ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

TRADE AMONG COMESA COUNTRIES: A GRAVITY APPROACH

BY
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A PROJECT SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF ARTS IN APPLIED TRADE POLICY ANALYSIS

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ACRONYMS

AFTA	ASEAN Free Trade Area
ASEAN	Association of Southeast Asean Nations
ASYCUDA	Automated System for Customs Data and Management
CARICOM	the Carribean Community and Commom Market
CEMAC	Central African Economic and Monetary Community
CEN-SAD	the Community of Sahel-Saharan States
CEPGL	Economic Community of Great Lakes Countries
CM	Common Market
CMEA	Council of Mutual Economic Assistance
COMESA	Common Market for Eastern and Southern Africa
CU	Custom Union
CUSFTA	Canada-US Free Trade Area
EAC	East African Community
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
EEC	European Economic Community
EFTA	the European Free Trade Association
EU	Economic Union
EU-SAFTA	European-South Africa Free trade Area
EXTRADE	External Trade
FTA	Free Trade Area
GDP	Gross Domestic Product
GDPPC	Per capita GDP
IGAD	Intergovernmental Authority on Development
IOC	the Indian Ocean Commission
LAFTA	Latin America Free Trade Association
MERCOSUR	the Common Market of the south
MRU	Mano River Union

NAFTA	North American Free Trade Area
PTA	the Preferential Trade Area for Eastern and Southern africa
RTA	Regional Trade Agreement
SACU	Southern Africa Custom Union
SADC	Southern Africa Development Community
SAP	Structural Adjustment Program
TII	Trade Intensity Index
TINET	Trade Information Network
UMA	Arab Magreb Union
UNCTAD	United Nations Conference for Trade and Development
WAEMU	West African Economic and Monetary Union
WTO	World Trade Organization

ABSTRACT

This study aimed at examining whether Common Market for Eastern and Southern Africa (COMESA) is effective in promoting trade among its member states. The study uses gravity model to estimate the trade intensity among its members for the year 1981 and 1999. The gravity model is applied to trade intensity indices and the estimation of the gravity equation is carried out using Tobit regression. The empirical results indicate that the standard gravity model variables have the expected effect on the trade linkage in COMESA. The main focus of the study is, on the estimation of COMESA, which is found to be insignificant in promoting trade among members. A comparison of the two periods result reveals a very similar pattern before and after the formation of COMESA. Thus, the result confirms the ineffectiveness of COMESA in enlarging trade among its members. Accordingly, the study suggests the requirement of joint effort of the member countries in coordinating, harmonizing and implementing policies, improving their human and institutional capabilities, increasing production capacity and expanding markets by involving active participation of the private sector so as to raise intra-COMESA trade.

Key words: COMESA, Gravity Model, Trade Intensity Index, Regional Trade Agreements

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CHAPTER ONE

INTRODUCTION

1.1. BACKGROUND

The underlying rationale for regional integration scheme arises from international trade theories that state free trade is superior to trade discrimination among trading partners. As it is expected that free trade leads to expansion of trade among trading partners which in turn enhances economic growth. Thus, the formation of regional integration can also be considered as a move towards free trade because it eliminates trade barriers.

It is argued that regional integration is also viewed as a means of fostering sustainable economic growth in general and encouraging trade in particular. This argument for regional integration rests largely on the possibility of driving economies of scale through expansion of trade and economic growth (Oyejide, 2000). The proliferation of regional integration initiatives in the world have been in line with this background.

It is also argued that regional integration can be used as a vehicle towards regional stability and development. Regional integration arrangements have also been taken as a means to accelerate economic development. It is with the aim of strengthening such thoughts that several regional initiatives have been pursued across Africa, too.

Currently, there are about fourteen regional integration groupings in Africa. In west Africa, there are Economic Community of West African States (ECOWAS), Mano River Union (MRU) and West African Economic and Monetary Union (WAEMU) and the Community of Sahel-Saharan States (CEN-SAD). Economic Community of Central African States

(ECCAS), Central African Economic and Monetary Community (CEMAC) and Economic Community of Great Lakes Countries (CEPGL) are in central Africa. Southern Africa Customs union (SACU), Southern Africa Development Community (SADC) and the Indian Ocean Commission (IOC) are found in Southern Africa while Arab Magreb Union (UMA) exist in Northern part. East African Community (EAC) and Intergovernmental Authority on Development (IGAD) exist in Eastern African. Common Market for Eastern and Southern Africa (COMESA), one of the largest regional trade agreement, straddles the sub-region of Southern and Eastern Africa and includes some parts of North and Central Africa (ECA, 2006).

COMESA was founded in 1993 and ratified in 1994 replacing the preferential trade area for Eastern and Southern Africa (PTA) which has been in existence since 1981. COMESA was established 'as an organization of free independent sovereign states which have agreed to co-operate in developing their natural and human resources for the good of all their people.' (www.comesa.org). It was intended to be purely trade and investment oriented organization which does not deal with politics. As of 2007, COMESA comprised of 19 members namely Burundi, Comoros, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Libya, Madagascar, Mauritius, Malawi, the Democratic Republic of Congo, Rwanda, Seychelles, Sudan, Swaziland, Uganda, Zambia and Zimbabwe. Countries that used to be members of COMESA and withdrew are Lesotho (1997), Mozambique (1997), Tanzania (2000) and Namibia (2004).

It is the largest regional grouping in Africa in terms of the number of member countries and in terms of the total population numbered over 389 million (COMESA, 2007). COMESA attained a free-trade-area status in year 2000 with nine of its member namely Djibouti, Egypt, Kenya, Madagascar, Malawi, Mauritius, Sudan, Zambia and Zimbabwe. Burundi and

Rwanda joined the FTA later in year 2004. Comoros, Seychelles and Libya also joined the COMESA FTA very recently. These fourteen FTA member countries have not only eliminated tariffs amongst its members, but also has involved in the relaxation of several quantitative restrictions and other NTBs. COMESA FTA is Africa's first free trade area under the Lagos Plan of Action which serves as a steping stone towards African Economic Community (Shacinda, 2001). It is intended to create a customs union by 2008 by removing all trade barrier against intra-COMESA trade and implementing a common external tariff.

COMESA was established with the aim to promote sustainable growth and development through strengthening the process of regional economic integration and increasing intra-COMESA trade. The agreement involves the elimination of intra-regional tariff and non-tariff barriers to encourage intra-regional trade in which COMESA has been trying to achieve so far.

However intra- COMESA trade remained very low; that is the share of intra- COMESA trade was about 5-7% over the last two decades due to various factors. In contrast, recent reports on intra-COMESA trade have been optimistic. COMESA has experienced considerable recent growth in intra-regional trade. Intra- COMESA trade grew by 10% and 9-10% in 2004 and 2005 respectively (COMESA, 2006).

In addition, a recent trade flow analysis identified commodity groups that COMESA member states export in large volumes to non-member countries and also imported in large volumes from the non-members which mainly is due to lack of knowledge of the COMESA market. The increase from realizing this tends to be US$ 1 billion annually (COMESA, 2007). This indicates that there is a possibility and potential to increase intra-COMESA trade which can have either trade creating or trade diverting effect.

1.2. STATEMENT OF THE PROBLEM

Regional integration has long been viewed in Africa as a vehicle for enhancing economic growth through encouraging intra regional trade. It has also been seen as a means of achieving industrialization and modernization through promoting trade and securing economies of scale and market access (Khandelwal, 2004).

However, progress in African integration has been slow despite the efforts and initiatives taken in promoting the arrangements. Several studies have been undertaken to assess the performance of regional integration in Africa and found out that the regional integration schemes failed to achieve one of their objectives, promoting intra-regional trade (Lyakurwa et al (1997), Elbadawi (1997), Alemayehu & Haile (2008), Gupta & Yang (2005)).

Several constraints have been stated in these studies. Regional integration efforts have been marked by issues of revenue loss, compensation issues and variation in initial condition, poor private sector performance, lack of political commitment and institutional issues, issues of overlaping membership, high transaction cost due to inadequate infrastructure, macroeconomic instability, distorted trade regimes, low resource complementarity and small market size.

This poor performance, as a result of the abovementioned factors, has also been the case in COMESA. Despite its objective of pomoting sustainable growth and development through increasing intra- COMESA trade, intra- COMESA trade remained insignificant.

Various studies have also attempted to examine the performance of COMESA (Alemayehu and Haile (2002,2008), Musila (2005), Rojid (2006), Gbetnkom (2006)) . These studies analyses problems and prospects of COMESA, trade potential of COMESA and trade creation and trade diversion effect of COMESA using gravity model. The findings indicate

that COMESA failed to promote its intra-regional trade whereas no strong evidence for trade diversion effect was found. In analyzing trade potential of COMESA, it is concluded that the scope to increase intra COMESA trade is limited.

As a way of investigating the extent to which COMESA has achieved its goal of expanding intra-regional trade, this paper examines the direction of trade within COMESA so as to analyse whether COMESA has achieved its goal of increasing trade among its members.

1.3 OBJECTIVE

The objectives of this study are as follows:

- To evaluate whether COMESA is effective in promoting trade among member countries
- To assess the extent to which COMESA achieved its goal of promoting intra-COMESA trade
- To make recommendations regarding the specific strategy COMESA should adopt to promote trade integration among its member countries.

1.4. METHODOLOGY AND DATA SOURCE

The method to be employed for assessing the impact of COMESA in increasing trade among its members is Gravity model. This model is widely used in evaluating the impact of regional trade agreements on member's trade. The reason for selecting this model is that by comparing the intensity of trade that members have with each other and with non members, this method identifies whether COMESA is effective in promoting trade among members.

The gravity model will also generate a conclusive explanatory capability as to bilateral trade linkage in COMESA, by taking the trade intensity index for each individual country as the dependent variable, and variables of GDP and GDPPC of both exporter and importer, surface area of both countries, distance between exporting and importing countries, and other additional variables that capture the trade effects such as common language between trading pairs, common border shared between the two countries and mutual membership in a Regional Trade Agreement (RTA) as our explanatory (independent) variables. We will then analyze the relationship of the independent variable coefficients and examine to see if accepted economic relationships hold (i.e. positive effects for the coefficients of respective GDP and negative effects for the distance variable) and conduct a thorough discussion of the results. Most importantly, this study will try to capture the effect of COMESA membership on trade linkage among member countries.

The main data source will be IMF Direction of Trade Statistics and World Development Indicator CD Rom. Data from different sources such as UNCTAD, www.indo.org, WTO and COMESA web page will also be obtained.

1.5. SIGNIFICANCE OF THE STUDY

The study of regional integration schemes is relevant as it plays an important role in helping member countries to expand trade among them. Given this consideration, this study analyses the impact of COMESA in promoting trade among its member states.

This study is important because it offers an analysis of the effectiveness of COMESA in trade expansion for all who need the information such as COMESA member states' governments, academecians, research institutions, and policy makers.

This study also contributes to the empirical literature which uses gravity models to assess the impact of COMESA on promoting trade among member states.

1.6. LIMITATION OF THE STUDY

The major limitation of this study arises from data issue. This study couldnot include all member countries in the analysis due to unavailability of data and inaccessibility of data. We couldnot also include some variables that would have impact on the pattern of trade in COMESA due to the same problem.

1.7. ORGANIZATION OF THE STUDY

This study is segmented into five chapters. Chapter one comprises of the introduction, problem statement, justification, objectives, methodology and data source and limitation. The theoretical and empirical review of regional integration, a review of regional integration in Africa and performance of COMESA are presented in Chapter two. Chapter four put forward the general overview of COMESA and provides a description of the trade performance of the regime. Chapter four discusses the methodologies employed, the data and variables used for the analysis, along with the estimated results from the model used for this study. Chapter five includes the conclusion and recommendation of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1. THEORETICAL LITERATURE

2.1.1. REGIONAL ECONOMIC INTEGRATION

The theory of economic integration refers to as commercial policy of discriminatively reducing or eliminating trade barriers among the nations integrating together which can take different forms that could range from Preferential Trade Arrangements (PTA) that is the loosest level of economic integration to Free trade Area (FTA), Customs Union (CU), Common Market (CM), Economic Union (EU) which is the most advanced type of economic integration, (Salvatore, 1998).

In PTA, there are lower trade barriers among member states than applicable on non members. Under FTA, all tariff and non tariff barriers are eliminated among members whereas each country keeps its own trade barriers with non-members. In CU, it is the same as FTA but the member states adopt common external tariffs on non-members. A common market allows free movement of factors of production in addition to features of Customs union. Under Economic Union, there are harmonization of economic policies on top of free movement of both factors of production and goods and services (Alemayehu, 2007)

Regional integration arrangement is a preferential agreement which can usually be reciprocal agreement among countries that cut barriers to economic transactions (Radelet, 1997). Mshomba (2000) describes regional economic integration as special economic arrangements taken place by countries in a given geographical area. On the other hand,

Winters (1996) puts regional integration as “any policy designed to reduce trade barrier between subset of countries regardless of whether those countries are contiguous or even close to each other.”

The basis for regional integration can be economic, political social as well as cultural matters. Regional integration can embrace economic matters so as to achieve economies of scale, to effectively allocate resources, to spur economic growth and to expand trade. The social ground for regional integration is attributed to facilitation of factor mobility. With regard to political motives, regional integration enhances the credibility of government commitment (Ayodele and Olu-Adeyemi, 2007). Haas (1971) strengthens this point by putting regional integration as a process of integrating small states into larger political communities (Cited in Ayodele and Olu-Adeyemi, 2007).

Regional integration arrangements are exception to World Trade Organization’s (WTO) principle of Non discrimination. As WTO adopts the most favored nation treatment rule, which states all trade preferences given to one member state must also be given to all other member countries (Article I). As of 2007, some 380 RTAs have been notified to the GATT/WTO. Of these, 300 RTAs were notified under Article XXIV of the GATT 1947 or GATT 1994; 22 under the Enabling Clause; and 58 under Article V of the GATS (www.wto.org).

2.1.2. STATIC AND DYNAMIC EFFECTS OF REGIONAL ECONOMIC INTEGRATION

According to economic theory, the effect of regional integration scheme is analyzed on the basis of static effects as well as dynamic effects. Regional economic integration is considered as beneficial because it increases trade among partner countries due to reduction

of tariff. However, it is argued that whether it is always beneficial or not is an empirical issue. The static effects of regional integration are measured in terms of the relative size of trade creation and trade diversion. Viner (1950) introduced for the first time the distinction between trade creation and trade diversion effects of regional integration. He argued that regional integration can enhance or lower the welfare of the society depending on the extent of trade creation and trade diversion.

