ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

TRADE EFFECTS OF REGIONAL ECONOMIC INTEGRATION IN AFRICA USING DISAGGREGATED DATA: *The Case of Southern African Development Community (SADC)*

BY:

MENGESHA YAYO

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DEPARTMENT OF ECONOMICS

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MENGESHA YAYO

A thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master of Science in Economics(Economic Policy Analysis)

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"Trade Effects of Regional Economic Integration in Africa Using Disaggregated Data: the case of Southern Africa Development community (SADC)."

By

Mengesha Yayo Negasi

Approved by the Board of Examiners:

Girma Estiphanos
Advisor


Signature

Alemayehu Geda
Examiner


Signature

Beyene Tadesse
Examiner


Signature

Acknowledgement

I would like to express my sincere gratitude to my advisor, Dr. Girma Estiphanos for all his patience and solid advice as well as respecting my ideas in the course of this research which contribute a lot to the quality of this thesis .My thank also goes to Dr. Alemayehu Geda for his generous support in providing materials. I also extend gratitude to African Economic Research Consortium (AERC) for the financial support and made me capable to perform this thesis properly. I can not forget to thank Economic Commission for Africa for allowed me to use the library. I am also grateful to the staffs of Department of economics for their kind cooperation and secretarial service which made my stay in the university comfortable. Finally, I would like to provide my paramount thanks to my family, friends and colleagues who have continued to support and encourage me over the last few years which was the pillar of my strength for the completion of this work.

Be blessed you all!!

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Abbreviations and Acronyms

ACP	African Caribbean Pacific
AGOA	African Growth and Opportunities Act
AU	African Union
CFA	Communauté Financière Africaine
ECA	Economic Community for Africa
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
EPA	Economic Partner Agreements
EU	European Union
FTA	Free Trade Area
IGADD	Inter-Governmental Authority on Drought and Desertification
IGO	Inter Governmental Organization
ISI	Import Substitution Industrialization
LDC	Least Developed Country
OECD	Organization for Economic Cooperation and Development
REC	Regional Economic Community
REI	Regional Economic Integration
RTA	Regional Trading Agreement
SADC	Southern Africa Development Community
SADCC	Southern African Development Coordination Conference
SSA	Sub Saharan African
TC	Trade Creation
TD	Trade Diversion
UMA	The Maghreb Union
WTO	World Trade Organization

Abstract

Empirical studies on regional economic integration process in Africa exhibit sluggish progress and there by limited level of intra trade. The existing literatures in Africa, particularly in Southern African regional integration bloc, SADC have neglected effects of regional economic integration dealing with disaggregated data. This study analyzes trade creation and diversion effects of the Southern African Development Community (SADC) using disaggregated data from 2000 to 2007. The investigation estimates an augmented gravity model using panel data and random effect estimator methods applying instrumental variables where needed.

The results show that the intra -SADC trade is growing in fuel and minerals, and heavy manufacturing sectors while it displays a declining trend in agricultural and light manufacturing sectors. This implies that SADC has displaced trade with the rest of the world in both fuel and minerals, and heavy manufacturing sectors. SADC has served to boost trade significantly among its members rather than with the rest of the world. Countries participating in SADC have moved toward a lower degree of relative openness in these sectors trade with the rest of the world. However, the increasing trend of extra-SADC trade bias over the sample period in both agricultural commodities and light manufacturing sectors means that there has been a negative trade diversion effect. In other words, the value of trade between members and non-members has been increasing (and not falling as would be the case with trade diversion) for the two sectors. These results seem to suggest that SADC countries retained their openness and outward orientation despite they signed the trade protocol for enhancing intra-SADC trade.

Keywords: *agricultural sector, fuel and minerals, heavy and light manufacturing sectors, SADC, Southern African Development Community, regional economic integration effect , trade creation and trade diversion effects*

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CHAPTER ONE: INTRODUCTION

1.1 Background

Regional integration in Sub-Saharan Africa is not a recent phenomenon. At least two unions, the Southern African Custom Union and the East African Community have existed since 1910 and 1919 respectively. Regional integration arrangements initially became fashionable in the 1960s, following the formation of the European Economic Community in 1957 and the European Free Trade Area in 1960. These were pursued by a large number of regional integration agreements in the developing world as well.

In Africa, at the first two post- colonial meetings in April 1958 and in June 1960, African leaders adopted regionalism as one panacea for the economic constraints imposed by the smallness and fragmentation of national markets .However, the majority of the regional economic integration schemes were established in the 1970s.

The driving force behind the establishment of regional integration schemes in SSA has been both political and economic strategy. Most schemes were formed as a result of disappointment with the international political and economic systems, which were viewed as being unfavorable to developing countries (William et al, 1997:159). Some regional integration schemes such as EAC and those in the CFA zone were formed at the initiation of former colonizers with the view of maintaining closer links. The formation of most of the unions also coincided with the era of export pessimism. This school of thought argued that the world trading system was not favorable

to developing countries as a result of declining commodity terms of trade, export earnings instability, low trade elasticity and unfair protectionism against LDCs' exports in developed countries.

These arguments led to conclusion that the trade could not promote development in developing countries which were used to justify import sub-substitution industrialization (ISI) policies. Most of the regional integration groupings in SSA were formed on the basis of import substitution strategies. The hope was that by widening the market, together with protection of important sectors, economies of scale would ultimately lead to increased intra-union trade and promotion of over all development. Nevertheless, history has shown that the ISI policies not only failed in individual countries but also in the regional integration groupings. Such arrangements launched to fallout of fashion in the 1970s, in part because the first experiences were not successful (William et al, 1997).

However, in the late 1980s and early 1990s regional integration has again become an attractive policy option, in both the developed and developing world. In this regard, since the end of cold war and with the emergency of powerful trading blocs, there has been a renewed interest in Africa concerning the need to create strong regional economic integration (REI) mechanisms to promote economic growth (Baldwin, 1997).

According to ECA(2006), even though the African Union only recognizes eight RECs, the continent currently has fourteen inter-governmental organizations (IGOs), working on regional integration issues, with numerous treaties and protocols governing relations among them, and

between them and the member states. This proliferation of institutions and protocols means that out of the 53 member states of the African Union (AU), 26 belong to two of the fourteen IGOs, 20 belong to three of them, and one country belongs to four. Among these regional schemes, Southern African Development Community (SADC) is a regional bloc working for the southern African sub region of the continent .Hence, this study confines to this regional scheme. Next, it summarizes the historical and present status of the region under the study.

Genesis of Southern African Development Community (SADC)

Originally known as the Southern African Development Co-ordination Conference (SADCC), the organization was formed in Lusaka, Zambia on 1 April 1980, following the adoption of the Lusaka Declaration. SADCC's original strategy was to concentrate on promoting co-operation in the area of infrastructure. In practice, its primary activities were the co-ordination of members' development initiatives and assistance in raising funds for these projects.

The focus of the organization, therefore, has been on issues of economic co-operation and development. For the first twelve years, SADCC operated without a legal framework, treaty or protocol. Conscious of the poor record of regional economic integration schemes in Africa and other developing countries, the founders opted for a loose organization promoting co-operation and co-ordination rather than formal integration. With members' economies being mainly, but not exclusively, dependent on apartheid South Africa, they aimed to reduce this dependency while simultaneously promoting development (*DFARSA, 2004).*

SADCC only had limited success in economic co-operation and development endeavor. Trade with South Africa increased, even during the time when the organization actively sought to limit this growing dependency, and so has dependence on donors. In 1989, at the SADCC Heads of State meeting in Harare, it was decided to formalize the organization by giving it legal status that would replace the existing memorandum of agreement. Four years of consultation followed, the Declaration and Treaty of the SADC was eventually signed by Heads of State and Government in Windhoek, Namibia in 1992. This move was mainly motivated by a need to shift the focus of the organization from co-ordination of development projects to the more complex tasks of integrating the economies of member states and expressed confidence that developments, such as the independence of Namibia and the transition in South Africa will take the region out of an era of conflict and confrontation, to one of co-operation; in a climate of peace, security and stability (Malan and Cillier, 1997).

These are prerequisites for development with the change of name, the emphasis changed from 'development co-ordination' to 'development integration'. The true vision of SADC is in essence full economic integration of the Southern Africa region and trade liberalization. However, it has been claimed that the old SADCC always portrayed itself as an economic body; the organization had more political and ideological inclinations than economic concerns.

Initially established as a regional organization between nine member countries with the aim to "facilitate flexible coordination on those aspects of national development plans which have potential regional impact", the Southern African Development Community (SADC) as of today has 14 member countries: Angola, Botswana, The Democratic Republic of the Congo, Lesotho,

Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. South Africa and Mauritius joined the bloc in 1994 and 1995 respectively.

Recently, SADC has focused on macroeconomic stability and convergence in member countries in order to achieve the formation of a common market over the medium term. In this regard, SADC has announced a plan in March 2004. The goals include establishment of a SADC customs union and implementation of a common external tariff by 2010, a common market pact by 2012, and establishment of a SADC central bank and preparation for a single SADC currency by 2016.

1.2 Statement of the Problem

The relevance of regional integration is very persistent issue in Africa, specifically in view of political and economic backwardness. Africa is confronted with deep rooted level of poverty, minimal share of world trade, and low pace of development in human capital and infrastructure, faces with excess of challenges from external pressures.

Ensuring that regional economic integration succeeds in Africa is vital, not only because of the prospective and challenges mentioned above, but also because the polices that are required to ensure its successes are the same as those needed if Africa is to benefit from the process of globalization and integration in to the world economy .Owing to these facts, regional integration

in Africa is needed, hoping that it will help in enhancing economic development and growth in the continent. However, the effectiveness of regional integration in Africa is an empirical issue.

