteration 2	log likelihood	-70.474353
Iteration 3	log likelihood	-70.183783
Iteration 4	log likelihood	-70.178697
Iteration 5	log likelihood	-70.178695

Random-effects ML regression	Number of obs	=	95
Group variable (i): i	Number of groups	=	19

Random effects u <sub>i</sub> - Gaussian	Obs per group: min	<	5
	avg	=	5.0
	max	=	5

Log likelihood = -70.178695	LR chi2(6)	=	30.61
	Prob > chi2	=	0.0000

Intrad	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
lngdp	.9790459	.224089	4.37	0.000	.5398395 1.418252
lnpop I	-.3444864	.1841416	-1.87	0.061	-.7053973 .0164246
lndist 1	-.0991067	.0572103	-1.73	0.083	-.2112368 .0130234
lang	-.1753613	.2347559	-0.75	0.455	-.6354744 .2847518
fta	.8459089	.4040299	2.09	0.036	.0540248 1.637793
border	.173986	.1097458	1.59	0.113	-.0411118 .3890837
cons	10.43074	7.176828	1.45	0.146	-3.635589 24.49706
<hr/>					
/sigma_u I	.7184587	.127789	5.62	0.000	.4679969 .9689204
/sigma_e I	.3770082	.0308732	12.21	0.000	.3164978 .4375186
rho	.7840934	.0678457			.6300948 .8925273

Likelihood-ratio test of sigma\_u=0: chibar2(01)= 83.74 Prob>=chibar2 = 0.000

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