Trade creation takes place when a member country replaces its domestic production by imports from a more efficient partner state (at a relatively lower cost). Trade creation is supposed to enhance welfare of member states as it leads to greater specialization in production. It also increases welfare of non members through increased volume of imports.

On the other hand, trade diversion occurs when lower cost imports from outside the regional integration get replaced by higher cost imports from member states. Since trade diversion shifts production from more efficient to less efficient producers, welfare is reduced. It also reduced welfare as there is reduction in government revenue due to the shift in imports from non members with tariff to members without tariff. However, there is a gain to consumers that results from lower price due to trade diversion.

Regional economic integration induces trade creation and trade diversion which in turn leads to resources allocation. Trade creation results in an improvement in resource allocation and economic welfare whereas trade diversion worsens efficiency in allocation of resource in the world as it replaces imports of highly efficient non member states by imports from less efficient member states (Urata and Okabe, 2007).

Viner (1950) argued that trade creation is welfare enhancing, accruing gains from both supply and demand side. The supply side gains accrue from efficient reallocation of

resources that is resources are taken away from protected industries towards industries in the region. Consumers can buy from low cost producers which is the demand side gain. And the distributional effect can be put as previously producers lose while consumers and low cost producers gain (Radelet, 1997).

Meade (1955) as cited in Pokviarak (2007) puts that trade creation is associated with welfare gain whereas trade diversion is associated with welfare loss. According to Meade (1955) the magnitude of change in welfare depends on not only the magnitude of both trade creation and diversion but also on the magnitude of costs associated with trade creation and trade diversion.

Trade diversion is considered as welfare reducing (though this may not always be the case). Theoretically, there are two possibilities in which trade diversion will not be welfare reducing, however. First, when the cross border subsidy is compensated by the increase in consumer surplus. Secondly, when members jointly constitute a large share of world trade so that they influence world price and members can act as cartel so as to lower the price of imports from world and increase the price of export to the world (Radelet, 1997).

Regional integration is beneficial if the effect of trade creation outweighs that of trade diversion. Carim (1997) describes two possible situations in which trade creation outweighs trade diversion. The first scenario is when intra-regional trade is large or has a potential to become large. And the second scenario is when members of the union have complementary productive structure.

In addition, Salvatore (1998) put the following condition for regional economic integration to lead to trade creation and increased welfare: the more competitive economies of member states, the greater the pre-regional integration trade and economic relationship among

potential members of the agreement; the shorter the geographic distance between the member countries , the greater the size of the regional integration i.e. the number of countries forming it, the higher the pre-regional integration trade barriers between member countries and the lower the regional integration's barriers on trade with the rest of the world.

The dynamic effects result in change in the economy through increased competition, increased investment and industrialization and through achievement of economies of scale. The competition effect arises from freeing imports from partner countries. Regional economic integration exposes members to greater competition, which in turn leads to more efficiency in production and marketing (Lyakurwa et al, 1997). Increased competition will also help to allocate resources in line with comparative advantage (Mshomba, 2000). However, regional economic integration can also bring about less competition in case of either cartel like cooperation between firms in the region or when members assign different sectors to different countries in the region (Radelet, 1997).

Moreover, regional economic integration results in increase in investment of both domestic and foreign. This may arise from increase in market size, diffusion of new technology and practices and by reducing uncertainty and enhancing policy credibility. There is also attraction of foreign direct investment due to reduction in trade barriers and transportation costs (Stevens, 2002). Baldwin (1992) states that this boost in investment due to the presence of regional integration in turn results in growth acceleration.

The dynamic effect associated with economies of scale arises from enlarged and diversified market. This enables firms to reduce unit cost of production (Langammer & Hiemenz, 1990). As regional economic integration expands the market for both input and output, it allows existing firms to expand production and also attract new firms. The increase in

production then leads to greater specialization of labor, use of better equipments, acquisition of inputs at a discounted rate and acquisition of new technologies (Mshomba, 2000). It is argued that there is also a possibility of structural transformation due to the formation of regional economic integration. Regional economic integration may help facilitate in the transformation from traditional primary commodities production to new industrial products production and export which spark industrialization.

2.2. EMPERICAL LITERATURES

2.2.1. REGIONAL INTEGRATION IN AFRICA

Over the past three decades, African States have been enmeshed in the struggle to attain sustainable economic development and self reliance through regional economic integration. Both political and economic motives has been the major forces behind evolution and development of regional integration in Africa. Having a small market size which can not enable African countries to enjoy the benefits from economies of scale and specialization is among the economic motive. Regional integration arrangements in Africa have been taken as a means to overcome the barriers of small economies (Aryeetey and Oduro 1996). Besides, the political motive relied itself on “Pan-Africanism ideology” (Ayodele and Olu-Adeyemi, 2007).

Regional integration in Africa are considered as a “steping stone” towards greater integration in the world (Summers, 1991). Regional integration in Africa have long been viewed as a catalyst towards the structural transformation of African economies in general and intra-regional trade promotion in particular. However, in empirical literature of studies that have been conducted in the area of regional integration in Africa so far, it is argued that

regional integration in Africa failed to achieve its objective of expanding intra regional trade.

Lyakurwa et al (1997) review the experiences of regional integration in Africa by examining the objectives and achievements of the regional integration schemes. They also assess the problems and prospects of regional integration in Sub-Saharan Africa. The major reasons for failure of regional integration in Africa, as stated by Lyakurwa et al (1997), are failure to implement trade liberalization policies, issues of compensation, failure of import substitution policies which was adopted by most African countries, lack of political commitment and macroeconomic instability.

Yang & Gupta (2005) analyzed the effectiveness of regional integration in Africa in achieving their major goal of increasing intra-regional trade. They put high external trade barriers and low resource complementarity inaddition to market size, poor transport facilities and high trading costs among the major constraints. The study also criticized the goal of regional integration in Africa for being highly ambitious which in turn contributes to failure of achieving it.

Foroutan (1992) argued that the formation of regional trade integration in Sub-Saharan Africa does not have significant impact on member's trade as the share of intra-regional trade is not only very small but also stagnant. Disparities in economic development among members and uneven distribution of gain from regional integration are accounted for failure of regional trade integration in Sub-Saharan Africa. The study also put failure to liberalize trade barriers due to revenue issues, import substitution policies and uneven distribution of benefits as responsible factors for failure of intra-regional trade expansion.

As pointed out by Longo and Sekkat (2004), the progress of regional integration in Africa has been disappointing as both the level and growth rates of intra-African trade remain very low. The study emphasized on lack of infrastruture, political instability and inadequate economic policies as major obstacles for intra-African trade expansion.

Similarly, Ayodele and Olu-Adeyemi(2007) states that the record of regional integration in Africa has been disappointing for it is marked by low level of intra-regional trade, high political conflict and coordination failures.

Elbadawi (1997) investigate the determinant of intra-African trade using gravity model. The finding suggest that African regional trade agreements increased intra-regional trade with abscence of trade diversion in the first half of 1980s whereas these regional trade agreements adversely affected both intra-regional trade and overall trade indicating trade diversion effect in the second half of 1980s. Elbadawi(1997) concluded that "regional integration in Africa has been a failure". Moreover, Foroutan and Pritchett (1993) stated that failure of intra-trade expansion in Africa can be attributed to failure of regional integration efforts.

Alemayehu (2007) gives extensive explanation for failure of regional integration schemes in Africa taking institutional, political and policy issues as major factors that hinder the progress of regional integration in Africa using both qualitative and gravity model. Additionally, the study put the issue of revenue loss, issues of compensation and variation in initial condition and poor private sector participation as impediments to the progress of regional integration in Africa.

Coulibaly (2007) has studied the impact of regional trade agreements on member's trade flows taking the experience of ECOWAS and SADC in Sub-Saharan Africa and other

regional trade agreements from Asia and Latin America. Using two step estimation procedure by combining gravity model and kernel estimation technique, this study has evaluated the participation effect of each member in regional trade arrangements taking the number of years of membership as a proxy. The results indicate that both ECOWAS and SADC had a positive impact on their members' intra trade.

The overall assessment of regional integration in Africa indicates that regional integration in Africa have failed to achieve the goal of expanding intra-regional trade.

2.2.2. EMPERICS ON TRADE CREATION AND TRADE DIVERSION EFFECT

Recently, the use of gravity model in analyzing the effect of regional trade agreements on bilateral trade flows has gained popularity. The analysis of the impact of regional grouping examine whether regional trading arrangements increase or decrease trade among its members on the basis of the concepts of trade creation and trade diversion. Various studies have been conducted to estimate the trade creation and trade diversion effect of several regional groupings in Europe, Asea, North and Latin America, and in Africa as well. The majority of the empirical studies use the gravity model to test for the trade effects of RTAs using a dummy variable.

Aitken (1973) extended the model to incorporate the impact of PTA and then evaluated the effects of European Economic Community (EEC) and the European Free Trade Association (EFTA) on bilateral trade flows of member countries using gravity model. The results revealed that gross trade creation effect in both bloc and trade diversion effect exist between the two bloc, however.

A study attempted by Bayoumi and Einchengren (1995) also examined the impact of EEC and EFTA on European trade flows using first diference version of gravity model. They found out EFTA to have trade creating effect and evidence for both trade creation and trade diversion effect in EEC was found.

Pelzman (1977) evaluated the trade creation and trade diversion effect of Council of Mutual Economic Assistance (CMEA). He analyzed the effects for both aggregated and disaggregated trade flows using gravity trade flow model. The empirical results for aggregated trade flows estimation was found to have trade creation effect whereas for the disaggregated no evidence of trade cretion was found. Pelzman(1977) concluded that CMEA agreement in general presented both trade creation within memebers and trade diversion from rest of the world.

Cernat (2001) assess whether South-south regional trade agreements such as African regional agreements are more trade diverting than others. In his analysis, nine regional trade agreements namely AFTA, AND, CARICOM, COMESA, ECOWAS, EU, MERCOSUR, NAFTA and SADC are examined for trade diversion and trade creation effect. The results indicate AFTA, EU, CARICOM, COMESA and SADC had trade creation effect. However, AND and MERCOSUR had substantial trade diversion effect where as insignificant trade diversion for NAFTA and no evidence of trade diversion for ECOWAS was found. Given the results, Cernat (2001) concluded tht South-South regional trade agreements are not more trade diverting than the others.

Kwentua (2006) has undertaken a study which mainly focuses on trade creation and trade diversion effects of European-South Africa Free Trade Area (EU-SAFTA) using a gravity model. He also examined the trade creation and trade diversion effects resulting from participation in EU, COMESA and SACU along with EU-SAFTA. The findings revealed

that all regional grouping except SACU create trade opportunities for their member countries implying trade creation effect. Similarly All but SACU had positive trade diversion effect indicating that these regional groupings do not necessarily divert trade from non members. The study concluded that particiapation in regional and preferential trade agreements promote both trade between members and trade with non members.

Owusu and Hanink (1998) conducted a gravity model analysis to determine whether ECOWAS is effective in promoting trade among its members which is basically trade creation effect. The results suggested that ECOWAS failed to expand trade among its members.

The trade creation and trade diversion effects of Canada-US Free Trade Area (CUSFTA) was examined by Clausing (2001). The study analyzes the changes in trade patterns due to CUSFTA using disaggregated trade flow. Clausing(2001) concluded that CUSFTA had significant trade creation effect and little trade diversion effect.

Morais and Bender (2006) evaluate the effect of MERCOSUR and NAFTA on basis of the two concepts welfare, trade creation and trade diversion. The gravity model estimation indicate abscence of trade creation effect in both agreements and significant trade diversion effect in NAFTA which implies adverse impact on welfare. However, the finding presented inconclusive result for trade diversion effect in MERCOSUR.

Krueger (1999) also attempted a study to assess the effect of NAFTA on US-Mexico trade pattern. She started by examining the extent to which NAFTA accounted for the change in trade pattern using shift and share analysis which indicates the trade creation and trade diversion effect at commodity level and then evaluate the trade creation and trade diversion

effect at aggregate level using gravity model. The empirical results revealed that positive but insignificant trade creation effect whereas negative trade diversion effect.

Endoh (1999) studied the effect of EEC, LAFTA and CMEA. He used three set of dummy variables which represent import extra bloc, import intra bloc and exports extra bloc. The dummy for import extra bloc, import intra bloc and exports extra bloc are used to detect diversion of imports, trade creation and diversion of exports, respectively. The result indicates that a positive creation and a negative diversion in EEC and CMEA with a negative sign for both critrea in LAFTA.

The empirical evidences showed that the results of different studies are mixed. Some of the regional trade agreements creates trade among members while others divert trade from member countries. The overall effect of regional trade agreements can not be set apriori.

2.2.3. PERFORMANCE OF COMESA

COMESA has been in place for about fourteen years but has failed to produce significant levels of intra-regional trade. Studies that have been attempted to assess the performance of COMESA are discussed below.

Alemayehu and Haile (2008) review the challenges that regional integration in Africa face and assess their implication on their future prospect. They put issues of initial condition, compensation issues, lack of political commitment, overlapping membership, lack of policy harmonization and poor private sector participation among the major hinderances for lack of progress of regional integration in Africa. The study also used gravity model to test the determinant of intra-regional trade flows in Africa taking COMESA as a case study. The model include dummy variable so as to show the trade creation and trade diversion effect of COMESA. The results suggest that almost all the standard gravity model variables have

statistically significant impact on trade flows among the regional grouping. This results showed that good macroeconomic policies (such as financial deepening and infrastructure development) are important determinants of bilateral trade in Africa. But, they found that regional integration arrangements failed to expand intra-regional trade. The results also showed COMESA intra-trade was found not to be significantly different from its trade with non member countries which imply that COMESA is ineffective in promoting trade among its members.

Khandelwal (2004) also attempted a study on prospect and challenges for regional trade integration using the experience of COMESA and SADC. This study pointed out that country level implementation problems in COMESA and restrictive and complicated rules of orgin in SADC on top of overlapping membership, structural constraints, dependency on trade taxes and disparities in restrictiveness of the regions hinder the progress of the regional trade. He concludes that the scope for expansion of intra-regional trade is limited using the estimates of product complementarity index.

Muuka et al (1998) examined the impediments to economic integration in Africa taking COMESA as a case study. They grouped the issues into factors induced by Structural Adjustment Program (SAP) and factors that are not related to SAP. The SAP induced impediments include similarity in trade policy reform and contradition between similar and identical (International Monetary Fund and World Bank) programs. On the other hand, the Non SAP factors are underdevelopment of human capability and debt burden inaddition to the aforemention factors. Muuka et al (1998) concluded that COMESA failed to materialize the benefits of regional integration due to these impediments.