There are plenty of empirical studies regarding the effects of regional economic integration on trade flows. Various researchers employ different methodology to analyze the effects of regional economic integration and the results out of these studies are mixed. Although early empirical studies used cross- sectional data to estimate gravity models (Aitkin, 1973 and Berstrand, 1985), most researchers nowadays use panel data (Matyas, 1997; Wall, 2000 and Glick and Rose, 2001). One reason is that the extra time series observations result in more accurate estimates. However, these studies fail to employ disaggregated data for analyzing the effects of regional economic integration on trade. This indicates a limitation of model's dependence upon aggregated data as opposed to disaggregated data which can help in analyzing the effects of trade agreements on specific tradable commodity and helps member countries to identify sectors which are advantageous in joining the trading bloc. In addition, aggregate data masks commodity –level heterogeneity, which may also bias the estimate.

Specifically, to the best of our knowledge, the possibility of looking using panel data approach at sectoral level is hardly practiced in Africa. As elaborated earlier, this leads to a biased estimation and hence incorrect inferences. Clausing (2001) and Romalis (2005) eliminate some of these problems by using commodity level data to analyze the effects of the Canada –United States Free Trade Agreement (CUSFTA) and North America Free Trade Agreements (NAFTA) respectively.

Despite a number of empirical contributions in recent years, the effects of regional economic integration on trade in the region under the study at disaggregated data level have not been investigated rigorously. This void motivates our study, which focuses on the Southern African Development Community (SADC) and its effects on trade using disaggregated data. To assess the effects of SADC on trade flows of member nations, this study relies on a gravity model and disaggregated data .The study analyzes the effects of SADC on trade in four sectors, namely, agricultural commodities, fuel and minerals, heavy manufacturing and light manufacturing products. An augmented gravity model of panel data approach is used to determine the extent of intra regional trade bias and potential trade diversion effects for each sector separately.

1.3 Justification and Significance of the Study

This topic is relevant and timely, provide that Africa is attempting to enhance its regional integration process. There are outstanding issues that need to be recognized and addressed by African states, individually and collectively, in order to take this process forward. The effects of trade creation and trade diversion in the bilateral free trade agreement are important to study for several reasons. Free trade agreements are very important for developing countries (such as SSA) especially in a situation of an import-based economy. With free trade, trade flows will be smooth for both trading partners and eventually improve the welfare and consumption level of the populace at large, relying on the total effect. For this reason, trade creation and trade diversion effects play an important role in identifying trade patterns.

The underlying rationale for selecting SADC regional bloc is that Foroutan (1993) claims that "SADC has been considered by many inside and outside the region as a successful example of

regional integration to emulate elsewhere in SSA". ECA (2004) reports that SADC has scored relatively the highest shares and the first rank in terms of intra-community trade among the existing regional economic integrations in Africa for the years between 1994 and 2000.

Besides, as of Radelet (1999), the best example of successful coordination in SSA is SADC. Further more, the Southern African Development Community (SADC) is generally seen as one of the richest region in Africa. The participation of South Africa, the largest country of the continent, to SADC provides the basis for successful economic cooperation. It is for these reasons that the present study considers the SADC, among other regional groups, to be an organization that may serve as an example for analyzing of the trade effects of regional economic integration in Africa.

The purpose of choosing the SADC regional institution is thus to broaden the understanding of effects of regional economic integration on member's trade patterns when disaggregated panel data gravity approach is considered to the model that is specified for this study. Hence, this study is relevant to regional national policy makers in designing sectoral trade related agreements policies. From academic perspective, the expected benefit from this study is insight on regional economic integration effects at sectoral level.

1.4 Research Objective

The main objective of this study is to investigate the effects of Regional Trade Agreements on bilateral trade. The study focuses on the trade aspect of regional economic integration.

Specific Objectives

The specific objectives of this study are to:

i. Examine trade creation, trade diversion effects of regional economic integration at sectoral level.

ii. Assess the level of intra-trade and extra-trade in the region using disaggregated level data.

1.5 Method and Data

1.5.1 Method

The existing literatures on the methodology of assessing the effects of regional economic integration on trade flows among nations can be broadly classified in three categories. Empirical studies have employed a range of techniques to investigate the effects of RTAs. There are large bodies of empirical literatures that employ economy wide, multi sectoral computable general equilibrium (CGE) models to analyze the welfare impacts of RTAs. Although the CGE models have been influential in analyzing the welfare effects, their empirical limitations have been highlighted. First, the CGE studies have been prospective rather than retrospective (Krueger, 1999). Second, the sectoral aggregation does not allow analysis of specific markets. Policy information is often outdated, and baseline scenarios are unrealistic and based on older data (McKitrick, 1998).

Third, it relies on fundamental assumptions of perfect competition and constant elasticity of substitution (CES) technology and a system of demand and supply ensuring market clearing mechanism(see for instance Alemayehu,2002) which are not realistic. Moreover, it lacks details

on sectors (using high levels of sectoral aggregation), particularly for the poorest countries. Hence, the results of CGE studies are sometimes questionable. (Jayasinghe and Sarker, 2004: 5).

A descriptive approach is also applied in the literature to analyze the impacts of RTAs (Anderson and Norheim, 1993; Yeats, 1998; dell'Aquila et al, 1999).These studies employ various indicators to measure the regional concentration of trade. The descriptive approach indirectly assumes that the share of trade occurring with partner countries would not have changed in the absence of the agreement. This method depends on a static framework and the results are dependent on the level of aggregation. Consequently, changes in the terms of trade due to changes in the relative trade importance of members and outsiders, as well as declines in the volume of trade for a single commodity included in the broader class, cannot be detected .In addition, the descriptive approach lacks the ability to analyze trade creation and diversion effects and, hence, the welfare implications of RTAs. Econometric techniques have rarely been used to study the effects of RTAs on trade on disaggregated data.

As an alternative, recent econometric studies have incorporated the effects of RTAs into the model specification and estimate models using pre-RTA and post-RTA data. The impact of RTAs on trade flows is captured through the use of regional dummy variables. This is known as the gravity model approach, which explains bilateral trade flows between trading partners over time. The gravity model has become an attractive technique for assessing the effects of RTAs. The application of the gravity model has long been controversial because it often lacks a coherent theoretical foundation. Estimated results of empirical gravity equations suffer omitted variable bias due to the lack of a strong theoretical foundation. As a result, the estimates cannot be validly

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used to draw comparative-static inference about the impacts of barriers on trade flows. This shortcoming has been solved by the studies of Anderson and Wincoop, 2003 and Feenstra, 2002.

Anderson (1979) provides the first theoretical explanation for the gravity equation based upon the properties of expenditure systems. Since Anderson's synthesis, Bergstrand (1985, 1989), Helpman and Krugman (1985), and Deardorff (1998) also contribute to improvements of the theoretical foundation of the gravity model. In these studies, the gravity equation is derived theoretically as a reduced form from a general equilibrium model of international trade in final goods. As a result, the theoretical underpinnings of the gravity model have become apparent, well understood, and hence widely accepted in recent years. This new legitimacy for assessing international trade flows motivates our reliance on an extended gravity model in this study to analyze the trade effects of SADC.

The reason for selecting the gravity model is thus it has performed considerably well over a long period in explaining bilateral trade flows (see for example, Greenway et al, 2002). More over, the use of gravity model has enjoyed something of popularity in recent years, partly because of more systematic efforts to reinforce its theoretical underpinnings and partly because of the availability of a growing number of "natural experiments "in the form of RTAs. Further more, the potential for employing the frame work for ex post as well as ex ante analysis (i.e. to predict trade potentials and therefore remark on potentials adjustment problems) was also seen as essential.

Here, it is worth to raise question whether use of gravity model to investigate effects of RTAs on trade flows among trading partners is appropriate or not in African context. Because many

researchers argue that intra trade among African nations is limited as the gravity model would forcaste, hence the gravity model may not be good tool to explain factors that affect trade flows in Africa. However, Foroutan and Pritchett *(1993)* find that the gravity model predicts very well the low level of intra-SSA trade.

Specifically, given that SADC countries have concentrated and similar comparative advantages, static analysis of studies on regional trading suggest that the room for further intra trade within SADC is limited. Nevertheless, some results and ongoing researches show that development of intra industry trade might have trade creation and trade diversion effects in the region.

So, this study argues that applying this model to investigate effects of regional trade agreements (SADC) on partners' trade flows can at least exhibits the impacts of forming the regional bloc on members' trade flows across sectors irrespective of its size relatively with the rest of the world. The value added of this study is the attempt that, disaggregated data is employed to evaluate impacts of trading agreements on partner nations at sectoral level which may captures the most important sectoral impacts of different policy scenarios.

1.5.2 Data Source

Regarding to the nature of data, unlike other studies, this study uses commodity level data from four major sectors for each member states in the given scheme (SADC). These four sectors are agricultural products, fuel and minerals, heavy manufacturing products and light manufacturing products .Each sectors are commodity groupings because they contain different commodities

within it. Trade commodities are grouped in to four sectors on the basis of Keck and Piermartini (2005) sectoral aggregation.

This study concentrates on SADC from 2000 to 2007.The base year is selected to track the beginning of SADC's trade protocol implementation .The ending year is also chosen owing to the fact that the data sources for all variables is compiled merely up to the year 2007, again limits the analysis of this study there of .Further, it relies up on international institution data sources such as IMF Directions of Trade Statistics and world development indicator (WDI) CD- ROM, WTO,COMTRADE data base ,developed by the United Nations Statistics Division ,it also accesses data sets from World Integrated Trade Solution (WTTS),designed by the World Bank and other sources .

1.6 Scope and Limitations of the Study

In broad sense, regional integration among other things includes trade integration, monetary integration, labor market integration, capital markets integration and inter-governmental authorities. The programmes and objectives of SADC also range from trade liberalization among member states to establishing a common military organ for attaining peace and security. This study, nevertheless, restricts to trade aspect of regional economic integration. Further, the analysis of this study covers only static effects of trading agreements and does not take in to account dynamic effects triggered by further liberalization through, for instance, increased competition, economies of scale, improvements of the investment climate and technological change.

The main constraint this study confronts comes from data .Missing data values for some countries /or commodities are common in trade data. Reports for some countries are not recent .Trade data on some countries are not reported consistently and in a uniform unit of account. In general, availability of relevant data, time, and budget are played a limiting role on the scope and content of this study.

1.7 Organization of the Study

The remainder of this study is segmented into five chapters as follows. Chapter two takes the review of literature on this topic, and pays attention to both traditional and modern theory of regional economic integration as well as the effects of regional integration .It also assesses existing empirical findings on effects of regional economic integration to support the analytical methods used in this study. Chapter three examines an over view of economic, political and institutional aspects of SADC member states. Looking at an overview of experiences on regional integration progress in Africa is also part of this section. This is followed by empirical methodology in chapter four. In this regard, this study looks at model specification, description of the data and variables used for the analysis of the model used for this study. Chapter five presents the estimation results and discussion part of this study. Finally, Chapter six gives conclusion and policy implication.

CHAPTER TWO: REVIEW OF THE LITERATURE

2.1 Introduction

One of the most important tasks of a literature review is to structure the literature. Accordingly, in this chapter, we are going to look at the existing literatures on regional economic integration, both theoretically and empirically. Initially, this chapter starts with brief introduction on the term integration. Then, it defines regional economic integration and goes on to elaborate in detail on the economic integration theory that surrounds this concept. In this regard, old and new regionalism theories are examined .Moreover, theoretical motivations behind forming regional economic integration as well as the stages (forms of) regional economic integration and the economic theory behind them which explains how these are related are also covered as part of this section.

In the early years of regional integration, critics continued to raise concern about how the integration terminology could be properly used in the midst of a lack of clarity regarding its content. There are different aspects of regional integration, and these include economic, social and political aspects. Regional integration schemes are famous ways in which regions embark on their integration. There are differences, however, in the manner in which regional integration schemes have been implemented across the world, as well as in the results obtained by different regions. The main difference is in the extent of commitment to the application of regional integration in economic integration schemes in both developed and developing counties.

Moreover, before the 1950s, the term economic integration was used as a generic term to refer every conceivable aspect of international economic relations including trade and monetary relations, capital and labour movements and even international cooperation for such purposes as the control of pollution, the exploitation of the seabed and the regulation air transport (Robson, 1980:1; as cited in Alemayehu, 2006:4). But since 1950, it has been used more specifically to refer to a process of combing separate economies in to large economies regions (Alemayehu, 2006:4).

The term 'economic integration 'is specifically meant to refer to either regional economic integration or international economic integration. Whereas, international economic integration is synonymous with globalization, regional economic integration limits economic to a particular region (Mandyo, 2008:11). In this context, this study focuses on the regional aspects of economic integration, specifically to one of Southern African regional blocs, SADC.

Furthermore, as the world seems to be evolving towards a possible tripolar trading bloc, the issue of Africa trading bloc or region becomes more urgent. A number of integration schemes have been arranged in Africa, including trade integration, labour integration, capital market integration, monetary integration and integration of government activity and regulations .Thus regional integration can imply a number of things. However, for the purpose of this study, we concentrate on the trade aspect of regional economic integration. Because, as De Melo and Panagariya (1993) put it:

> "What ever the ultimate goal of a regional arrangement increased intra –regional trade ranks high among the priorities .It is also the yard-stick to measure how deep integration actually is".

2.1.1 Definition

The term 'integration', literally means to bring parts of an object in to a complete whole, while in economic terms, it would indicate, in narrowest sense, the coordination of economic activities with in a nation for the purpose of improving the development of that particular nation (Mutharika, 1972). Mutharika further renders the term a wider meaning, and indicates that it implies the process of integration of various economies in a given area or region into a single unit for the purpose of regional economic development. In a more precise way, economic integration occurs when two or more nations carry out policies that result in greater mutual economic interdependence. It follows that if such countries emanate from a single region or regional economic integration activities and/or process, these activities or process will be termed 'regional economic integration'.

Regional integration ,or more crudely 'regionalism' is "any policy designed to reduce trade barriers between a subset of countries regardless of whether those countries are actually contiguous or even close to each other" (Winter ,1996) . Integration aims at abolishing discrimination between local and foreign goods, services and factors. (Salvatore, 1997:97)

Economists have defined the term 'economic integration' in various ways over period. Economic integration is a process of eliminating restrictions on international trade, payments and factor mobility (Carbaugh, 2004). Economic integration thus results in the uniting of two or more national economies in regional trading agreements .According to Biswaro (2003), regional economic integration involves the process of trade, economic and financial convergence of integrating states.

The economic integration literature clearly distinguishes between regional economic integration and regional economic cooperation. Regional economic cooperation is seen more as an ad hoc and temporary scheme, which is mainly based on contractual agreements with regard to projects of mutual interest between member states. Such projects could involve two or more countries in the region. On the other hand, regional economic integration involves agreements that are more permanent.

The classical trade- oriented economic integration sees regionally coordinated development of infrastructure as an issue of cooperation rather than integration. Balassa (1961) point out that economic cooperation denotes the suppression of discriminatory practices is usually embodied in trade agreements, and like Carbaugh (2004), he agrees that economic integration implies an elimination of trade restrictions. In addition, other economists argue that there can not be integration with out cooperation. However, it is clear from these descriptions that both these concepts are means to an end, and not ends in themselves. According to Mutharika (1972), the process of economic integration can be at various stages in its development, embrace some aspects of economic cooperation efforts which are fully supported by this study.

Biswaro (2003) points that regional integration is characterized by the establishment of joint institutional mechanisms and a degree of shared sovereignty .Although this may be true in theory, the practicality of it is very difficult, particularly in Africa, as it involves ceding a percentage of the country's power to take decisions. This is confirmed by Biswaro (2003), when he argues that existing regional integration schemes in Africa function in a governmental rather than a supranational mode, and the actual sharing of sovereignty is minimal.

The term 'economic integration' also has other applications which do not require member countries to be from the same region or neighbors. In other words, the generic form of the term can also refer to establishing and developing ties between countries that may or may not be geographically linked.

2.1.2 Theories of Regional Economic Integration

Before examining the old and new theory of regional economic integration, it is worth while to spend some times discussing on the origins of regional economic integration theory and waves of regionalism across the world.

Some scholars believe that the theory of economic integration is based on the broad study on this issue by Balassa (1961), but there are those who believe that this theory began with the contributions to the customs union issue by Viner (1950).In essence, the theoretical foundations of conventional approaches to regional integration date back to three important schools of economics and political thought, which are neo-classical, Marxist and development economics. The theory of economic integration was originally developed from traditional trade theory ,which assumes perfect competition ,and whose major concern is the location of production of different kinds of goods (Imbriani and Reganati ,1994).Biswaro (2003) indicates that the earliest theoretical work on regional economic integration emanates from the theory of comparative advantage in international trade ,and interests of liberal economists in promoting the reduction of tariff and non- tariff barriers to trade.

Regional trade agreements have been a major and recurring feature of the global economy during the last half century. The evolution of thinking about such agreements has tracked the policy developments. The first wave of regionalism, led by the western European customs union which followed the 1957 Treaty of Rome, was analyzed within the framework of Vinerian customs union theory. The second wave, which was characterized by agreements in the 1980s going beyond preferential tariff reduction towards deeper integration, was considered to be a "New Regionalism" requiring new tools. The third wave of bilateral agreements in the early2000s continues many of the trends towards deeper integration, although it is in some respects hardly even regionalism (for details on these points, for instance, see Pomfret, 2005).

When we come to discussion of old and new regionalism theory, recent literature on regional integration distinguishes between different degrees of integration (Burfisher et al, 2003, Delvin and Estevadeordal, 2001).These degrees of integration range from "shallow" to "deep". The former goes only as far as the reduction of barriers to mobility of factors of production. The central element of the old regionalism theory (shallow regionalism) is the customs union concept as developed by Viner (1950), Meade (1955), and Kemp and Wan (1976).

In the words of Delvin and Castro (2002), "the big defining difference between the New Regionalism and earlier post-war experiences was the policy environment. The policy frame work encircling the "old" post –war regionalism in developing countries involves an inward-looking and protectionist /state –led import substitution strategy (often in the context of authoritarian regimes).

Mean while, the New Regionalism is entered into a frame work of policy reform that promotes open and competitive private marked – based economies in a modern democratic institution setting. Indeed, the New Regionalism is an extension of policy reform process. New regionalism comprises the characteristics of the deepest form of integration .Among many such characteristics few are: establishment of investment protocols and protections, harmonizing macroeconomic policies including fiscal and monetary policies, improving regional communication levels and establishing regional institutions such as development banks, harmonizing legal regulations, and monetary union (Burfisher et al, 2003).

2.1.3 Stages of Regional Economic Integration

The term 'integration 'in fact covers a wider variety of possible schemes. Given the differences in nature and objectives of these different schemes, it is important to distinguish clearly at the outset. Through regional trading agreements, a group of countries agrees to enjoy freer international economic relation among themselves .In the extreme, this follows for the free movements of goods and services, capital, and labor within the integrated area. However, the institutional arrangements under which countries open their borders will varies in reality .The following describes the increasing degree of intensity of the various schemes of integration.

*i. **Preferential Trade Arrangements***: provide lower barriers on trade among the participating nations than on trade with non member nations .This is the lowest forms of economic integration. The best example of such form of scheme is the British Common Wealth Preferential Scheme, established in 1932 by the United Kingdom with members and some members of the British Empire.

*ii. **A Free Trade Area*** : is the form of economic integration where all barriers are removed on trade among member nations but each nation retains its own barriers to trade with non- members .Examples are European Free Trade Agreement (EFTA) and North America Free Trade Area (NAFTA) .

*iii. **A Custom Union*** : allows tariffs or others barriers on trade among members (as in a free trade area) and in addition it harmonizes trade policies such as establishing a joint outer tariff wall or setting a common external tariff rates to wards the rest of the world . It combines both free trade area and mutual protectionism.