Umurungi (2005) critically review the experience of European Union, the ASEAN and SADC regions in search of lesson for COMESA to promote intra regional trade. By doing

descriptive and comparative analysis, she identifies what COMESA can learn from the experience of European Union, the ASEAN and SADC . Umurungi (2005) emphasized mainly on favourable macroeconomic condition, adequate infrastructure and diversified export base as a condition for regional integration to be successful. The review indicates that the fulfillment of these condition in European Union, the ASEAN and SADC expand intra-regional trade in the regions. Unfortunately, the COMESA region is characterized by unfavourable macroconomic condition, poor infrastructure and dependency on few primary commodity which limited the growth of intra-COMESA trade (Umurungi, 2005).

Trade potential of COMESA was assessed using gravity model by Rojid (2006). This study also examine whether COMESA is a building or a stumbling bloc. The empirical result suggest that COMESA is a building bloc. However, the results also indicated that COMESA's trade potentital is limited.

Musila (2005) examined the intensity of trade creation and diversion in COMESA, ECCAS and ECOWAS in 1990s using gravity model. He found a higher intensity of trade creation exist in ECOWAS followed by COMESA whereas no evidence for trade creation effect in ECCAS was found. The result also indicate no strong evidence for trade diversion in the three regional groups. Musila (2005) concluded that the intenstiy of trade creation and trade diversion differs not only from region to region but also from time to time.

Gbetnkom (2006) undertook a study which focuses on estimating the determinants of market integration among the COMESA member states and the extent to which the grouping accounts for the change in trade patterns as a consequence of tariff cut within the grouping. The study examines the implication of COMESA's accession to the Free Trade Area and shows that the accession to Free Trade Area has resulted an increase in intra regional trade. Besides, the result demonstrate that the traditional explanatory variable of

gravity model have significantly determined trade flows in COMESA and there exists both trade creation and trade diversion effect over the period under consideration though trade creation effects dominates trade diversion effect implying that COMESA fosters intra regional trade.

It seems the majority of abovementitoned studies arrived to similar conclusion; that is, COMESA failed to promote its intra-regional trade whereas no strong evidence for trade diversion effect was found.

Since this study is concerned with the analysis of the impact of COMESA in promoting trade among members, we use a gravity model inorder to assess whether COMESA is effective in enlarging trade among its members.

Instead of the mere volume of trade flows, this study in addition introduces the trade intensity index to measure the relative weight of a set of trade linkages, which explicitly reveals the relative importance of trade between two countries. This study also tries to distengle the impact of the trade liberalization program on bilateral trade linkages by estimating trade intensity model for the years to be taken under consideration

CHAPTER THREE

OVERVIEW OF COMESA

3.1. BACKGROUND

The achievement of sustainable economic development through economic cooperation was initiated in Africa as of 1958 and 1960 when the first and second conferences of independent African states were held. It was then that African countries agreed to enhance economic cooperation among themselves so as to tackle fragementation of economies and smallness of market size (www.comesa.org).

Regional integration in Africa had also been considered as a means not only to break away from colonial based trade pattern which was characterized by vulnerable export structure but also to foster economic growth through overcoming major obstacles such as fragmentation and smallnes of markets, narrow production ranges and undiversified economic activities (Aryeetey and Oduro, 1996).

It was against this background that the Treaty establishing the Preferential Trade Area for Eastern and Southern Africa (PTA) was signed in December 1981. The founding members of the PTA are Comoros, Djibouti, Ethiopia, Kenya, Malawi, Mauritius, Somalia, Uganda and Zimbabwe. It was taken as a primary step towards regional economic cooperation and integration to bring about sustainable economic growth and development of member states. The Treaty came into force in September 1982 following ratification by the nine member states.

The PTA was established with the following aims and objectives as defined in the treaty:

i) promoting cooperation and integration covering all areas of economic activity, particularly trade, industry, transport and communications, agriculture, natural resources and monetary affairs

ii) fostering closer relations among member states

iii) to create a common market which allows the free movement of goods, services, capital and labour within the region.

In order to achieve the above objectives, the PTA established strategies including reduction and elimination of trade barriers on goods originating within the region according to the Common List specification, cooperation in the field of both industrial and agricultural development, simplification and harmonisation of customs procedures and regulations, simplification and harmonisation of trade documents and procedures in the region, simplified clearing and payments arrangements to promote trade in goods and services within the region, and cooperation to develop coordinated and complementary policies and systems in transport and communications (www.fao.org)

The achievements of PTA among its programmes include 60% percent average tariff reduction on goods originating in the region, provision of preferential treatment in exchange of all commodity produced within the region by abolishing the use of Common List, establishment of a computer based regional trade information network (TINET) with focal points in each member countries, rehabilitation and upgrading of roads, railways, ports and telecommunications links within the region, implementation of the PTA Third Party Motor Vehicle Insurance Scheme (the Yellow Card) which facilitates the movement of vehicles within the region, simplification and harmonization of road customs transit documents through the introduction of a single Road Customs Transit Declaration Document,

establishment of the Clearing House in February 1984, and establishment of the PTA Trade and Development Bank for Eastern and Southern Africa (PTA Bank) in November 1985.

The PTA was then replaced by Common market for eastern and southern Africa (COMESA) in 1993 when the PTA head of states and governement meeting was held. It was at this meeting that accession of new members namely Eritrea, Madagascar and Seychelles was accepted and the Treaty establishing COMESA was signed. Then, the Treaty was ratified in 1994. COMESA was notified to WTO under the Enabling Clause in 1995. (African Development Report, 2000).

The COMESA treaty was different from that of the PTA for two reasons. Firstly, there exists the introduction of the concept of multiple speed or variable geometry which provides for a certain group of countries to move faster in the regional economic integration process than the whole group. In addition, it allows decisions to be made by majority rather than by consensus. Secondly, sanctions can be imposed on countries that fail to implement agreed COMESA programmes and settlement of disputes arising from interpretation or implementation of the Treaty (Ibid, p. 181).

Regarding the structure of COMESA, COMESA is made up of the following:

- the Authority of Heads of State and Government: represents the supreme Policy Organ of the region which is responsible for general policy, direction and control of the performance of the executive functions of the COMESA and the achievement of its aims and objectives;
- the Council of Ministers: undertakes policy decisions on the programmes and activities of COMESA including the monitoring and reviewing of its financial and administrative management;

- the Committee of Governors of Central Banks which manages the COMESA Clearing House and ensures implementation of the Monetary and Financial Co-operation programmes;
- the Intergovernmental Committee: is responsible for the development and management of programmes and action plans in all the sectors of co-operation excluding the finance and monetary sector;
- Technical Committees is accountable for the various economic sectors and for administrative and budgetary matters;
- the Secretariat is mainly responsible to provide technical support and advisory services to the Member States in the implementation of the Treaty; and
- the Consultative Committee of the Business Community and Other Interest Groups is responsible for the provision a link and facilitate dialogue between the business community and other interest groups and organs of the Common Market (www.comesa.org)

COMESA was established with the aims and objectives which pursue to deepen and broaden the process of regional integration in the region which had been initiated by the PTA. The aims and objectives of COMESA as stated in the treaty are:

- Attaining sustainable growth and development of the member states by promoting a more balanced and harmonious development of its production and marketing structures
- Promoting joint development in all fields of economic activity and adopting joint a macro-economic policies and programmes to raise the standard of living of its peoples and to foster closer relations among its Member States

- Cooperation in the creation of an enabling environment for foreign, cross-border and domestic investment through promotion of research and adaptation of science and technology for development;
- Cooperation in the promotion of peace, security and stability among member states
- Cooperation in strengthening the relationship between the Common Market and the rest of the world
- Contributing towards the establishment, progress and the realisation of the objectives of the African Economic Community.

Besides, the vision of COMESA is put as "*to attain a fully integrated and internationally competitive regional economic community with high living standards of its people and where goods, services, capital and labor freely moves across borders*." (www.comesa.org).

In order to achieve the objectives and goals , COMESA has designed trade and investment development programmes. Removal of trade and investment barriers through reduction of tariff and non tariff barriers on trade and opening up their markets was among the key programmes. The calendar of preferential liberalization towards the eventual elimination of tariffs on intra-COMESA trade was as follows: 60% reduction by 31 October 1993; 70% reduction by 31 October 1994; 80% reduction by 31 October 1996; 90% reduction by 31 October 1998; and 100% reduction by 31 October 2000, thus achieving a Free Trade Area (www.comesa.org). However, the implementation of this programme was behind the schedule.

Moreover, the programme had included restructuring, widening and diversifying the productive base of the COMESA economy, adoption of a phased Monetary and fiscal policies harmonization programme, harmonization of trade statistics and customs procedures and management systems and installation of ASYCUDA (Automated System

for Customs Data and Management) and EXTRADE (External Trade) in order to avail current and accurate trade statistics , development of transport and telecommunication infrastructure, and strengthening of the trade facilitation programme that include harmonized Road Traffic Charges, harmonized Axle Load Limits, COMESA Carrier License and Transit Plates, Road Custom Transit Declaration Document, Advance Cargo Information System, The Yellow Card Scheme, and COMESA Customs Bond Guarantee Scheme.

COMESA has also created various institutions so as to promote the regional economic integration. These includes The COMESA Trade and Development Bank in Nairobi, Kenya; The COMESA Clearing House in Harare, Zimbabwe; The COMESA Association of Commercial Banks in Harare, Zimbabwe; The COMESA Leather Institute in Ethiopia; The COMESA Re-Insurance Company (ZEP-RE) in Nairobi, Kenya; The COMESA court of Justices.

The COMESA FTA was achieved on 31st October, 2000 when nine of the member States namely Djibouti, Kenya, Madagascar, Malawi, Mauritius, Sudan, Zambia and Zimbabwe eliminated their tariffs on COMESA originating products, in accordance with the tariff reduction schedule adopted in 1992. Burundi and Rwanda joined the FTA on 1st January 2004. As of 2007, fourteen members are participating in the COMESA FTA. These FTA members have not only eliminated customs tariffs but are working on the eventual elimination of quantitative restrictions and other non-tariff barriers. In addition, it is intended to launch Customs union by the year 2008 which was initially planned to take place in 2004.

3.2. TRADE PERFORMANCE IN COMESA

COMESA comprises of a large number of countries which straddles from Eastern to Southern part of the continent (covering 42.6% of total African surface and accounting for 44.6% of total population and 32% of total GDP in the continent). Member states are characterized by strong disparities in their economic and social background (Carmignani, 2006). The COMESA member countries expound a highly heterogeneous picture in terms of population size, area, domestic market size, per capita income and other social and political situation.

COMESA is the largest regional economic integration in the African continent with an area of 60% covered by rivers and lakes that can be used in the development of water transport, hydroelectric power, irrigation and fisheries; where 90% of its land area is yet to be exploited; and which is enriched with huge mineral wealth such as gold, diamonds, platinum, chrome, manganese, phosphate, iron ore, coal, cobalt, copper, nickel and uranium (COMESA, 2006). This implies COMESA has got a large potential to be exploited.

Both COMESA and its predecessor the PTA have made achievements in the area of trade, investment, customs, transport, development finance and technical co-operation. For instance, the role of the PTA bank in promoting investments and providing trade financing facilities, the transport costs reduction by about 25% in accordance with the traffic facilitation measures undertaken and telecommunication sector developments can be mentioned among the achievements (www.comesa.org). There had also been improvements in production in the industrial and agricultural sectors.

Intra-COMESA trade has grown from US$ 798 million in 1985 to US$ 2.7 billion in 1995 and to US$ 8.5 billion in 2006 as a result of various measures undertaken such as trade

facilitation and trade liberalization measures. Growth in intra-regional trade has consistently been above 5.0 per cent except in 1985 and 2000, when 4.4 and 4.9 per cent growth rates were registered. The annual growth rate of intra COMESA trade is about 5.7% on average. (UNCTAD, 2007)

Despite this increase in the intra-COMESA trade in value terms, its share in total trade of COMESA remains very small accounting for about 4% to 6% of total trade of COMESA over the period 1981 to 2006. However, the figures constitute a very low share as compared to other regional economic integration; about 65% in European Union and about 23% in ASEAN (Alemayehu and Haile, 2008).

This low level of trade share can be attributed to the competitive and not complementary trade structure of member countries. Besides, the production structure of almost all COMESA member countries is similar and is also dominated by primary commodities production. In addition, manufacturing sector is underdeveloped in the region and manufactured goods are imported from third countries such as Europe.

Moreover, the limited growth of intra-COMESA trade can be resulted from lack of political commitment, lack of harmonization and coordination of macroeconomic policies, unequal distribution of gains and loses, issue of revenue loss, poor private sector participation, inadequate infrastructure, overlapping membership in addition to the aforementioned constraints (Muuka et al (1998), Alemayehu and Haile (2008)).

CHAPTER FOUR

METHODOLOGY AND DATA ANALYSIS

4.1. THE GRAVITY MODEL

The gravity model is widely used to describe the relationship in bilateral trade patterns in international trade. The gravity model for international trade arises from Newton's "Law of Universal Gravitation" in 1687. This Law of Universal Gravitational describes the attraction between two forces result from the product of their masses divided by the squared distance between the two objects which is then multiplied by a gravitational constant (Head, 2003).

The functional form of the Newton's Law of gravity is given by:

$$F_{ij} = G \frac{M_i M_j}{D_{ij}^2}$$

Where F_{ij} is the attraction of forces between the two bodies; M_i and M_j are the masses of the two objects; D_{ij} is the distance between the two forces and G is the gravitational constant.

Tinbergen (1962) and Pöyhönen (1963) applied the gravity model for the first time in the analysis of international trade flows in a very similar way to the Newton's law of gravity.

Tinbergen (1962) specified the gravity model for international trade as:

$$Trade_{ij} \approx \alpha \frac{GDP_i GDP_j}{D_{ij}}$$

$Trade_{ij}$ is the value of trade flows between country i and j; GDP_i and GDP_j are national income of the two countries (relative economic size of country i and country j) respectively; D_{ij} is the distance between the two countries and α is a constant.

One can obtain a linear relationship of the model by taking logarithms of the above equation as a result of its multiplicative nature

$$\ln Trade_{ij} = \alpha + \beta_1 \ln (GDP_i) + \beta_2 (GDP_j) - \beta_3 \ln D_{ij} + \varepsilon_{ij}$$

This model is considered as a standard instrument in the analysis of bilateral trade flows. Following Tinbergen (1962) and Pöyhönen (1963), several authors have applied and extended its use since then.

In its basic form, the model relates trade flows between country i and country j directly to their national income (GDP) and negatively to distance between the two countries as a proxy for transaction costs.

Linneman (1966) included population of the two trading partners in the above specification. Aitken (1973) also incorporated additional variable in the basic specification so as to estimate the effect of preferential trade agreements (PTA) on bilateral trade flows.

Thus the gravity model can be augmented through additional bilateral variables that affect the trade flows such as geographical proximity, cultural similarities proxied by common language or common taste or customs, historical ties indicated by colonial relationship, political and policy factors such as regional trade agreements on top of the basic gravity model variables of GDP, population and distance. Hence, the gravity model can be an instrument in modeling international trade flows.

However the model was originally criticized for its lack of theoretical foundation as it was constructed in an ad-hoc way. Subsequently, theoretical developments started to appear to support the gravity model.

Linnemann (1966) was the first to make an attempt in providing theoretical underpinning for gravity model. He developed the model with three countries-three goods Walrasian model which was criticized for its ad hoc hypothesis made to get the reduced form (Deardorff, 1995).

After four years, Leamer and Stern (1970) provided the model formulation from a probabilistic model of transacting by treating the relationship between exporter and importer in a random way. This model was purely based on pure mathematical construction with little economical foundation (Morais and Bender, 2006).

It has been shown that the gravity model equation can be derived from either the traditional or the new theory of international trade since the second half of the 1970s (Anderson (1979), Bergstrand (1985, 1989), Helpman (1984), Helpman and Krugman (1985), Feenstra, Markusen and Rose (2001), Eaton and Kortum (1997)).

Anderson (1979) made the first formal attempt to derive the gravity model equation from a model that assumed goods are differentiated by their country of origin. Anderson (1979) presented the derivation of the model based on pure expenditure system with the assumption of identical homothetic preference across the regions.

Bergstrand (1985) also derived the gravity equation by incorporating price variables and using the assumption of product differentiation. Then, Bergstrand (1989) extended his previous work by incorporating factor-endowment and non-homothetic taste variables. The model is a general equilibrium with two factors, two industries and many country models

using the assumption of monopolistic competition. In addition, Helpman (1984) provide the theoretical justification for the gravity equation from models of monopolistic competition.

Helpman and Krugman (1985) justified the model using product differentiation assumption with increasing returns to scale. Feenstra, Markusen and Rose (2001) derived the model from monopolistic competition and product differential. Anderson and Van Wincoop (2003) provided the theoretical justification based on imperfect competition and product differentiation based on constant elasticity substitution (CES) expenditure system. Oguledo and Macphee (1994) also derived the gravity model based on linear expenditure system.

Moreover, Eaton and Kortum (1997) derived the model from Ricardian Framework whereas Deardorff (1998) developed the model using Heckscher-Ohlin theorem under perfect competition.

These authors gave the theoretical foundation for the gravity model based on different economic theories. However, the difference in these theories helps to describe the variation in the specification of the model and results of empirical evidence too. To strengthen this argument, Deardorff (1998) argued that the gravity model does not attempt to prove the validity of one theory or another but all it tests is that the positive relationship between bilateral trade flows and income and the negative relationship with distance.

Despite the difference in theoretical justification for the gravity equation, the gravity equation shares two common features. The first one is that the gravity equation is bilateral that is it relates trade related dependent variable with income for both countries and distance between the two countries. Secondly, the gravity equation is used to estimate either determinants of the volume of trade flows or determinant of the nature of trade flows (Helmers and Pasteels, 2005).

The gravity model has been extensively used to analyze the determinants of bilateral trade flows. In addition to this, the gravity model has been used to investigate trade patterns. The gravity model has also been used to examine two way trade with industries (Intra-industry trade) by taking trade share rather than trade volumes (Bergstrand, 1989).

Moreover, Gravity models have been employed to assess the impact of trade policies such as the impact of regional integration agreements on trade flows. The model has been used to address the impact of the regional trade agreement on the level and direction of trade. The model has been used to evaluate how effective the regional trade agreements in promoting trade among members. To estimate whether regional trade agreements has a significant effect or not, a regional binary variable is included in the model which takes the value of one if the two countries are members of the regional trade agreement or zero otherwise.

The gravity model that has been used frequently to analyze bilateral trade flows between countries takes the following specification;

$$X_{ij} \approx \beta_0 + \beta_1 GDP_i + \beta_2 GDP_j + \beta_3 N_i + \beta_4 N_j + \beta_6 D_{ij} + \beta_7 A_{ij} + \varepsilon_{ij}$$

Where X_{ij} represents the value of the trade flow from country i to country j; GDP_i and GDP_j are the values GDP in country i and country j respectively; N_i and N_j are the size of population in both countries; D_{ij} is the distance from the capital cities of country i to that of country j; A_{ij} represent any other factor such as geographical proximity, historical ties, cultural similarities, policy or political factors and the like affecting trade among country i and country j either positively or negatively.

The GDP of the exporting country and the importing country is a good measure of output and income of the countries, respectively. Distance and country adjacency dummies are

proxies for transportation costs. The membership in regional trade agreement is among the factors that are perceived to be beneficial to increase trade; total populations of importing and exporting countries as well as their per capita income levels are other factors that affect trade.

The first application of the gravity model in international trade was made by Tinbergen (1962) and Pöyhönen (1963). Three years later Linnemann (1966) applied the model to assess the determinants of trade flows between eighty nations in 1958.

Aitken (1973) applied the gravity model by augmenting it to include dummy variable for membership in PTA. He evaluated the impact of PTA on trade flows. Following this work, some authors used the model to assess the impact of different regional trade agreements (Pelzman (1977), Bayoumi and Einchengreen (1995), Endoh (1999), Krueger (1999), Alemayehu and Haile (2002, 2008), Hanink and Owusu (1998) and many more).

A huge number of empirical applications of the model have proved its success in international trade in general; and particularly in investigation of determinants of bilateral trade, in assessing the effect of trade policies and in predicting trade patterns. Anderson and Wincoop (2003) referred to the gravity model as “one of the most empirically successful in Economics” at predicting bilateral trade flows.

Accordingly, Deardorff (1998) stated that this empirical success of the model can be attributed to its power in explaining some real phenomenon such as trade between industrialized countries, intra-industry trade and trade liberalization effects. In addition the model has gained in popularity due to its high explanatory power and good statistical fit in its application. As a result, it is called as “workforce” for empirical studies in international trade (Bayoumi and Eichengreen, 1995).

4.2 MODEL SPECIFICATION

The gravity model has been recognized for its empirical success in explaining trade flows among countries. Besides it has been widely applied to evaluate the impact of trade policies in either level of trade or direction of trade among members. Consequently, the use of gravity model in assessing the effectiveness of COMESA in promoting trade among its member is found to be appropriate in this study.

Following Hanink and Owusu (1998), the dependent variable in this study is the trade intensity index rather than bilateral trade flows. The trade intensity index is used to measure the relative strength of trade between two countries. This index is used to determine whether the value of trade among countries is greater or smaller than would be expected on basis of their importance in world trade (www.worldbank.org).

The trade intensity index (TII) is defined as the share of a country's export to a partner divided by the share of world export to that partner. It is calculated in the following way

$$T_{ij} \approx \frac{x_{ij} / X_{iw}}{x_{wj} / X_{ww}}$$

Where x_{ij} is country i's exports to country j; X_{iw} is country i's export to world (total exports of country i); x_{wj} is world's export to country j; and X_{ww} is total world exports.

The trade intensity index is a measure of exporting country's relative market preference for the importing country. An index with value greater than one indicates a bilateral trade linkage that is larger than expected or a relatively stronger market preference for importing

country. On the other hand, a $T_{ij} < 1$ reveals exporting country's relatively weak preference for importing country's market (Hanink and Owusu (1997)).

In contrast to trade volumes which are used to measure the level of trade between countries, the trade intensity index is a measure of relative strength of trade between countries (Chow (1999), Peh (1999), Foroutan (1998)). Consequently, we employ the trade intensity index in the gravity model to measure the relative importance of trade flows across trading partners. In addition, this measure identifies bilateral trade linkage among members and between non members.

In the estimation of the relative intensity of bilateral trade linkage, using Trade Intensity Index has two advantages. Firstly, the trade intensity index shows the effectiveness of RTA by examining direction of trade patterns among members. And our objective is to measure the effectiveness of COMESA in promoting trade among members by analyzing the relative bilateral trade linkage among COMESA members which can be done using this index. The second one is that the trade intensity index normalizes factors that may affect the absolute trade flow. The use of trade intensity index controls for country heterogeneity across trading members since these factors have equal impact on bilateral trade flows of one country with all its trading partners, thus they will affect the aggregate trade volume but not across partners trade structure of this country (Balogun,2008).

THE MODEL

We conduct the estimation of the gravity model to assess the effect of membership in COMESA on trade intensity index values which are described previously.

The model takes the following general form;

$$T_{ij} \approx f\left(\begin{array}{l} GDP_i, GDP_j, GDPPC_i, GDPPC_j, SURF_i, SURF_j, \\ D_{ij}, LANG_{ij}, CB_{ij}, COMESA_{ij}, SADC_{ij} \end{array}\right)$$

We estimate the following semi log linear model to examine the effect of COMESA's existence in bilateral trade linkage between country i and country j

$$T_{ij} \approx \beta_0 + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln GDPPC_{ij} + \beta_4 \ln\left(\ SURF_{ij}\ \right) + \beta_5 \ln D_{ij}$$
$$+\beta_6 CB_{ij} + \beta_7 LANG_{ij} + \beta_8 COMESA_{ij} + \beta_9 SADC_{ij} + \varepsilon_{ij}$$

Where T_{ij} is the trade intensity index of the i[th] exporting country with respect to the j[th] importing country. GDP_i and GDP_j is the GDP of country i and country j . $GDPPC_i$ and $GDPPC_j$ are the per capita GDP of the two countries. $SURF_i$ and $SURF_j$ denote the geographical area (area in sq km) of the exporting and importing countries respectively. D_{ij} indicates the distance in km between the largest cities of countries. $LANG_{ij}$ is a dummy variable that denote common language which takes the value of unity if the country i and country j speak common language. CB_{ij} is a dummy that denotes common border shared between the two countries and takes value of one if the two countries share a border and zero otherwise. $COMESA_{ij}$ is a dummy variable that identifies joint membership in COMESA and takes the value of one if the two countries are members of COMESA and

zero otherwise. $SADC_{ij}$ is also a dummy variable that shows joint membership in SADC and takes the value of one if there is a joint membership in SADC and zero otherwise.

In all the applications of the gravity models, GDPs of the trading partners are the variables usually used as proxy of their demand and supply conditions. The GDP of the exporting country indicates the productive capacity and the GDP of the importer is a measure of market size. The trade intensity is determined by the level of development of the two countries which is proxied by the GDP per capita and geographical area proxied by the surface area of the countries in square kilometer. Furthermore, in the standard specifications of the gravity equation, geographical distance is used as proxy of transport costs. These variables (GDPs and Distance) are usually referred to as standard variable of gravity model and are assumed to determine the "normal" pattern of trade (Agostino et al, 2007).

To control for observable country-pair specific factors affecting bilateral trade, the model includes some dummy variables. In particular, LANG and CB are two binary variables set to unity if the trade partners share a common language or border, respectively. The variable COMESA is a dummy variable set to unity if *i* and *j* are members of COMESA and zero otherwise which is expected to indicate the effectiveness of COMESA in promoting trade among members. The Variable SADC is also a dummy variable that takes value of one if the two countries are members of SADC and zero otherwise.

The variables are measured in the following units: Trade intensity index(TII_{ij}) are measured

in millions of dollars; GDP and GDPPC are also measured in millions of dollars; Distance is measured in kilometers; Surface is measured in square kilometers and Common border, language, COMESA, Common Language, Common Border and SADC are binary variables.

THE ESTIMATION TECHNIQUE

The calculated trade intensity indices involve zero values. This is because of the existence of zero bilateral trade flows in our dataset due to either lack of report or lack of actual exchange (see Foroutan and Pritchett (1993), Longo and Sekkat (2004), Alemayehu and Haile (2008)). In the case of zero value, the log specification would result in undefined values so we use semi log specification in our estimation. In addition, using double log specification would skip country pairs with such values (Longo and Sekkat, 2004). Hence, the trade intensity indices are expressed in level terms whereas some of the explanatory variables take logarithmic form.

Moreover, using OLS estimation technique would result in biased estimates due to this censored nature of the data set. So Tobit is the appropriate estimation technique as it accounts country-pairs with zero exports between them. (Elbadawi (1997), Longo and Sekkat (2004), Foroutan and Pritchett (1993), Alemayehu and Haile (2008)).

The model is estimated using the data for TII and all the other explanatory variables for the period 1981 and 1999 separately. The year 1981 is chosen to provide the necessary information on bilateral trade flows of COMESA before its establishment as COMESA is established in December 1981. The reason to take this year is due to the availability of all the data required for the analysis before COMESA was established. The year 1999 is taken to indicate the bilateral trade linkage of the region after COMESA has taken place. This year provides the best information of the trade flows because the effect of COMESA on bilateral trade flows can be captured in a best way in this period as the trade liberalization programme takes place between the year 1993 and 1999 and we can separately look at the effect of COMESA on bilateral trade flows as COMESA achieved its FTA level and exist

together with the COMESA. So we undertake this analysis to examine the changes in trade patterns before and after COMESA.

The set of observation consists of COMESA member countries and non COMESA members countries that share border with any one of the member countries (the countries are listed in the Appendix A). The individual T_{ij} for each country with each of the other countries are aggregated in cross section so as to serve as a dependent variable for a total of 552 (24x23) observations. The aggregation requires the inclusion of dummy variables in order to incorporate country specific effects on the trade intensity indices. Consequently, we need to put in 23 dummy variables to the right hand side of the equation for which each denotes all countries except one as an exporter. Hence, the inclusion of these dummy variables detects the country specific effects on the trade intensity indices.

EXPECTED SIGN

The GDP of the trading partners is considered to represent the size of the economy and their estimated sign is expected to be positive. The GDP per capita of the trading partners is used as a proxy for level of development; the higher the GDP per capita of a country, the more it is expected to trade: its estimated coefficient is expected to be positive. If a country has greater geographical area, then most of the economic activities will take place in the country as a result the sign is expected to be negative. In gravity model, distance is a resistance factor and has a negative impact on volume of bilateral trade. As the distance between the exporting and importing countries becomes larger, exports will fall. The distance is a factor, which is used as a proxy to consider the impact of transport costs and other transaction costs. One of the major barriers to trade flows is higher transportation cost so that B6 is expected to be negative. As the existence of a common border usually facilitates trade, we expect the elasticity of Common Border to be positive. In addition, speaking a common

language reduces transaction cost, so common language has a positive impact on trade relationship among countries. $COMESA_{ij}$ is the variable of interest which indicates the effectiveness of COMESA in enlarging trade among members is expected to have positive impact.