*iv. **A Common Market***: goes beyond a customs union by also allowing the free movement of labor and capital among member nations. The EU achieved the status of a common market at the beginning of 1993.

*v. **An Economic Union***: goes still further by harmonizing or even uniting the monetary and fiscal policies of member sates .This is the most advanced type of economic integration .Benelux and NAFTA are best example for this type of integration.

vi. Political Union: this is the highest form of integration in which the members become one nation .In other words, it is total unification (like the unification of western and eastern Germany 1991).

2.1.4 Rationales of Regional Economic Integration

Regional economic integration is pursued for a variety of reasons. The main motivation for all regional integration schemes has been the prospect of enhanced economic growth and development. Specifically, in terms of trade, the fundamental motivation behind any form of

regional economic integration is to improve welfare of the members through a reduction or elimination of barriers to trade in the region.

Apart from economic motive, regional economic integration can be formed for political strategy. More precisely, economic integration has been adopted in different cases to overcome political tensions between countries, in the belief that, as long as member states obtain economic gains from the integration, the conflicts between them will be reduced in order to protect these benefits. Investigations into the relationship between trade and security as well as the direction of causation also show that "doubling of trade between two countries lowers the risk of conflict between them by 17 percent" (World Bank, 2000).

In African context, the deriving forces for forming regional integration schemes stem from both economic and political point of view. In the 1960's, many African nations like other developing countries formed regional trade arrangements with the aim of promoting industrialization of their economies. A belief exists that industrialization was possible through import-substitution trade policies and later, through export promotion following the unsuccessful progress of regional integration process in Africa.

Other motivation for pursuing establishment of regional integration can be increasing bargain power, i.e. Regional trade integration has also been adopted with a view to rise the bargaining power of member states in trade negotiations. As an illustration of this kind of motive, the World Bank (2000:18) argues, "the formation of the original European Economic Community (EEC) in 1957 was the desire to increase bargaining power relative to the United States". This motivation goes with the reality of Africa since it comprises agricultural dominated economies and

fragmented as well as small market which need collective power to enhance bargaining power at international market. The rest of this chapter is devoted to present theoretical and empirical literature on the effects of regional economic integration.

2.2 A Review of literature on Effects of Regional Economic Integration

This section analyzes the theory on effects of regional economic integration .It further reviews the existing empirical findings on this topic, in order to grasp some practical insights in this regard.

2.2.1 Theoretical Framework on Effects of Regional Economic Integration

Entry in to a regional integration scheme can have both static effects , which is as a result of resource allocation in response to changing relative prices ,and dynamic effects ,come from a changes in efficiency ,ability to exploit economies of scale ,and in level of investment and growth

Much of theoretical literatures belong to the static effects of trade integration, specifically in the context of a customs union. The current study also biases more towards reviewing the static effects of regional integration effects. However, dynamic effects are more significant given that the changes they constitute are cumulative rather than simply once and for all adjustments (Hine, 1994).Again, although these dynamic factors are identified as potentially importance, there is no consensus as to a single adequate model to treat the issues. Despite the fact that dynamic effects are more difficult to model, recent theoretical developments enable us to distinguish some of the key issues. But, now we confine to the static, resource allocation effects. Next, we devote in presenting dynamic effects briefly.

2.2.1.1 *Static Effects*

Liberal economic theoretical framework is relied on the assumption that 'productive efficiency' is enhanced if states undertake economic production in areas where they have relative advantage to others, thus rationalizing costs and prices. In general, economic theories view existence of tariffs and quotas as hostile to free flow of goods within a region. Realizing this fact and unwilling to adopt complete free trade liberalization for various reasons , states form various regional schemes as the 'second best' trade policy to minimize distortions in trade flows and enjoy the fruits out of it. As it is mentioned at the out set of this subsection, these regional economic integration schemes result in both static and dynamic effects.

The static impact refers to changes occurred in the equilibrium market price and quantity before and after the creation of the economic bloc. This can be a trade creation or a trade diversion. For a given product, trade creation appears when high cost production is substituted by low cost production because of regional integration while economic diversion occurs when low cost production is substituted by high cost production. Trade creation is therefore a positive impact of regional integration on the contrary of trade diversion. Nevertheless, besides to trade creation and trade diversion effects, the static effects of regional integration can involve other impacts. Thus, we are going to look at these static effects by classifying in to traditional (trade creation and diversion) and non- traditional static effects in broader sense.

Viner takes into account only trade-creation and trade-diversion effects, which are considered by Cline (1978) as traditional static gains. On top of these traditional static effects, Cline (1978) provides additional non-traditional static effects from regional trade integration, which are as

follows: firstly, there is what has been termed the "labour opportunity cost" effect. This occurs when an increase of output made possible by regional trade integration allows for the employment of extra labour at a wage below the minimum wage rate. In fact, this occurs because the extra labour is withdrawn from family farm agriculture or non-organized urban services, where the salary was absent or very small.

Secondly, there is the 'economies of scale' effect, which occurs when firms become able to produce at their capacity, as a result of the increase of the market size made possible by the integration. Lastly, there is the 'foreign exchange savings' effect. The foreign exchange that is referred to here, is that of non-member countries, because, in effect, when a group of countries forms an RTA, they increase imports from within the union and reduce the level of imports from outside the union, thus save foreign exchange.

Further studies also discover more static gains from regional trade integration, depending on the models used. Following the classification of Baldwin and Venables (1995) and that of Lloyd and Maclaren (2004), the models assuming perfect competition and constant returns to scale identify that trade volume, trade cost and terms of trade as beneficial effects of regional trade integration. However, models assuming imperfect competition and increasing returns to scale identified benefits from regional trade integration in the form of out put, scale and variety effect.

2.2.1.2 Welfare Effects

Across the globe, there is a fierce debate about the merits of regional trading agreements. While some herald such agreements as stepping stones towards worldwide free trade, others fear that these initiatives will be stumbling blocks, acting primarily to divert trade from other countries to

those countries receiving preferential treatment. Although these issues are essential for the future of the world's trading relationships, a number of obstacles prevent economists from reaching any consensus on the effects of preferential trading agreements.

The second-best nature of tariff liberalizations under preferential trading arrangements makes it very difficult to assess a priori whether the welfare effects from a preferential trading arrangement will be positive, even for the members of the arrangement. In addition, the empirical works fail to provide firm conclusions on even the most basic issue regarding preferential trading agreements: whether trade creation outweighs trade diversion (Clausing, 2001).Next, even though it is not the concern of the current study, we see what different researchers say about this net gain out of regional integration briefly.

Regional trade integration is regarded as advantageous, because it allows for an increase of trade between partner countries, as there is a reduction of tariffs. Therefore, regional trade integration is not seen as a stumbling block to free trade but as a way towards it. However, the question arises as to whether the increase of trade between member countries of a RTA is always beneficial to those countries individually and as a group.

Before the work of Viner (1950) on The Customs Union Issue, the answer to the above question was ambiguous and non-measurable. Viner's analysis introduces the theory of trade creation and trade diversion that show the question of desirability of trade integration. According to Viner's analysis, trade creation will bring gains to the union, while trade diversion will lead to a loss. This means that regional trade integration will be beneficial only if the effect of trade creation is big enough to outweigh that of trade diversion. Referring to Viner (1950), Lipsey (1960) declares that trade creation can occur if both countries, the importer and exporter in the union, are

producing the same commodities. Further, he adds that the larger the difference between the costs at which the same commodity is produced in the country, the larger trade creation will be.

Carim (1997) describes two situations in which trade creation is more likely to outweigh trade diversion. This may happen firstly if trade between member countries is large or has the potential to become large as compared to their overall trade; secondly, if the productive structures of the member countries are complementary. Moreover, according to Waschik (2004), the more elastic the import demand curve of the importing country, the greater will be the trade creation. Trade creation will also be greater, the higher the initial tariff. Thus, according to Viner's theory, although the increase in intra-trade between member countries of a RTA may be a necessary condition, it is not a sufficient one. For a regional trade integration to be successful, the trade created must be big enough to outweigh the trade diverted.

Following Viner (1950), Lipsey (1960) shows that Viner's analysis is based on unrealistic assumptions of inelastic demand and perfect competition. This author indicates that, once these assumptions are relaxed, even a purely trade diversion union may be beneficial. In effect, Viner limits his analysis to inter-country substitution in the production of traded goods and ignores the inter-commodity substitution in consumption that follows from changes in relative prices resulting from tariff elimination. As the consumer in the importing country is now able to alter his consumption, following the price change, he will increase or at least maintain his utility. At the same time, there will be an increase in trade for the whole union. Thus even a trade-diverting union can be beneficial (Umurungi, 2005:13). Note that, graphical representation of conceptual analysis of trade effects of regional integration is provided in the appendix III of this study.

According to Cline (1978), all the above-mentioned impacts of regional trade integration are static effects or allocation effects, as they constitute a once-off outward shift in the production possibility frontier attainable by the country, given its resources. However, considering the dynamic path of the economy, more gains from regional trade integration have been identified. These are briefly discussed in the next sub section.

2.2.1.3 *Dynamic Effects*

The effects considered in the above subsection are purely static responses of producers and consumers in more general models to changes in relative prices owing to changing patterns of tariffs. The associated welfare changes are once and for all effects which in principle have their impact shortly after the integration scheme is introduced. Besides these effects, however, there are also a variety of potential dynamic effects. These may be felt more gradually but will be longer lasting and in some cases continued.

First, there is the competition effect, brought about by freeing imports from partner countries. Second, there is the investment effect, which appears when there are new foreign and domestic investments that have not occurred in the absence of regional trade integration. Third, the larger market provides greater possibilities for the exploitation of economies of scale. Fourth, there is an effect on capital formation, possibly through various channels: reduction on barriers to diffusion, technological transfer, externalities from export growth, rising marginal product of capital and so on. Fifth, the union members acting as a group may be more able to influence the terms of trade they face. Lastly, there is the structural transformation effect, which is a shift from traditional primary-products export to new industrial-products export.

In contrast to the static effect of regional trade integration, the dynamic effects are presumed to continue to generate annual benefits, even after the withdrawal of a country from the union .For instance, a rising in the growth rate made possible by integration will have continued effects provided that it is sustained. Every dynamic effect is consequences of the increase in effective size following integration and will have potentially positive effects on growth. They likely constitute stronger arguments for regional integration than the static arguments based on resource allocation arguments addressed above. More precisely, dynamic effects, if present, are likely to dominate static effects.

The relevance of dynamic effects of regional economic integration in African context is an empirical issue. However, provided that the very small proportions of world manufacturing trade constituted by Africa, especially as an exporter, the blocs in the continent may acquire a very minimal dynamic gains .On the other hand, the terms of trade benefits from integration behaviors may be greater in agriculture unlike to the other dynamic effects (economies of scale, competitiveness, and capital formation). Hence, greater bargaining power of the union over its terms of trade which apply more to agriculture than manufacturing is potentially of more relevance dynamic effect component to Africa.

2.2.2 Empirical Findings on Regional economic integration

The above section presents a brief overview of the theory on regional trade integration, which helps to understand how regional trading agreements work and through which mechanisms they provide benefits to member countries. At this sub section, the focus is switched to reviewing of the existing empirical evidences on the effects of regional economic integration.

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There are a dozes of empirical findings applied to assess the effects of regional economic integration which vary in approaches .Thus, for analytic purposes, it is useful to classify the researchers' findings on the topic according to the type of methodology they approach to examine the impacts of forming regional economic integration on trade flows , viz descriptive approach, simulation approach(Computable General Equilibrium),or econometric approach(gravity model and others) as well as the nature of data they employ , namely cross section, time series , panel based on aggregate or commodity level. Next, empirical works of selected researchers on the topic are reviewed in line with the above classifications.

Some depends on a simulation approach based on global general equilibrium models to analyze the economic effects of policy changes due to formation of a regional bloc. Others apply econometric approaches to historical trade data and examine the effects of the establishment of a regional trading bloc on bilateral trade flows. First, let's see the CGE model.

2.2.2.1 CGE Model

The simulation approach uses a static Computable General Equilibrium (CGE) model or a dynamic inter –temporal general equilibrium model. The model specifies economic structures and behaviors of agents in detail and, using the frame work, simulate the economic effects of existing or proposed regional blocs. Simulation based on the general equilibrium models usually finds substantial potential gains from trade liberalization between members of RTA.

There are a large number of ex ante CGE studies of trade agreements that examine what effects can be expected from preferential trading arrangements (for instance , Brown et al , 1992; Brown and Stern ,1989a; Haaland and Norman, 1992). More recently, Hertel et al (2006) applies CGE

analysis in order to better evaluate the likely outcome of a Free Trade Area of the Americas (FTAA) and they find that that imports increase in all regions of the world as a result of the FTAA, and this outcome is robust to variation in the trade elasticities. Moreover, they conclude that there is great potential for combining econometric work with CGE-based policy analysis in order to produce a richer set of results that are likely to prove more satisfying to the sophisticated policy maker.

One weakness or imperfection of CGE studies is that their results are very sensitive to the assumptions, parameters, and data used in the model, and have to be interpreted accordingly. While CGE models are useful for speculating what effects of a particular agreement might be? but with out firm evidence. Besides, they do not allow an investigation of the questions we are concerned with here, i.e. analyzing of the trade creation and trade diversion effects of regional trading arrangements on trade patterns at sectoral level.

Krueger (1999) also mention that CGE studies have been prospective rather than retrospective. In CGE model, the sectoral aggregation also does not permit analysis of specific markets. As of Mckitrick (1998), policy information is usually outdated, and base line scenarios are far from facts and based on the older data. Therefore, the validity of the results of CGE studies is questionable in some case. Furthermore, CGE models are clearly preferable to partial equilibrium ones when analyzing trade policy changes in a complex environment. They are not necessarily very effective, however, at capturing changes in trading conditions, since there have to be exogenously set and revised by the policy analyst. CGE methods are also very data demanding and tending not to be applied with high levels of data disaggregation (Milner and Sledziewska, 2005:7).

2.2.2.2 Descriptive Approach

A descriptive approach is also another methodology pursued in the literature to examine the effects of regional economic integration on trade patters (for example, Anderson and Norheim, 1993; Yeats, 1998; dell'Aquila et al, 1999). These studies use different indicators to measure the regional concentration of trade. A descriptive approach implicitly assumes that the share of trade happening with the partner nation would not have changed in the absence of the agreement. This method depends on a static frame work and the results are dependent on the level of aggregation. As a result, changes in terms of trade as a result of changes in the relative trade importance of members and outsiders, as well as declines in the volume of trade for a particular commodity comprised in the broader class, can not be detected .Further more, a descriptive approach misses the ability to analyze trade creation and trade diversion effects and, hence, the welfare implications of RTAs (Jayasinghe and Sarker, 2004).

2.2.2.3 Gravity Model

Developing an accurate counterfactual of Ex post studies of how much trade would have increased in the absence of a given free trade agreement or customs union has proved difficult. For instance, Balassa (1967, 1975) constructs a counterfactual of how trade would have changed in the absence of European integration by calculating pre-integration income elasticities that were assumed to continue post-integration.

It was later exhibited, however, that income elasticities vary substantially pre- and post-integration, making these results sensitive to the sample period. Some (including Frankel and

Wei, 1995; Frankel and Kahler, 1993; Frankel, 1997; Krueger, 1999; Aitkin, 1973; Aitkin and Obutelewicz, 1976; Willmore, 1976) apply gravity model to assess the impact of preferential arrangements on trade flows. This model has the advantage of including several variables that are affecting trade flows, such as income changes and exchange rate variables. Schwanen (1997) undertakes a comprehensive study of changes in Canadian trade patterns, considering the effects of both CUSFTA and NAFTA between 1989 and 1995. He compares trade in sectors that have been liberalized by these agreements to trade in other sectors, finding that trade growth with the United States was much faster in liberalized sectors.

Yeats (1997) employs a new index for analyzing one aspect of a RTA, its static trade effects. This helps him to examine changes in the regional "orientation" of exports, and shows how this information can be employed in connection with the "revealed" comparative advantage (RCA) index to identify apparent "inefficiencies" in trade patterns. He restrains from providing comments on the many other possible effects of RTAs such as benefits from political cooperation, enhancing the credibility of reform strategies, or dynamic gains from trade. On top of this, he does not address the net welfare effect of trade creation and trade diversion relative to where member countries' trade policies started from in 1988.

Helliwell et al (1998) use two types of evidence in their approach to assess the impact of the FTA on inter provincial trade. First, they develop a gravity model to explain inter provincial and province-state trade flows. Then, they analyze new industry-level data to estimate the extent to which tariff changes in Canada and the United States help explain inter-industry differences in the growth of inter provincial trade.

At the aggregate level, their results show that the FTA increased north-south trade relative to east west trade. After adjusting for appropriate factors, the gravity model suggests that in 1996, inter provincial trade would have been 13 percent higher than it actually was if the1988 trade structure had remained unchanged. However, since the FTA also affected the provinces general economic growth, it is hard to calculate the FTA's net effect on the overall 15 percent increase in inter provincial trade between 1988 and1996.

The disaggregated results of Helliwell et al (1998) suggest that the FTA-related reduction in Canadian tariffs led to increases in imports from the United States and to reductions in inter provincial trade. On the other hand, reductions in U.S. tariffs led to increases in exports to the United States and to increases in inter provincial trade. Overall, the authors calculate that FTA-induced tariff cuts led to reductions in inter provincial trade by about 7 percent, only about half of the total reduction previously calculated with aggregate data.

Regional dummy variables (inter and extra) have been used in gravity models (using ex-post approaches) to try to capture separate trade creation and diversion effects, including for the case of EU integration effects on Polish trade. The estimated coefficients on the dummy variables may capture a range of policy and other (including misspecification) effects rather than the regional trade policy effect under investigation. It is also the case that gravity modeling is invariably used to model total trade flows or at least broad aggregates of trade. In which case it does not allow the investigator to comment on trade creation and diversion effects at the disaggregate level. (Milner and Sledziewska, 2005)

However, the existing empirical literatures on the topic exhibit that most of the researchers' findings are based on aggregated data level .Nonetheless , there is firm argument that estimation relied on aggregated data could mask changes that may be occurring at disaggregated level. In addition, the use of more disaggregated data allows one to exploit the variation in the extent of tariff liberalization under the agreement with out utilizing such variable. It is difficult to identify the effects of tariff liberalization on different sectors. So sectoral variation could make a difference in the welfare outcome.

Realizing this deficiency in the existing literature on the topic, using a simple supply and demand framework specification analysis, Clausing (2001) employ data at the commodity level and the results indicate that the Canada-United States Free Trade Agreement had substantial trade creation effects, with little evidence of trade diversion. Further, he argues that unlike the approaches of many previous studies of preferential trading agreements that have relied on aggregate data, disaggregate data (at the commodity level) are used to analyze how actual tariff changes affect trade flows. Without utilizing the variation in the extent of liberalization across goods, it would be far more difficult to distinguish the effects of an agreement from other influences affecting trade flows. Here, the current study agrees with the above notions because assessing the impacts forming regional trading blocs on trade flows based on aggregate data level may bias the estimation and results in incorrect inference.