THE DATA

The model is estimated for cross section dataset comprised of COMESA members and non members who share a border with any of the member states for the period 1981 and 1999 (the countries are listed in the Appendix A).

Trade data are taken from the Direction of Trade of the IMF. The data for real GDP, GDP per capita and Surface area of both countries are obtained from the World Development indicators 2007 database. The www.indo.org and Encyclopedia 2007 is the source used to construct some of the determinants of trade linkage namely Common border and common language. The distance variable is taken from www.timeanddate.com/worldclock/distance.htm. Moreover, the dummy COMESA and SADC is created using information drawn from the WTO database on regional trade agreements (available at http://www.wto.org/english/tratop_e/ region_e/region_e.htm).

4.3 ECONOMETRIC RESULTS

As the main objective of this study is to determine whether COMESA is effective in increasing intra-COMESA trade using gravity model, this section examines the results of the estimated gravity model.

The regression results of the Tobit estimation for both year 1981 and 1999 are outlined in the following tables. The use of cross-sectional data requires researchers to make

adjustments since error terms in cross-sectional regressions tend to be heteroscedastic (Wooldridge, 2000). Therefore in order to correct for heteroscedasticity and obtain robust results for our model, we utilize the bootstrap procedure to compute heteroscedastic consistent standard errors in our estimation. The results that are obtained from this procedure are the results that are reported in this study.

Table 1. Tobit regression results for year 1981

Variables	Coefficients	Bootstrap std err	z	P>|z|
$lnGDP_i$	60.5464	14.20994	4.26*	0.000
$lnGDP_j$	2.818211	9.702237	0.29	0.771
$lnGDPPC_{ij}$	7.902355	11.0944	0.71	0.476
$lnSURF_{ij}$	-1.71634	6.085862	-0.28	0.778
lnD_{ij}	-46.67955	21.36137	-2.19*	0.029
CB_{ij}	95.58883	26.75012	3.57*	0.000
$LANG_{ij}$	26.53598	20.73741	1.28	0.201
$COMESA_{ij}$	44.37183	25.79699	1.72	0.085
$SADC_{ij}$	-9.941965	17.84589	-0.56	0.577
_cons	-1166.213	318.2301	-3.66	0.000
/sigma	105.189	16.50238		
Number of obs	552			
Replications	288			
Wald chi2(31)	80.44			
Prob > chi2	0.0000			
Pseudo R2	0.0949			
Log likelihood	-1085.5826			

Note: the dependent variable is the trade intensity indices. The country specific dummies are included and reported in the appendix. * denote significance at 5% level

Marginal effects after bootstrap: Tobit

variable	dy/dx	Std. Err.	z	P>|z|
$lnGDP_i$	60.5464	14.21	4.26	0.000
$lnGDP_j$	2.818211	9.70224	0.29	0.771
$lnGDPPC_i$	7.902355	11.094	0.71	0.476
$lnSURF_{ij}$	-1.71634	6.08586	-0.28	0.778
lnD_{ij} |	-46.67955	21.361	-2.19	0.029
CB_{ij}* |	95.58883	26.75	3.57	0.000
$LANG_{ij}$*|	26.53598	20.737	1.28	0.201
$COMESA_{ij}$**|	44.37183	25.797	1.72	0.085
$SADC_{ij}$*|	-9.941965	17.846	-0.56	0.577
	Predited y value =-128.6206			

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Table 2. Tobit Regression for the year 1999

Variables	Coefficients	Bootstrap std err	z	P>|z|
$lnGDP_i$	107.4627	21.55694	4.99*	0.000
$lnGDP_j$	32.23814	12.35557	2.61*	0.009
$lnGDPPC_{ij}$	-23.94961	13.26736	-1.81	0.071
$lnSURF_{ij}$	-19.285	7.720501	-2.50*	0.012
lnD_{ij}	-74.43834	32.68374	-2.28*	0.023
CB_{ij}	109.3515	33.33901	3.28*	0.001
$LANG_{ij}$	42.15236	21.95032	1.92	0.055
$COMESA_{ij}$	18.20797	20.52387	0.89	0.375
$SADC_{ij}$	9.826338	22.49191	0.44	0.662
_cons	-1841.112	447.3761	-4.12	0.000
/sigma	145.5914	21.69691		

Number of obs	552
Replications	378
Wald chi2(31)	62.42
Prob > chi2	0.0007
Pseudo R2	0.0640
Log likelihood	-1873.9215

Note: the country specific dummies are included but not reported due to space constraint. * denote significance at 5% level.

Marginal effects after bootstrap: Tobit

variables	dy/dx	Std. Err.	z	P>|z|
$lnGDP_i$	107.4627	21.557	4.99	0.000
$lnGDP_j$	32.23814	12.356	2.61	0.009
$lnGDPPC_{ij}$	-23.94961	13.267	-1.81	0.071
$lnSURF_{ij}$	-19.285	7.7205	-2.50	0.012
lnD_{ij}	-74.43834	32.684	-2.28	0.023
CB_{ij}*	109.3515	33.339	3.28	0.001
$LANG_{ij}$*	42.15236	21.95	1.92	0.055
$COMESA_{ij}$*	18.20797	20.524	0.89	0.375
$SADC_{ij}$*	9.826338	22.492	0.44	0.662
	Predited y value = -72.40422			

(*) dy/dx is for discrete change of dummy variable from 0 to 1

The coefficient of the exporting country GDP is positive as expected and statistically significant at 5% percent level in both periods. This result confirms the theoretical expectation of the positive relationship between the two variables as GDP of the exporting country represents the production capacity of the country and hence its ability to export. While the importing country's GDP has a positive sign but only statistically different from zero in the latter year.

The coefficient of per capita GDP is positive in the year 1981 and negative in 1999, respectively. But it is insignificant in both cases. The negative sign of the coefficient may suggest that countries with low level of economies, which is true for countries in our

sample, may tend to have less trade among themselves. Some researchers also found the same sign and argued that richer countries in terms of per capita GDP tend to have more trade and by implication the poorer ones tend to have lesser (Balolgun (2008), Deardorff (1998)).

The coefficient for geographical area has the expected negative sign but only significant in year 1999. As most of the economic activities in larger economies take place in that country larger economies trade less in relative to smaller ones.

The distance variable coefficient appears to be significant with its expected negative sign in both periods. Distance is used as proxy for transaction costs and transportation cost. Hence, the more distant the trading countries, the higher the cost of transportation and other distance related trade costs which constrain the intensity of trade. This result supports the importance of trade costs in explaining the patterns of trade.

Similarly, the coefficient of the common borders has a positive sign as expected and significant in both periods. This points out that if the trading partners are adjacent, trade tends to increase. Since most of the sample countries in this study are neighbors that share border, the results indicate that they are engaged in border trade.

The language coefficient is positive but not significant in both periods. The SADC dummy is found to be negative but insignificant in the year 1981. However, the coefficient has positive sign as expected but also insignificant in the year 1999. This implies that the existence of SADC does not significantly affect trade in the region. The factors outlined below for COMESA are also the responsible factors for the limited intra-SADC trade.

The coefficient for COMESA dummy, which is the variable of interest in this study, has the expected positive sign but not significant in both periods. This implies that membership in

COMESA does not significantly affect trade among COMESA members. This result is also consistent with results of previous studies (Alemayehu and Haile (2008), Musila (2005), Umurungi (2005), Khandelwal (2004), Rojid (2006)).

The effect of COMESA on the region's trade found to be insignificant. This can be attributed to various factors. As the member states generate higher government income from tariff, there is the issue of revenue loss and hence countries are reluctant to implement the trade liberalization program. In addition, there is the issue of compensation and variation in initial condition of member state. The poor performance private sector and inactive participation of the sector also contributes to the ineffectiveness of COMESA on top of low resource complementarity, small market size and lack of knowledge of the market. Other major factors such as macroeconomic instability, lack of policy harmonization and coordination, and distorted trade regimes are among the responsible factors for the poor performance of the COMESA. Moreover, lack of full commitment and institutional issues, inadquate financial and administrative resources, issues of overlaping membership, and political instability constrain the performance of COMESA. High transaction cost due to inadequate infrastructure, lack of technological improvement, insuffient skill and brain drain,strife and draughts are also placed among the hindering factors (Alemayehu and Haile (2008), Musila (2005), Muuka et al (1998), Umurungi (2005), Khandelwal (2004), Rojid (2006), COMESA (2007))

CHAPTER 5

CONCLUSION AND RECOMMENDATION

COMESA, one of the largest regional trade agreements in Africa, is examined in this study. COMESA was established with the aim of promoting sustainable development and growth in the region through intensifying the process of regional integration and fostering intra-COMESA trade.

Thus, this study aims to evaluate the extent to which COMESA has achieved its goal of increasing intra-COMESA trade and also to analyze the effectiveness of COMESA on expanding trade among member countries.

Using gravity model, the study has analyzed the pattern of trade among COMESA member countries and their neighboring countries that share border with anyone of the member countries for the years 1981 and 1999. These two years under consideration are selected to represent the period before and after the formation of COMESA, respectively.

The gravity model was applied to trade intensity indices of the sample countries. The use of trade intensity indices is suitable for reflecting cross country comparisons of bilateral trade linkage. The finding indicates that the standard gravity model variable particularly GDP of the exporting country, GDP of the importing country and distance come up with the expected results during the two periods under consideration. The coefficient for $GDPPC_{ij}$ is positive in the year 1981 and negative in the year 1999 but insignificant in both cases. The coefficient for common border and common language are positive as expected. Negative coefficient as expected are also found for the surface area. The coefficient for SADC

dummy has the unexpected negative sign in the year 1981 and is positive as expected in the year 1999.

The most important finding for this study, the coefficient of COMESA dummy is found to be positive but insignificant in both years. This result of the gravity model estimates confirms that the COMESA has no significant effect on the intensity of regional trade flows in the periods under consideration. The result of this study is also consistent with previous studies that assess the impact of COMESA on intra-COMESA trade which have argued that COMESA failed to achieve its goal of expanding its intra-regional trade.

Several researchers outline several factors that are responsible for this poor performance of COMESA. Among these factors, issue of revenue loss, failure to implement programs, issues of compensation and variation in initial condition of member state, poor performance private sector and inactive participation of the sector, low resource complementarity, small market size and lack of knowledge of the market, macroeconomic instability, lack of policy harmonization and coordination, distorted trade regimes, lack of full commitment and institutional issues, inadquate financial and administrative resources, issues of overlaping membership, and political instability, high transaction cost due to inadequate infrastructure, lack of technological improvement, insuffient skill and brain drain, strife and draughts (Alemayehu and Haile (2008), Musila (2005), Muuka et al (1998), Umurungi (2005), Khandelwal (2004), Rojid (2006), COMESA (2007)).

Accordingly, Progress in COMESA regime will mainly require joint effort of the member states for coordination, harmonization and implementation of policies, improvement of human and institutional capabilities, increasing production capacity and expansion of markets, active participation of the private sector and deal with problems that arise from simultaneous membership in more than one regional trade agreements.

Despite the sound results discussed above in this study, the gravity model has several limitation. Among these, first the model is highly dependent on aggregated data and examine the trade flow at a very aggregate level which restricts the analysis of the effect of regional trade agreements on specific commodities. Second, the model does not consider the composition of demand and supply between the trading partners which is useful for countries with high sectoral and geographical concentrated trade. Thirdly, although the model analyses the welfare implication of regional trade agreements in terms of trade creation and trade diversion it does not explicitly reveal the extent of trade creation and trade diversion. Nevertheless, the gravity model presents appealing results in evaluating the effects of regional trade agreements.

In general, this study has examined the effectiveness of COMESA in promoting intra-COMESA trade and found out that COMESA does not have a significant effect in increasing intra-COMESA trade. The study analyzes by applying gravity model using cross sectional data set. Accordingly, we can mention some direction of future research. One is that it is possible for reasearchers to assess this effect on trade intensity at a commodity level in a more detailed manner . The other possibility is to undertake a panel data analysis which is an indepth analysis.

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APPENDICES

APPENDIX A. COUNTRIES LIST FOR THE ENTIRE SAMPLE

TABLE A.1: REPORTER AND PARTNER COUNTRIES

Reporter and partner countries
1. Angola 2. Burundi 3. Central Africa 4. Chad 5. Comoros 6. Congo, REP 7. Democratic Republic of Congo 8. Djibouti 9. Egypt 10. Ethiopia 11. Kenya 12. Libya 13. Madagascar 14. Malawi 15. Mauritius 16. Mozambique 17. Rwanda 18. Seychelles 19. South Africa 20. Sudan 21. Tanzania 22. Uganda 23. Zambia 24. Zimbabwe

APPENDIX B. MEMBERSHIP OF THE SAMPLE COUNTRIES IN COMESA AND SADC

TABLE B.1. MEMBERSHIP IN COMESA AND SADC

Countries	COMESA	SADC
Burundi	X	
Central Africa		
Chad		
Comoros	X	
Congo ,REP		X
Democratic Republic of Congo	X	X
Djibouti	X	
Egypt	X	
Ethiopia	X	
Kenya	X	
Libya	X	
Madagascar	X	
Malawi	X	X
Mauritius	X	X
Mozambique	X	X
Rwanda	X	
Seychelles	X	X
South Africa		X
Sudan	X	
Tanzania	X	X
Uganda	X	
Zambia	X	X
Zimbabwe	X	X