Similarly, Jayasinghe and Sarker (2004) conduct a study that analyze trade creation and trade diversion effects the North America Free Trade Agreement (NAFTA) on trade of six selected agri food products from 1985 to 2000. Their investigation estimates an extended gravity model using pooled cross –sectional time –series regression and generalized least squares methods .As a

result, they find that share of intra regional trade is growing with in NAFTA and that NAFTA has displaced trade with the rest of world .In addition, NAFTA has served to boost trade significantly among its members rather than with the rest world. Their results also show that countries participating in NAFTA have moved to a lower degree of relative openness in agri food trade with in the rest of the world. Welfare effects rely on the relative issue magnitude trade creation and trade diversion effects and it is an inherently empirical issue. Moreover, net effects of trade creation and trade diversion may vary across the commodities with in the same RTA, between RTAs and over time.

Using panel data econometric models analysis applied to highly disaggregated trade data, Milner and Sledziewska (2005) come out with the result that shows the European Agreement had transitory but significant trade diverting effects for Poland's import; the trade diversion substantially dominating the trade creation. In other words, in static terms, at least, the Europe Agreement was likely over the implementation period to have been net welfare –reducing for Poland.

The panel gravity model for trade has often been estimated with out taking account of the effects of past trade and income on current trade flows. However, there are numerous economic reasons that show trade is dynamic process. Put it differently, most of the literatures on gravity model based on panel are static, which means that they merely permit for contemporaneous effects of repressors on trade flows.

As a remedy for the observed weakness of static panel gravity model, Bun and Klassen (2002) apply a dynamic panel model by extending the static model with lagged regressors incorporating lags of trade and income. Consequently, using a panel of 221 annual bilateral OECD trade flows

over 48 years, they explore that the dynamics are significant and note that static models are misspecified.

Some researchers argue that taking in to consideration uncertainty to the model specification raises the validity of the model. In this regard, to account for the model uncertainty that surrounds the validity of the competing preferential trading agreement theories, Eicher et al (2007) introduce Bayesian Model Averaging (BMA) to the preferential trading agreement literature. Once the model incorporated uncertainty as part of the empirical strategy, it enables them to report clear evidence of Trade Creation, Trade Diversion, and Open Bloc effects; otherwise, if the uncertainty about the true specification is not considered in the econometric method, the precision of estimates is inflated, since they lack to add the uncertainty surrounding the true theory.

In African context, there are huge empirical works that analyze the impacts of regional integration. Among these, Alemayehu and Haile (2002), on their study for COMESA, show that bilateral trade flows among the regional groupings could be explained by standard variables as demonstrated by the results of the conventional gravity model, while regional groupings have had insignificant effect on the flow of bilateral trade. Further, they suggest that the performance of regional blocs is mainly constrained by problems of variation in initial condition, compensation issues, real political commitment, overlapping membership, policy harmonization and poor private sector participation.

Khorana et al (2007), using a partial equilibrium model, assess the implications of the transitional measures for products sensitive from the Ugandan perspective. The simulation results question

the underlying rationale for these arrangements. They also discuss whether the regional trading arrangements confer any real benefits on the stakeholders and suggest alternative approaches that may increase the benefits for Uganda from trade liberalization within the customs union .At this juncture, in depth analysis of specific regional bloc would be worthwhile because the existing empirical findings on the effects of regional economic integration on partner nations' trade flows may vary from one region to other regions even with in Africa .

2.2.3 Empirical Findings on SADC

In this sub section, the existing empirical studies on analyzing regional integration effects for SADC are reviewed. There are plenty of studies that assess the effects of regional integration on trade pattern. Among these, we are going to review some of the basic ones. Maasdorp (1999), on his study of 'regional trade and food security in SADC', concludes that trade in the region can contribute substantially to provide improved food security. Besides, he notes that there is considerable scope for greater intra-regional trade in grain and other food products, and for greater cross- border investment in agriculture and agro-industry.

Using a multi-region model constructed to focus on the determination of sectoral and geographic trade patterns, Lewis et al (1999) model South Africa and the rest of southern African to evaluate how alternative SADC regional trade strategies can influence trade pattern in the region and how the EU deal affects the region's economies. Consequently, they conclude that: (i) trade creation dominates trade diversion for the region under all FTA arrangements; (ii) the rest of southern Africa benefits from an FTA between the EU and South Africa; (iii) the rest of southern Africa gains more from zero-tariff access to EU markets than from a partial (50 percent) reduction in

global tariffs; and (iv) the South African economy is not large enough to serve as a growth pole for the region. Access to EU markets provides substantially bigger gains for the rest of southern Africa than does access to South Africa.

To address the potential of increasing intra SADC trade, Chauvin and Gaulier (2002) use three complementary approaches. The first two refer to trade indices: export diversification indices, revealed comparative advantages and trade complementarily indices and the last one is based on gravity model. Given that SADC countries have concentrated and identical comparative advantages, their static analysis show that the chance for further trade within SADC is limited. However, some results and ongoing researches show that development of intra industry trade might have trade creation effects in the region.

Cheng and Wall (2005), using the gravity model to estimate international trade flows, allow for country-pair heterogeneity. Their results suggest that standard gravity estimates of the effects of integration can differ a great deal from what is obtained when heterogeneity is accounted for.

Keck and Piermartini (2005) apply general equilibrium model (15 regions, 9 sectors) to simulate the impact of EPAs for countries of SADC. Their simulation results show that EPAs with the EU are welfare-enhancing for SADC overall, leading also to substantive increases in real GDP. For most countries further gains may arise from intra-SADC liberalization. The possibility of the EU entering a FTA with other countries, such as Mercosur, reduces estimated gains, but they still remain largely positive. Similarly, estimated gains need to be revised downwards if agriculture liberalization is not as far reaching as a reduction of import barriers for manufactures.

Further more, they note that at the sectoral level, the largest expansions in SADC economies take place in the animal agriculture and processed food sectors, while manufacturing becomes comparatively less attractive following EU-SADC liberalization. Interestingly, multilateral liberalization would instead promote some of the manufacturing sectors (textile and clothing and light manufacturing). Their results also show the need for the SACU tariff pooling formula to be adjusted to reflect new import patterns as tariffs are removed.

To recap, the literature reviews, both theoretical and empirical findings presented in the preceding sections provide some insights on the topic under the study. However, only few studies are reviewed. In general, regional economic integration has both static and dynamic effects. From the above empirical findings, one can discern a draw back from methodological point of view; some rely on simulation approach (CGE model). But, as it is elaborated earlier, this method has some limitations in explaining effects of regional economic integration on trade flows at sectoral level .Others use gravity model to examine the effects of regional integration on trade flows. Even though it is argued that gravity model is superior to CGE model, still most studies apply gravity model to analyze the effects of regional integration using aggregated trade data.

However, estimation based on aggregated data could mask effects of regional economic integration within sectors. As result, estimators become inconsistent and thereby lead to wrong decisions. Hence, initiated by this void, this study is intended to investigate the trade effects of SADC regional bloc using disaggregated data level; believing that, the results out of this study might serve as bridge for the gap observed in the existing literature on the topic.

CHAPTER THREE: BRIEF OVERVIEW OF SADC ECONOMIC, POLITICAL AND INSTITUTIONAL STRUCTURE

In this chapter, this study seeks to provide an overview and assess the economic, political and institutional aspects of SADC member states. Here, it pays attention in assessing of intra-trade structure, trade protocol and sectoral responsibility of each member nation in the region. This study also wants to present short over view of regional integration experiences across Africa.

3.1 Economic Indicators of SADC Member Nations

From the beginning, the southern African region comprises heterogeneous countries both in terms of economic and political dimensions. Put it differently, there is significant gaps of development. As table 1 below exhibits , six countries, with GDP per capita inferior or equal to USD 660(DRC, Lesotho, Malawi, Mozambique, Tanzania ,Zimbabwe) , eight other countries, with income per capita from USD 900 to 8600 (Botswana, Swaziland , Namibia, Mauritius, Seychelles, Zambia, South Africa, Angola) . If one excludes South Africa from the region, the average per capita income in 2007 is US$ 2,735 in SADC.

As it is evident from table 2, excluding SACU countries, the largest economy in the SADC region is Angola, contributing 44% of the region's GDP. DRC contributes 13% to the region's GDP and ranks as the second largest economy for the year 2007.

Table1: GDP per capita of SADC Members for the year 2000 and 2007(in US Dollars)

country/year	2000	2007	% share as of SADC	
			2000	2007
Botswana	3,745.75	7,932.89	15.35	19.13
Lesotho	313.816	663.863	1.28	1.60
South Africa	2,440.23	5,915.71	10.00	14.26
Swaziland	1,191.11	2,837.53	4.88	6.84
SACU	7,690.91	17,349.99	31.52	41.83
Angola	805.658	3,756.19	3.30	9.06
DRC	105.091	170.725	0.43	0.41
Malawi	220.821	266.061	0.90	0.64
Mauritius	3,768.66	5,495.64	15.44	13.25
Mozambique	227.977	396.694	0.93	0.96
Namibia	1,595.95	3,671.50	6.54	8.85
Seychelles	8,846.54	8,600.08	36.26	20.73
Tanzania	308.05	428.368	1.26	1.03
Zambia	349.565	938.552	1.43	2.26
Zimbabwe	477.517	402.586	1.96	0.97
SADC	24,396.74	41,476.39	100	100

Source: Own Computation, From World Economic Outlooks, 2008

As table 2 indicates, even if SACU is a subgroup of SADC, it represents the largest economic region in Africa (66% of SADC's GDP in 2007). This is largely owing to the economy of South

Africa that dominates SACU; accounting for 90% of the customs unions population and 94% of its GDP.