APPENDIX C. DESCRIPTIVE SUMMARY STATISTICS OF THE VARIABLES

TABLE C.1. SUMMARY STATISTICS FOR THE YEAR 1981

Variable	Obs	Mean	Std. Dev.	Min	Max
Tii_{ij}	552	12.59781	62.0861	0	769.9152
$lnGDP_i$	552	21.70638	1.499468	18.76323	25.33464
$lnGDP_j$	552	21.70638	1.499468	18.76323	25.33464
$lnGDPPC_{ij}$	552	12.32533	1.364238	9.861415	16.38192
$lnSURF_{ij}$	552	24.67763	3.273755	13.75193	29.40186
lnD_{ij}	552	7.764965	.6698473	2.302585	8.926784
CB_{ij}	552	.1974638	.3984463	0	1
$LANG_{ij}$	552	.2264493	.4189128	0	1
$COMESA_{ij}$	552	.6884058	.463565	0	1
$SADC_{ij}$	552	.1630435	.3697404	0	1
d1	552	.0416667	.2000076	0	1
d2	552	.0416667	.2000076	0	1
d3	552	.0416667	.2000076	0	1
d4	552	.0416667	.2000076	0	1
d5	552	.0416667	.2000076	0	1
d6	552	.0416667	.2000076	0	1
d7	552	.0416667	.2000076	0	1
d8	552	.0416667	.2000076	0	1
d9	552	.0416667	.2000076	0	1
d10	552	.0416667	.2000076	0	1
d11	552	.0416667	.2000076	0	1
d12	552	.0416667	.2000076	0	1
d13	552	.0416667	.2000076	0	1
d14	552	.0416667	.2000076	0	1
d15	552	.0416667	.2000076	0	1
d16	552	.0416667	.2000076	0	1
d17	552	.0416667	.2000076	0	1
d18	552	.0416667	.2000076	0	1
d19	552	.0416667	.2000076	0	1
d20	552	.0416667	.2000076	0	1
d21	552	.0416667	.2000076	0	1
d22	552	.0416667	.2000076	0	1
d23	552	.0416667	.2000076	0	1

TABLE C.2. SUMMARY STATISTICS FOR THE YEAR 1999

Variable	Obs	Mean	Std. Dev.	Min	Max
Tii_{ij}	552	26.67827	119.8946	0	1293.611
$lnGDP_{i}$	552	22.14682	1.52436	19.11438	25.57199
$lnGDP_{j}$	552	22.14682	1.52436	19.11438	25.57199
$lnGDPPC_{ij}$	552	12.32528	1.669375	9.261794	17.09893
$lnSURF_{ij}$	552	24.6692	3.269733	13.75193	29.40186
lnD_{ij}	552	7.764965	.6698473	2.302585	8.926784
CB_{ij}	552	.1974638	.3984463	0	1
$LANG_{ij}$	552	.2264493	.4189128	0	1
$COMESA_{ij}$	552	.6884058	.463565	0	1
$SADC_{ij}$	552	.1630435	.3697404	0	1
d1	552	.0416667	.2000076	0	1
d2	552	.0416667	.2000076	0	1
d3	552	.0416667	.2000076	0	1
d4	552	.0416667	.2000076	0	1
d5	552	.0416667	.2000076	0	1
d6	552	.0416667	.2000076	0	1
d7	552	.0416667	.2000076	0	1
d8	552	.0416667	.2000076	0	1
d9	552	.0416667	.2000076	0	1
d10	552	.0416667	.2000076	0	1
d11	552	.0416667	.2000076	0	1
d12	552	.0416667	.2000076	0	1
d13	552	.0416667	.2000076	0	1
d14	552	.0416667	.2000076	0	1
d15	552	.0416667	.2000076	0	1
d16	552	.0416667	.2000076	0	1
d17	552	.0416667	.2000076	0	1
d18	552	.0416667	.2000076	0	1
d19	552	.0416667	.2000076	0	1
d20	552	.0416667	.2000076	0	1
d21	552	.0416667	.2000076	0	1
d22	552	.0416667	.2000076	0	1
d23	552	.0416667	.2000076	0	1

APPENDIX D: NORMALITY TEST

D.1. for the year 1981

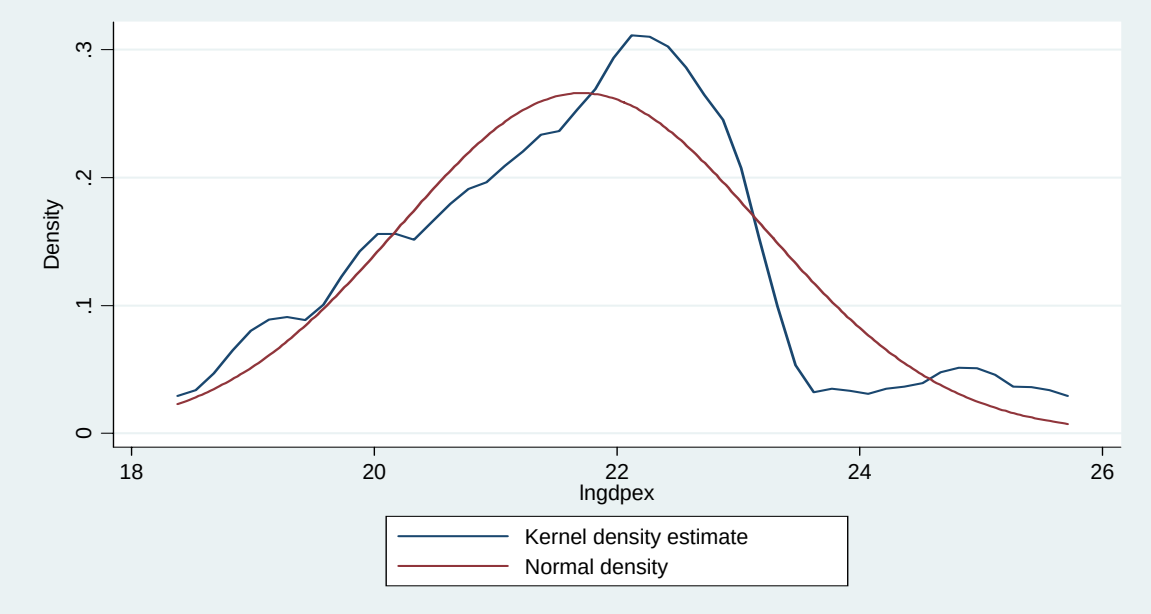

Figure D.1.1. Real GDP of the Exporting Country for the year 1981

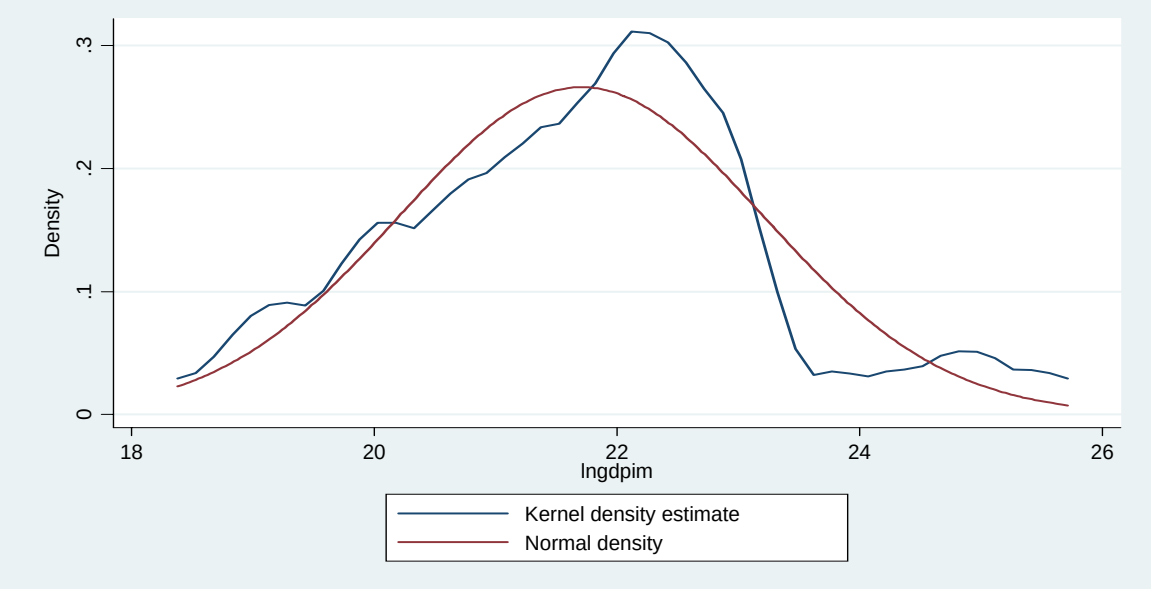

Figure D.1. 2. Real GDP of the Importing Countries for the year 1981

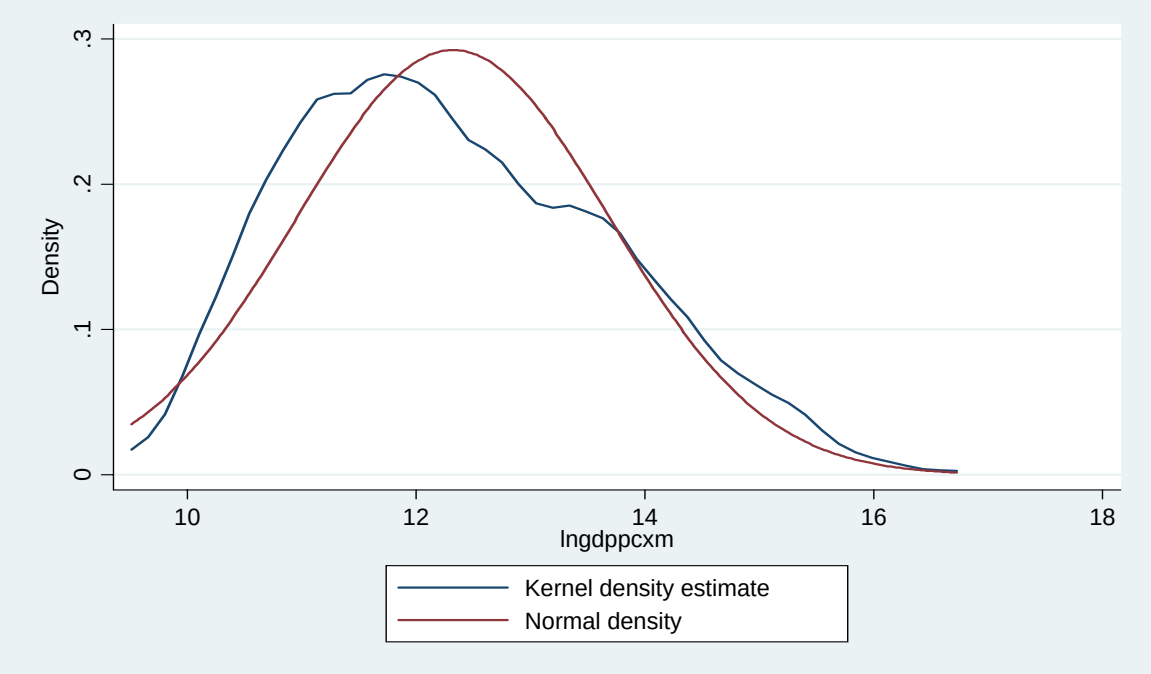

Figure D.1. 3. Product of Real Per Capita GDP of the importing and exporting countries for the year 1981

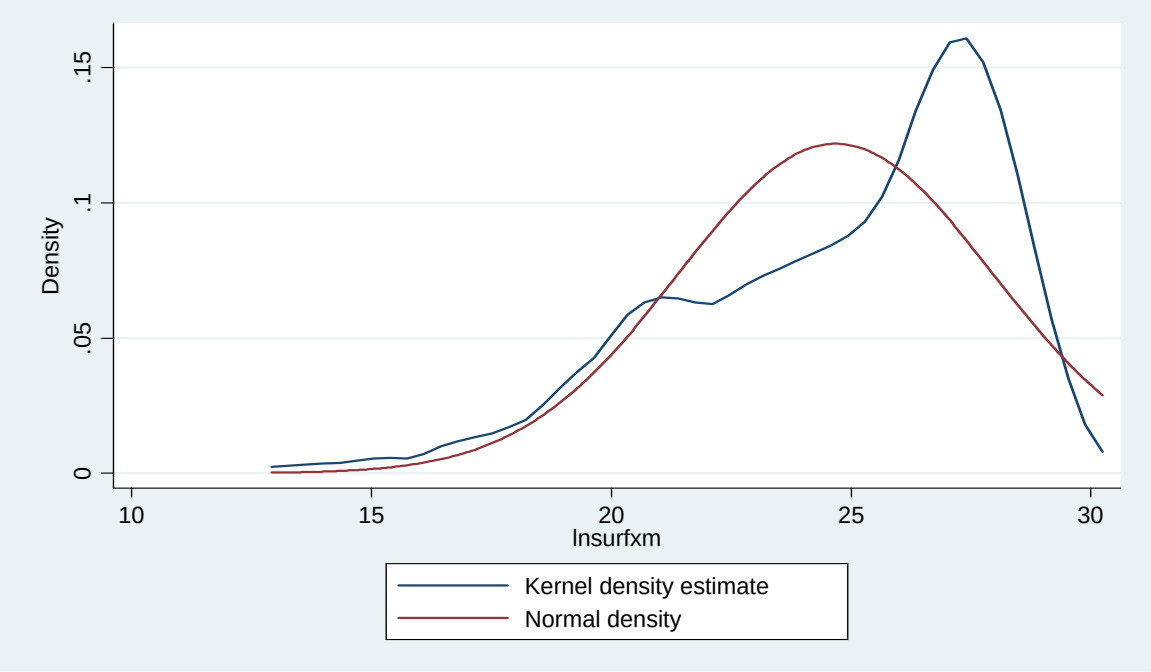

Figure D. 1. 4. Product of surface area of exporting and importing countries for the year 1981