Table2: GDP of SADC Members for the year 2000 and 2007(in billion US dollars)

country/year	2000	2007	% share as of SADC	
			2000	2007
Botswana	5.951	12.382	3.34	2.07
Lesotho	0.687	1.598	0.38	0.26
South Africa	111.13	283.071	62.47	47.53
Swaziland	1.19	2.89	0.66	0.48
SACU	118.958	299.941	66.87	50.36
Angola	11.386	61.334	6.40	10.29
DRC	12.116	19.021	6.81	3.19
Malawi	2.665	3.561	1.49	0.59
Mauritius	4.555	6.928	2.56	1.16
Mozambique	4.204	8.069	1.49	1.35
Namibia	3.128	7.446	1.75	1.25
Seychelles	0.698	0.712	0.39	0.11
Tanzania	10.843	16.691	6.09	2.80
Zambia	3.775	11.411	2.12	1.91
Zimbabwe	5.556	4.723	3.12	0.79
SADC	177.884	595.524	100	100

Source: Own Computation, From World Economic Outlooks, 2008

SADC is small in international terms with a GDP of US$ 177 and 594 billion in 2000 and 2007 consecutively. One country, namely South Africa in SADC covers 47% of SADC's GDP in 2007. This underlines the importance of the South African economy not only to SACU or SADC but also the entire continent (Daya .Y et al, 2006).

3.2 Integration plans, Instruments and Intra-Regional Trade of SADC

SADC was supposed to pass through different integration phases using various instruments agreed among the member states .These are dealt in below under the title trade protocol of SADC. Next, it examines the situation of intra- trade in SADC and sectoral responsibility with in the given scheme.

3.2.1 Overview of the SADC Trade Protocol

The Southern African Development Community (SADC) Trade Protocol Was signed in August 1996 but only came into effect on September 1, 2000, after protracted negotiation, indicating serious commitment towards regional economic integration. Angola, the Democratic Republic of Congo (DRC) and Seychelles were not yet party to the free trade process. Angola formally acceded to the protocol in March 2003 but is yet to negotiate a tariff liberalization schedule with other Member States. The aim was to liberalize trade flows between members and eventually lead to deeper integration in the region (Kalaba and Tsedu, 2008:1).

The first steps of the implementation of the Trade Protocol started with the trade liberalization process, which was to be completed over eight years. The tariff phase down process came into effect as from September 2000. A free trade area (FTA) will be reached in 2008, where up to

85% of trade flows within SADC will be duty free (SADC Secretariat, 2003). The remaining 15% consisting of sensitive products will be liberalized by 2012. Subsequent to the FTA, SADC envisages establishment of a Customs Union by 2010 and of a Common Market in 2015. A further liberalization of trade in services was to be undertaken, but there was very little progress reported in that area.

The main instrument of trade liberalization is therefore the elimination of customs tariffs and non tariff measures on substantial intra-SADC trade. The intention is also to extend trade liberalization to services. However, services liberalization has not yet been a subject of negotiations. More energy had to be devoted to protracted negotiations on the liberalization of trade in goods, especially on rules of origin for sensitive products (Kalenga, 2004:30-31).In addition, the protocol calls for other trade and investment facilitation measures, including harmonization of customs rules and procedures, attainment of internationally acceptable standards, quality, accreditation and metrology (SQAM) and harmonization of sanitary and phyto-sanitary (SPS) measures. Some progress has been made in the areas of customs co-operation, SQAM and related measures. So far, the focus of the Trade Negotiation Forum (TNF) has been on the reduction of customs duties on intra-SADC trade and the adoption of common rules-of-origin.

The reduction of tariffs is being carried out based on four categories. Category A requires immediate reduction of duty to zero at the beginning of the implementation period, by 2000. These commodities already attracted low or zero tariffs. The second category B deals with goods that constitute significant sources of customs revenue and whose tariffs are to be removed over 8 years, by 2008. Categories A and B should account for 85% of intra-SADC trade so that by 2008

SADC can be regarded as a free trade area not in line with Article 24 of the General Agreement on Tariffs and Trade(GATT). This needs that "completely all trade" should be duty free.

Category C deals with sensitive products (imports sensitive to domestic industrial and agricultural activities) whose tariffs are to be eliminated between 2008 and 2012. Category C is limited to a maximum of 15% of each Member's intra-SADC merchandise trade. Category E is goods that can be exempted from preferential treatment under Articles 9 and 10 of the Trade Protocol such as firearms and munitions, comprising of a small fraction of intra-SADC trade. There are two special agreements on trade in sugar and clothing and textiles, regarded as sensitive products. Sugar has been one of the highly sensitive products and susceptible to the influence of domestic interest groups and politicians in the world's sugar producing countries including SADC.

The Trade Protocol provides for the elimination of all existing non-tariff barriers (NTBs) and refraining from introducing new ones. However, in practice it does appear that non-tariff measures are widespread, increasing and are a real obstacle to intra-regional trade expansion. Some SADC members' states continue to introduce non-tariff measures such as a periodic ban on imports, imposition of additional import levies and other forms of import controls, often as protectionist devices. This undermines the credibility of the Trade Protocol and makes it irrelevant in the eyes of traders, investors and consumers at large (Kalenga, 2004:29).

3.2.2 SADC Trade Level

Despite impressive growth in total exports between 2000 and 2007, intra-SADC trade remains weaker. A comparison of SADC with other regional blocs shows that intra-regional trade

provides the necessary impetus for deeper integration and regional progress. However, SADC is relatively lagging behind most regions out side Africa. SADC's growth of extra-regional trade was more than with fellow members. Trade between countries also reveals that more than two thirds of total trade is with South Africa. Moreover, the largest community in Africa both in terms of membership, total GDP and population is COMESA, however, intra regional trade is higher in SADC. As well, if it includes SACU members, SADC exceeds all regional communities in terms of GDP (Day. Y et al, 2006).

Table3: Export Trends of SADC by Destination in 2000 and 2007(in billion US dollar)

Destination/Year	2000	2007	%share as of SADC'S total trade	
			2000	2007
world	37514227630	89984721569	100	100
EU	14538655920	33037333057	38.76	36.71
USA	3281106511	9342922414	8.75	10.38
Asia	5402537588	22237271742	14.40	24.71
intra -SADC	6076542057	14171814150	16.20	15.75
others	8253130079	10798166588	22	12

Source: Own Computation from COMTRADE DATA CD-ROM

Since SADC has commenced its implementation of the trade protocol, it experiences huge increases in exports. However, most of these exports are destined to markets outside the region itself and Africa as whole. European countries are the major trading partner of the SADC members. Following European countries, Asia and USA serve as second and third significant

export destination of SADC members respectively. SADC's trade with other than member Africa countries is very minimal. Therefore, SADC lost market shares of its own export growth, and therefore missing out on opportunities to take advantage of its own integration initiative (Kalaba and Tsedu, 2008:10).

In concluding this subsection, one can observe that SADC has not made progress in terms of intra-regional exports. Besides, SADC exports with in the region have become more concentrated with the implementation of the protocol on trade. This occurred despite the fact that total exports rise in 2007 by twice the value at the implementation of the SADC trade protocol. However, it is encouraging to realize some increases in global share of exports, even though it is negligible. It remains a positive sign, and a start that can be constructed around. Furthermore, the rate of increase in exports is also providing a base over which momentum can be built (Kalaba and Tsedu, 2008:11).

3.2.3 Share of Exports by SADC member states

So far, SADC overall trade has been examined. Now, the focus switches to the response by SADC member states in terms of their export share to the initiatives and incentives of the trade protocol.

This analysis provides insight on how the individual members have contributed to regional trade as well as with specific members. The analysis is based on the calculated shares of each SADC member to with in the region and total trade export of the region's members for the two periods, 2000 and 2007. In addition, it serves as an indicator of how individual members are integrating into the regional trade or economy.

Table4: Share of Intra- Export value in SADC Members (in US dollars)

country/year	2000	2007	As % of total intra-SADC trade	
			2000	2007
Botswana	311803682	912051531	5.13	6.43
Malawi	68410275	308042855	1.13	2.17
Mauritius	26463813	92133980	0.44	0.65
Namibia	44491805	1535031360	0.73	10.83
South Africa	3122554087	6294236707	51.39	44.41
Tanzania	30739011	367042000	0.51	2.58
Zambia	259915593	1073402762	4.28	7.57
Zimbabwe	557809092	2200917668	9.18	15.53
Seychelles	4113681	2041191	0.61	0.014
Swaziland	671800120	846898993	11.06	5.98
Mozambique	129977202	540015103	2.14	3.81
intra-SADC trade	6076542057	14171814150	100	100

Source: Own Computation from COMTRADE DATA CD-ROM

As table 4 above displays , in both years, South Africa contributes the highest share in total intra-SADC trade .Zimbabwe and Namibia represent the second and third position in total trade takes place with in the region respectively in 2007. According to the table 5 below, South Africa accounts for 70% of the total exports of SADC. Next to South Africa, Botswana and Zambia

represent the second and third rank in the total exports of the region consecutively for the year 2007.

Table5: Share of Total Export value in SADC Trade by Members (in US dollar)

country/year	2000	2007	As % of SADC-World	
			2000	2007
Botswana	2762610944	5072523185	7.36	5.64
Malawi	379292364	868559184	1.01	0.97
Mauritius	1489961728	2054081555	3.97	2.28
Namibia	1326732160	4040273925	3.54	4.49
South Africa	26297951898	64026608364	70.10	71.15
Tanzania	655797120	2139346909	1.75	2.38
Zambia	892362022	4618619360	2.38	5.13
Zimbabwe	1924962432	3310184142	5.13	3.68
Seychelles	193679154	360146563	0.51	0.40
Swaziland	890750016	1082299753	2.37	1.20
Mozambique	363962000	2412078629	0.97	2.68
SADC-World	37514227630	89984721569	100	100

Source: Own Computation from COMTRADE DATA CD-ROM

3.2.4 Sectoral Responsibility in SADC

As explained in chapter two, SADC has applied state control approach of economic regionalization, combining development cooperation with market integration. It focuses on

cooperation among 20 different sectors including trade, health, mining, water and fisheries. Its main instruments are legally binding protocols. In order to address national priorities through regional action, most member states had been allocated the responsibility of coordinating one or more sectors. This involved proposing sector policies, strategies and priorities, and processing projects for inclusion in the sectoral programmes, monitoring progress and reporting to the Council of Ministers. SADC has established a number of Coordinating Units in several sectoral areas of relevance to regional cooperation. Among these, the overall coordination of the Food, Agricultural and Natural Resources sectors is the responsibility of the Zimbabwe government, while forestry matters are specifically followed by a Forestry Sector Technical Coordination Unit (FSTCU) hosted by the Department of Forestry of Malawi.