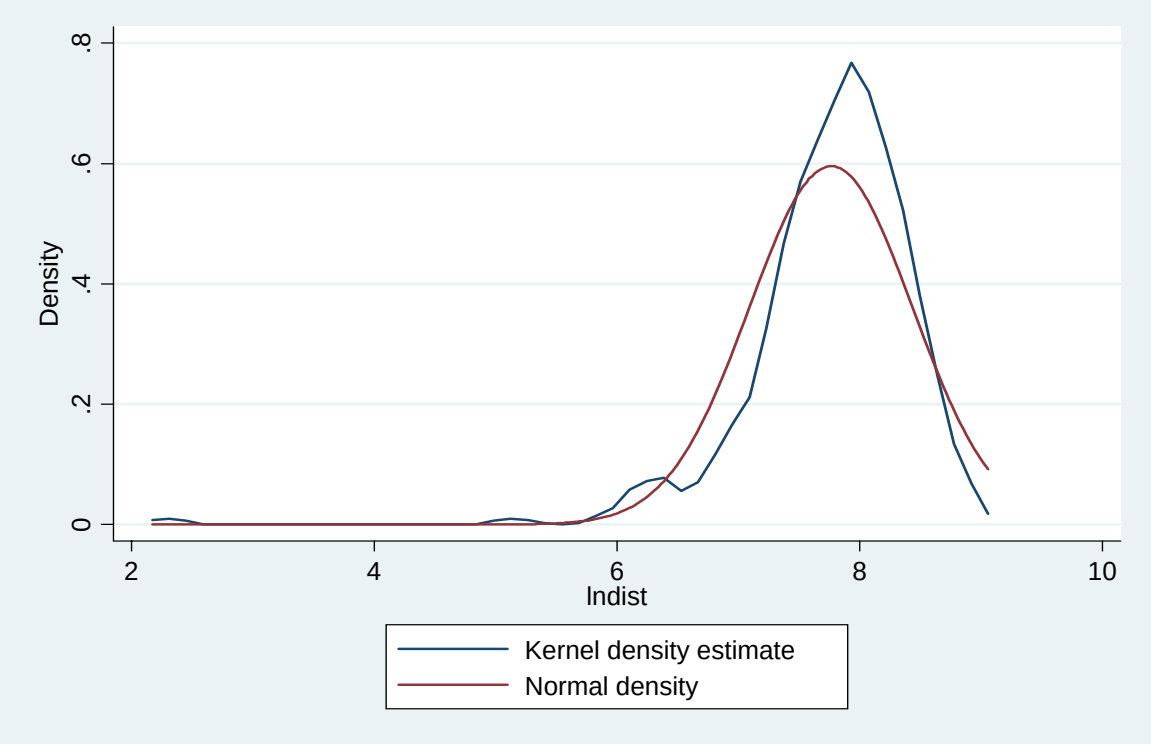

Figure D. 1. 5. Distance between the exporting and importing countries

D.2. for the year 1999

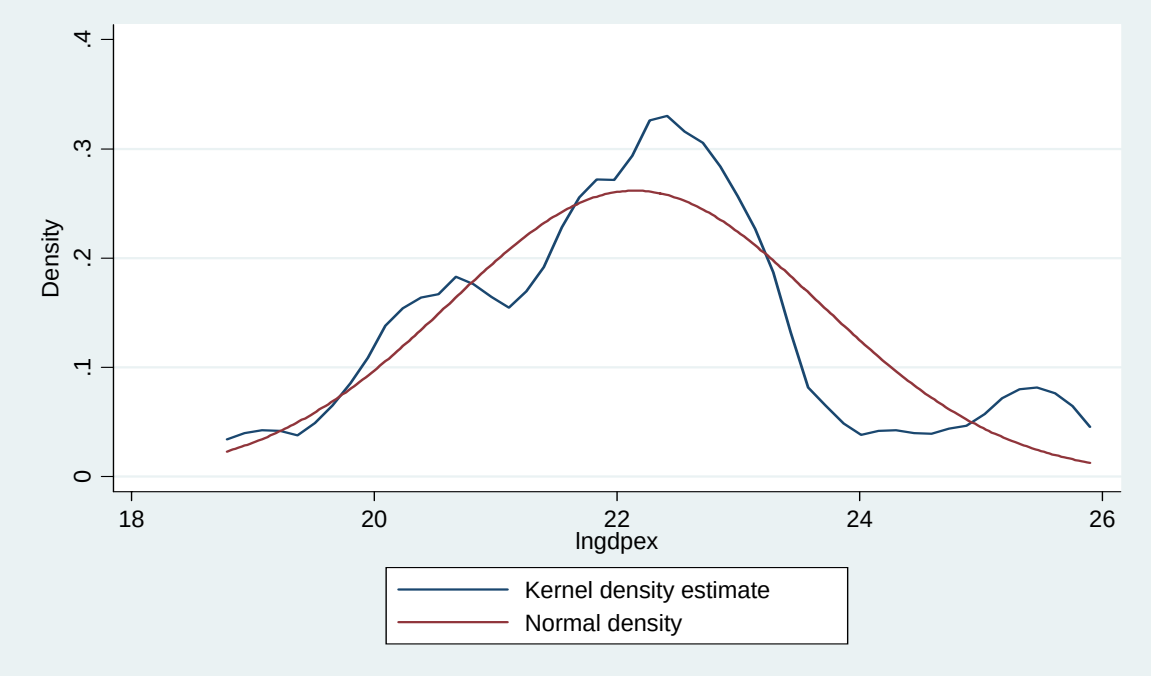

Figure D.2.1. Real GDP of the Exporting Country for the year 1999

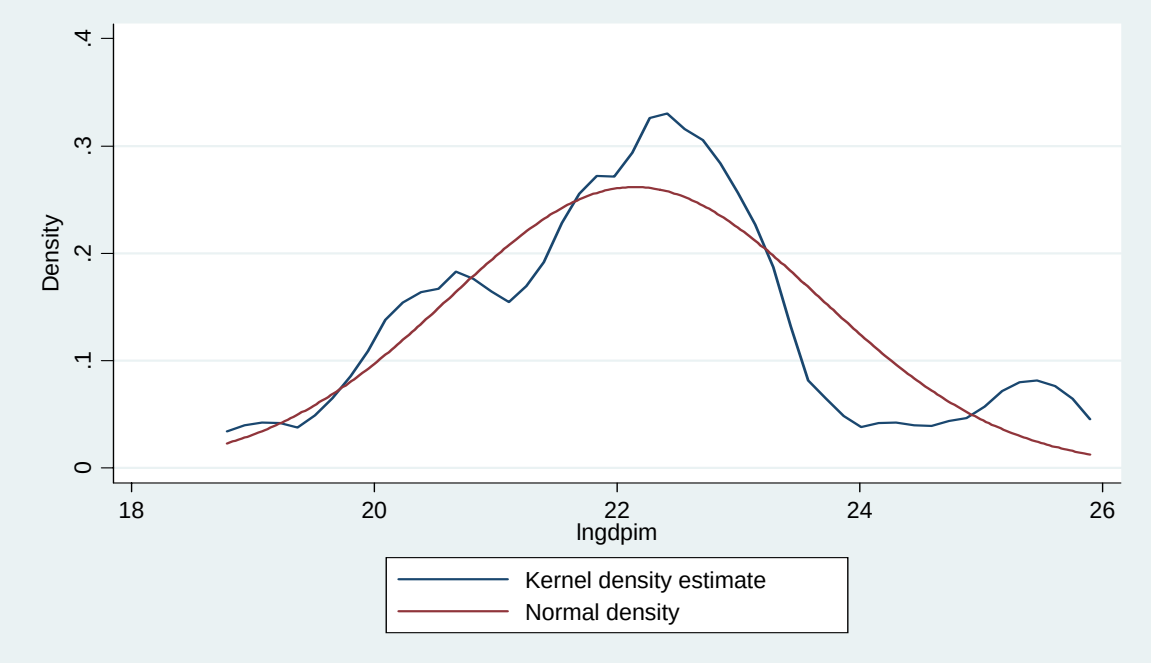

Figure D.2.2: Real GDP of the importing country for the year 1999

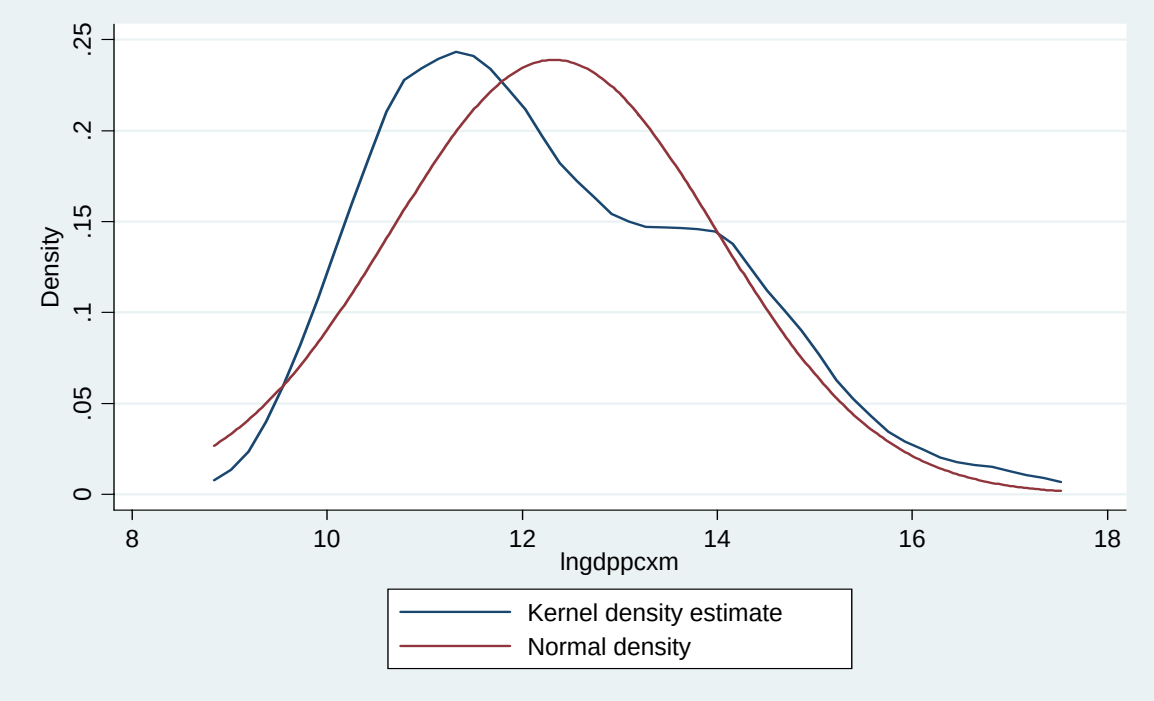

Figure D.2.3: Product of Real Per Capita GDP of the importing and exporting countries for the Year 1999

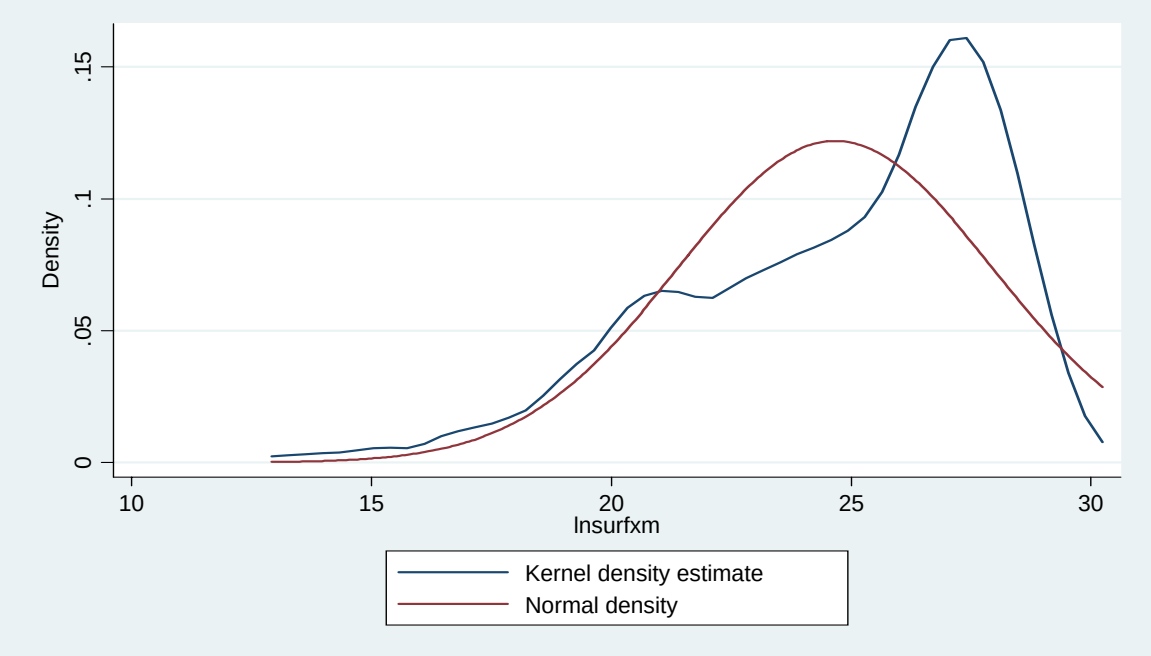

Figure D.2.4: Product of the surface area of the exporting and importing countries for the year 1999

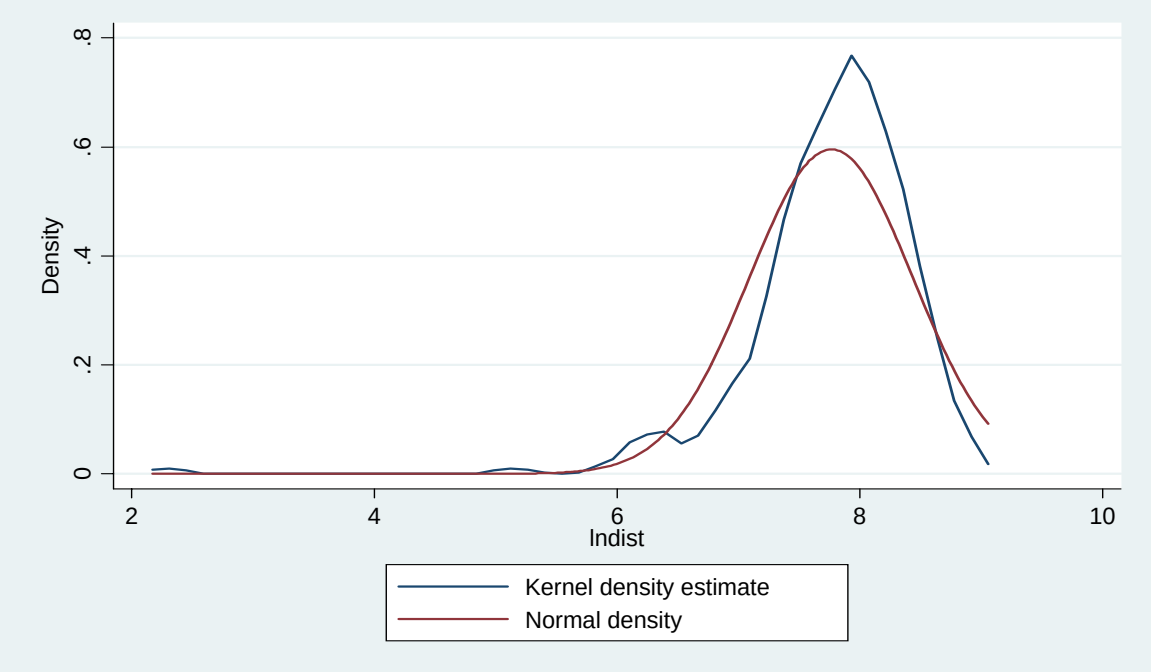

Figure D.2.5: Distance between the exporting and importing countries for the year 1999

APPENDIX E: TEST FOR OUTLIERS

TABLE E.1 Tests of Outliers In The Year 1981

outlierlngdpex	Freq.	Percent	Cum.
0	552	100.00	100.00
Total	552	100.00	

outlierlngdpim	Freq.	Percent	Cum.
0	552	100.00	100.00
Total	552	100.00	

outlierlndist	Freq.	Percent	Cum.
0	552	100.00	100.00
Total	552	100.00	

outlierlnsurfxm	Freq.	Percent	Cum.
0	552	100.00	100.00
Total	552	100.00	

outlierlngdppcxm	Freq.	Percent	Cum.
0	548	99.28	99.28
1	4	0.72	0.72
Total	552	100.00	

Table E.2. Test of outliers for the year 1999

outlierlngdpex	Freq.	Percent	Cum.
0	552	100.00	100.00
Total	552	100.00	

outlierlngdpim	Freq.	Percent	Cum.
0	552	100.00	100.00
Total	552	100.00	

outlierlndist	Freq.	Percent	Cum.
0	552	100.00	100.00
Total	552	100.00	

outlierlnsurfxm	Freq.	Percent	Cum.
0	552	100.00	100.00
Total	552	100.00	

outlierlngdppcxm	Freq.	Percent	Cum.
0	550	99.64	99.64
1	2	0.36	0.36
Total	552	100.00	

APPENDIX F. Skewness/Kurtosis test for normality

Table F.1 Skewness / kurtosis test for Normality for the year 1981

Variabes	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
tii	0.000	0.000	.	0.0000
lngdpex	0.026	0.611	5.18	0.0750
lngdpim	0.026	0.611	5.18	0.0750
lndist	0.000	0.000	.	0.0000
lngdppcxm	0.000	0.001	21.98	0.0000
lnsurfxm	0.000	0.709	41.85	0.0000

Table F.2 Skewness /and kurtosis test for Normality for the year 1999

Variabes	Pr(Skewness)	Pr(Kurtosis)	adj chi2 (2)	joint Prob>chi2
tii	0.000	0.000	.	0.0000
lngdpex	0.001	0.808	9.65	0.0080
lngdpim	0.001	0.808	9.65	0.0080
lndist	0.000	0.000	.	0.0000
lnsurfxm	0.000	0.701	41.95	0.0000
lngdppcxm	0.000	0.031	23.72	0.0000

APPENDIX G: Tobit regression results

Table G.1. For the year 1981

Tobit regression — Number of obs = 552; Replications = 288; Wald chi2(31) = 80.44; Prob > chi2 = 0.0000; Log likelihood = -1085.5826; Pseudo R2 = 0.0949

tii	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
$Lngdp_i$	60.5464	14.20994	4.26	0.000	32.69543	88.39737
$Lngdp_j$	2.818211	9.702237	0.29	0.771	-16.19782	21.83425
$Lngdppc_{ij}$	7.902355	11.0944	0.71	0.476	-13.84227	29.64698
$lnsurf_{ij}$	-1.71634	6.085862	-0.28	0.778	-13.64441	10.21173
lnd_{ij}	-46.67955	21.36137	-2.19	0.029	-88.54706	-4.812047
CB_{ij}	95.58883	26.75012	3.57	0.000	43.15956	148.0181
$LANG_{ij}$	26.53598	20.73741	1.28	0.201	-14.1086	67.18055
$comesa_{ij}$	44.37183	25.79699	1.72	0.085	-6.18935	94.93301
$sadc_{ij}$	-9.941965	17.84589	-0.56	0.577	-44.91928	25.03535
d1	-163.2958	145.7618	-1.12	0.263	-448.9837	122.3922
d2	48.76713	55.13554	0.88	0.376	-59.29653	156.8308
d3	24.08882	98.98393	0.24	0.808	-169.9161	218.0938
d4	85.14748	260.0061	0.33	0.743	-424.455	594.75
d6	-155.5035	64.65293	-2.41	0.016	-282.2209	-28.78609
d7	-48.77494	87.63598	-0.56	0.578	-220.5383	122.9884
d8	56.77072	144.2338	0.39	0.694	-225.9224	339.4638
d9	-151.1662	41.66003	-3.63	0.000	-232.8184	-69.51405
d10	-89.34127	89.61385	-1.00	0.319	-264.9812	86.29864
d11	51.17772	33.42897	1.53	0.126	-14.34186	116.6973
d12	-198.8748	100.738	-1.97	0.048	-396.3177	-1.431961
d13	-157.3537	169.1006	-0.93	0.352	-488.7849	174.0774
d14	47.46599	33.78527	1.40	0.160	-18.75194	113.6839
d15	29.14985	30.99962	0.94	0.347	-31.60828	89.90798
d16	-14.20715	56.74534	-0.25	0.802	-125.426	97.01166
d17	-48.19386	38.62222	-1.25	0.212	-123.892	27.50431
d18	-37.10447	205.1093	-0.18	0.856	-439.1113	364.9023
d19	-927.9063	144.7324	-6.41	0.000	-1211.577	-644.236
d20	-172.0473	153.0659	-1.12	0.261	-472.051	127.9564
d21	-50.66138	25.22076	-2.01	0.045	-100.0932	-1.229608
d22	-88.81155	31.96528	-2.78	0.005	-151.4623	-26.16076
d23	-60.4031	48.92865	-1.23	0.217	-156.3015	35.49529
_cons	-1166.213	318.2301	-3.66	0.000	-1789.933	-542.4937
/sigma	105.189	16.50238			72.84492	137.5331

Marginal effects after bootstrap:tobit
y = Fitted values (predict)
= -128.6206

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
$Lngdp_i$	60.5464	14.21	4.26	0.000	32.6954	88.3974	21.7064
$Lngdp_j$	2.818211	9.70224	0.29	0.771	-16.1978	21.8342	21.7064
$lngdppc_{ij}$	7.902355	11.094	0.71	0.476	-13.8423	29.647	12.3253
$lnsurf_{ij}$	-1.71634	6.08586	-0.28	0.778	-13.6444	10.2117	24.6776
$lndist_{ij}$	-46.67955	21.361	-2.19	0.029	-88.5471	-4.81205	7.76497
CB_{ij} *	95.58883	26.75	3.57	0.000	43.1596	148.018	.197464
$LANG_{ij}$ *	26.53598	20.737	1.28	0.201	-14.1086	67.1806	.226449
$COMESA_{ij}$ *	44.37183	25.797	1.72	0.085	-6.18935	94.933	.688406
$SADC_{ij}$ *	-9.941965	17.846	-0.56	0.577	-44.9193	25.0353	.163043
d1*	-163.2958	145.76	-1.12	0.263	-448.984	122.392	.041667
d2*	48.76713	55.136	0.88	0.376	-59.2965	156.831	.041667
d3*	24.08882	98.984	0.24	0.808	-169.916	218.094	.041667
d4*	85.14748	260.01	0.33	0.743	-424.455	594.75	.041667
d6*	-155.5035	64.653	-2.41	0.016	-282.221	-28.7861	.041667
d7*	-48.77494	87.636	-0.56	0.578	-220.538	122.988	.041667
d8*	56.77072	144.23	0.39	0.694	-225.922	339.464	.041667
d9*	-151.1662	41.66	-3.63	0.000	-232.818	-69.5141	.041667
d10*	-89.34127	89.614	-1.00	0.319	-264.981	86.2986	.041667
d11*	51.17772	33.429	1.53	0.126	-14.3419	116.697	.041667
d12*	-198.8748	100.74	-1.97	0.048	-396.318	-1.43196	.041667
d13*	-157.3537	169.1	-0.93	0.352	-488.785	174.077	.041667
d14*	47.46599	33.785	1.40	0.160	-18.7519	113.684	.041667
d15*	29.14985	31	0.94	0.347	-31.6083	89.908	.041667
d16*	-14.20715	56.745	-0.25	0.802	-125.426	97.0117	.041667
d17*	-48.19386	38.622	-1.25	0.212	-123.892	27.5043	.041667
d18*	-37.10447	205.11	-0.18	0.856	-439.111	364.902	.041667
d19*	-927.9063	144.73	-6.41	0.000	-1211.58	-644.236	.041667
d20*	-172.0473	153.07	-1.12	0.261	-472.051	127.956	.041667
d21*	-50.66138	25.221	-2.01	0.045	-100.093	-1.22961	.041667
d22*	-88.81155	31.965	-2.78	0.005	-151.462	-26.1608	.041667
d23*	-60.4031	48.929	-1.23	0.217	-156.302	35.4953	.041667

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Table G.2 For the year 1999

Tobit regression — Number of obs = 552; Replications = 378; Wald chi2(31) = 62.42; Prob > chi2 = 0.0007; Log likelihood = -1873.9215; Pseudo R2 = 0.0640

tii	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf.	Interval]
$Lngdp_i$	107.4627	21.55694	4.99	0.000	65.21192	149.7136
$Lngdp_j$	32.23814	12.35557	2.61	0.009	8.02166	56.45462
$lngdppc_{ij}$	-23.94961	13.26736	-1.81	0.071	-49.95315	2.053932
$lnsurf_{ij}$	-19.285	7.720501	-2.50	0.012	-34.41691	-4.1531
lnd_{ij}	-74.43834	32.68374	-2.28	0.023	-138.4973	-10.37939
cb_{ij}	109.3515	33.33901	3.28	0.001	44.00826	174.6948
$LANG_{ij}$	42.15236	21.95032	1.92	0.055	-.8694861	85.17421
$comesa_{ij}$	18.20797	20.52387	0.89	0.375	-22.01809	58.43402
$sadc_{ij}$	9.826338	22.49191	0.44	0.662	-34.257	53.90968
d1	-148.6513	44.71736	-3.32	0.001	-236.2957	-61.00692
d2	43.90551	42.208	1.04	0.298	-38.82066	126.6317
d3	75.21932	77.6702	0.97	0.333	-77.01149	227.4501
d4	73.40436	265.1501	0.28	0.782	-446.2803	593.089
d6	-58.93135	49.6967	-1.19	0.236	-156.3351	38.47238
d7	-6.043886	55.57863	-0.11	0.913	-114.976	102.8882
d8	104.424	81.68257	1.28	0.201	-55.6709	264.5189
d9	-178.756	51.16302	-3.49	0.000	-279.0336	-78.47829
d10	-21.65594	61.80101	-0.35	0.726	-142.7837	99.47181
d11	38.29461	49.09152	0.78	0.435	-57.923	134.5122
d12	-214.0481	104.7504	-2.04	0.041	-419.355	-8.741169
d13	34.12448	34.25826	1.00	0.319	-33.02047	101.2694
d14	33.7951	32.90609	1.03	0.304	-30.69966	98.28986
d15	33.68354	36.0011	0.94	0.349	-36.87732	104.2444
d16	-18.48343	48.57375	-0.38	0.704	-113.6862	76.71936
d17	6.642008	71.39924	0.09	0.926	-133.2979	146.5819
d18	-36.14901	186.7531	-0.19	0.847	-402.1783	329.8803
d19	-178.8089	56.00236	-3.19	0.001	-288.5715	-69.04632
d20	-126.7089	44.99242	-2.82	0.005	-214.8925	-38.52541
d21	5.72244	29.60766	0.19	0.847	-52.3075	63.75238
d22	-90.71945	35.869	-2.53	0.011	-161.0214	-20.4175
d23	112.4147	56.45171	1.99	0.046	1.771402	223.058
_cons	-1841.112	447.3761	-4.12	0.000	-2717.953	-964.2712
/sigma	145.5914	21.69691			103.0663	188.1166

Marginal effects after bootstrap:tobit
y = Fitted values (predict)
= -72.40422

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
$Lngdp_i$	107.4627	21.557	4.99	0.000	65.2119	149.714	22.1468
$Lngdp_j$	32.23814	12.356	2.61	0.009	8.02166	56.4546	22.1468
$lngdppc_{ij}$	-23.94961	13.267	-1.81	0.071	-49.9532	2.05393	12.3253
$lnsurf_{ij}$	-19.285	7.7205	-2.50	0.012	-34.4169	-4.1531	24.6692
lnd_{ij}	-74.43834	32.684	-2.28	0.023	-138.497	-10.3794	7.76497
cb_{ij} *	109.3515	33.339	3.28	0.001	44.0083	174.695	.197464
$LANG_{ij}$ *	42.15236	21.95	1.92	0.055	-.869486	85.1742	.226449
$comesa_{ij}$ *	18.20797	20.524	0.89	0.375	-22.0181	58.434	.688406
$sadc_{ij}$ *	9.826338	22.492	0.44	0.662	-34.257	53.9097	.163043
d1*	-148.6513	44.717	-3.32	0.001	-236.296	-61.0069	.041667
d2*	43.90551	42.208	1.04	0.298	-38.8207	126.632	.041667
d3*	75.21932	77.67	0.97	0.333	-77.0115	227.45	.041667
d4*	73.40436	265.15	0.28	0.782	-446.28	593.089	.041667
d6*	-58.93135	49.697	-1.19	0.236	-156.335	38.4724	.041667
d7*	-6.043886	55.579	-0.11	0.913	-114.976	102.888	.041667
d8*	104.424	81.683	1.28	0.201	-55.6709	264.519	.041667
d9*	-178.756	51.163	-3.49	0.000	-279.034	-78.4783	.041667
d10*	-21.65594	61.801	-0.35	0.726	-142.784	99.4718	.041667
d11*	38.29461	49.092	0.78	0.435	-57.923	134.512	.041667
d12*	-214.0481	104.75	-2.04	0.041	-419.355	-8.74117	.041667
d13*	34.12448	34.258	1.00	0.319	-33.0205	101.269	.041667
d14*	33.7951	32.906	1.03	0.304	-30.6997	98.2899	.041667
d15*	33.68354	36.001	0.94	0.349	-36.8773	104.244	.041667
d16*	-18.48343	48.574	-0.38	0.704	-113.686	76.7194	.041667
d17*	6.642008	71.399	0.09	0.926	-133.298	146.582	.041667
d18*	-36.14901	186.75	-0.19	0.847	-402.178	329.88	.041667
d19*	-178.8089	56.002	-3.19	0.001	-288.572	-69.0463	.041667
d20*	-126.7089	44.992	-2.82	0.005	-214.892	-38.5254	.041667
d21*	5.72244	29.608	0.19	0.847	-52.3075	63.7524	.041667
d22*	-90.71945	35.869	-2.53	0.011	-161.021	-20.4175	.041667
d23*	112.4147	56.452	1.99	0.046	1.7714	223.058	.041667

(*) dy/dx is for discrete change of dummy variable from 0 to 1