After 2001, nevertheless, the responsibility of each member state on sector cooperation was abandoned. To improve the speed of sector protocol implementation as well as the focus of cooperation activities, SADC centralized its activities. Sector protocols were clustered in four directorates (trade and investment, infrastructure and services, food and agriculture, and human development and special programmes), which are managed by the SADC Secretariat in Gaborone, Botswana. However, the centralization of activities is not fully implemented yet due to missing financial resources and lack human capital .Still, SADC is partly able to address structural hindrances and supply-side constraints through the instrument of sector cooperation, such as monetary cooperation and harmonization of payments (Khandelwal 2004).

3.3 Political History and Institutional Overview of SADC

The SADC countries comprising Angola, Botswana, Democratic Republic of Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Seychelles, Tanzania,

Zambia and Zimbabwe have a similar history of long settler colonialism before attaining independence in the decades beginning in the 1960s to the decade ending in the 1990s. Angola, Mozambique, Namibia, South Africa and Zimbabwe only attained independence after protracted armed liberation Struggles coupled with international negotiations(.(HODZI, 1995).

An understanding of the philosophical, political and economic and historical background is essential to the comprehension of the functions of institutions in SADC. SADC is virtually the transformation of the so-called war-time frontline states and newly independent state of Southern Africa from a purely defensive military alliance, against apartheid and settler colonial minority regimes, into an economic and political alliance (HODZI, 1995).

3.4 Regional Integration Experiences in Africa

Progress in Africa integration is mixed across sectors, regional economic communities, and member states .There have been some strides in tradc, communications, macroeconomic policy and transport, but integration has lagged in energy, manufacturing, and food and agriculture. Some regional economic communities have excelled in trade liberalization, free movement of people, infrastructure, and peace and security, but others have not .This pattern points to an area of concern in Africa integration –one that should be addressed as a critical priority (ECA, 2004).

In sub-Saharan Africa (SSA) with its many states and fragmented economies, regional integration is even more difficult. Thus, it is not surprising that most of the dozens of regional economic integration schemes established in Africa have either been abandoned or are dormant, owing to their lack of success. It appears that the Southern African region is the most advanced in terms of regional integration. However, this view is disputed in some quarters, and it is unclear how the region compares internationally. (Khandelwal, 2004:13).

CHPTER FOUR: EMPIRICAL METHODOLOGY

This section attempts to cover model specification part of the current study, starting from the theoretical background of gravity model to its application in the SADC trade flow determinants .It also devotes to describe the data nature and variable employed to estimate the specified model for this study.

4.1 The Gravity Model

The gravity model is a popular formulation for statistical analyses of bilateral flows between different geographical entities. In the following, an overview of the evolution and use of this equation are provided. Originally, in 1687, Newton proposed the "Law of Universal Gravitation." This inspiration of gravity model which comes from physics states that the force of gravity between two objects is proportional to the product of the masses of the two objects divided by the square of the distance between them, it is given by:

$$F_{ij} = G \cdot \frac{M_i \cdot M_j}{D^2_{ij}}, \quad \text{.. (1)}$$

Where notation is defined as follows

- F_{ij} is the attractive force.
- M_i and M_j are the masses.
- D_{ij} is the distance between the two objects.
- G is a gravitational constant depending on the units of measurement for mass and force.

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Since then, it has been applied to a whole range of what we might call "social interactions" including migration, tourism, and foreign direct investment.

However, economists discovered the gravity model to apply in international trade when Tinbergen (1962) and Poyhonen (1963) proposed that roughly the same functional form could be applied to international trade flows. Consequently, a large number of empirical works applied gravity model to inspect the trade creation and trade diversion effects of the RTAs. According to this model, flows of export between two countries are explained by their economic sizes (GDP or GNP), population and direct geographical distances between the countries. Based upon Newton's Law of Gravitation; the gravity model predicts that the flow of people, ideas or commodities between two locations is positively related to their size and negatively related to the distance. In its original form, they specified the following gravity model equation:

$$trade_{ij} = A \frac{(GDP_i . GDP_j)^{b1}}{dis\tan ce_{ij}^{b2}}, \quad \text{..... (2)}$$

Where,

tradeij is the value of bilateral trade between country *i* and *j*, GDPi and GDPj are country *i* and *j's* respective national incomes, distanceij is a measure of the bilateral distance between the two countries and *A* is a constant of proportionality.

The multiplicative nature of the gravity equation means that we can take natural logs and obtain a linear relationship between log trade flows and the logged economy sizes and distances. Taking logarithms of the gravity model equation (2), we get the estimable equation:

$$\log(trade_{ij}) = A + b_1 \log(GDP_i . GDP_j) - b_2 \log(dis\tan ce) + \varepsilon_{ij} \quad \text{..... (3)}$$

Where A, b_1 and b_2 are coefficients to be estimated. The error term ε_{ij} captures any other shocks and chance events that may affect bilateral trade between the two countries.

Equation (3) is the core gravity model equation where bilateral trade is predicted to be a positive function of income and a negative function of distance. While the core gravity equation has been used in the empirical literature since the econometric studies of trade flows by Tinbergen (1962) and Pöyhönen (1963), the theoretical justification behind the core gravity model has been a gradual process.

4.1.1 Theoretical Justification of the Gravity Model in Analyzing Trade

As it is mentioned earlier, the Newtonian physics notion is the first justification of the gravity model. The second rationale for the gravity equation can be analyzed in the light of a partial equilibrium model of export supply and import demand provided by Linneman (1966), the details about this is given in Linneman approach subsection. Relying on some simplifying assumptions, the gravity equation proves to be a reduced form of this model. Nonetheless, Bergstrand (1985) and others indicate that this partial equilibrium model could not explain the multiplicative form of the equation and also left some of its parameters unidentified mainly because of exclusion of price variable. With the simplest form of the equation, of course, Linneman's justification for exclusion of prices is consistent. Let's look at it in detail in the following paragraphs.

The Trade Flow Model: Linnemann Approach (1966)

Factors which determine trade flows between any pair of countries-say, the exports from Country X to country Y may be categorized in to three categories. For instance,

1. factors that indicate total potential supply of country X- the exporting country-on the world market
2. factors that indicate total potential demand of country Y- the importing country

on the world market;

3. factors that represent the "resistance" to a trade flow from potential supplier to potential buyer Y. The "resistance" factors are cost of transportation, tariff wall, quota, etc.

The potential supply of any country to the world market is linked systematically to (i) the size of a country's national or domestic product (simply as a scale factor), and (ii) the size of a country's population. The level of a country's per capita income may also be considered as a third factor though its influence will be very limited, most of the time. If the third factor actually had no effect totally, then the factors (i) and (ii) would apparently be completely independent of each other as explanatory variables, on theoretical grounds. On the other hand, if the third factor did have an effect, then the three explanatory factors would not be independent of each other, as a change in one of the three would necessarily be associated with a change in at least one of the other two variables. For statistical exercises, this has important implications because it would indicate certain problems of identification.

The Price Level

Potential supply and potential demand, in the equilibrium situation, on the world market have to be equal. For this, a prerequisite must be that the exchange rate has been fixed at a level corresponding with the relative scarcity of the country's currency on the world market. Equality of supply and demand on the world market also indicates that every country has a moderate price level in the long run. If the price level is too high or too low, there would be a permanent disequilibrium of the balance of payments. Adjustment through a change in the exchange rate

will necessarily take place. Thus, the general price level will not influence a country's potential foreign supply and demand except in the short-run.

A Formula for the Flow of Trade between Two Countries

Let Ep = Total potential supply

Mp = Total potential demand

R = Resistance

Apparently, the trade flow from country i to country j will depend on E^p_i and M^p_i. Here, it is assumed that a constant elasticity of the size of the trade flow in respect of potential supply and potential demand. Indicating the trade flow from country i to country j by X_{ij}, the trade flow equation would then combine the three determining factors in the following manner:

$$X_{ij} = \beta_0 \frac{\left(E^p_i\right)^{\beta_1} \left(M^p_j\right)^{\beta_2}}{\left(R_{ij}\right)^{\beta_3}} \quad \text{..... (4)}$$

In its simplest form, all exponents equal to 1.

The above three explanatory factors in (4) should now be replaced by the variables determining them. Therefore, we now introduce the following notations.

Y= Gross national product

N= Population size

y = Per capita national income (or product)

D = Geographical distance

P = Preferential trade factor

E^p is a function of Y and N, and possibly of y. Thus, we may write

$$E^p = \gamma_0 Y^{\gamma_1} N^{\gamma_2} \quad \text{.....(5)}$$

In which $\gamma_1 = 1$ and γ_2 is negative. If we include per capita income, in spite of its limited significance, as one of the explanatory variables, we have

$$E^p = \gamma_0 Y^{\gamma_1} N^{\gamma_2} y^{\gamma_3} \quad \text{.....(6)}$$

However, as y = Y/N, the coefficients of this equation would be dependent. So, per capita income will not be introduced as an individual variable. If its effect is at all significant, that would be incorporated "automatically" in the exponents of the two other variables:

$$E^p = \gamma'_0 Y^{\gamma'_1} N^{\gamma'_2} \quad \text{.....(7)}$$

The same is true for the potential supply, M^p, which is determined by identical forces

$$M^p = \gamma'_4 Y^{\gamma'_5} N^{\gamma'_6} \quad \text{.....(8)}$$

It is argued that potential supply and potential demand are, in principle, equal to each other. Therefore $\gamma'_0 = \gamma'_4$, $\gamma'_1 = \gamma'_5$ and $\gamma'_2 = \gamma'_6$. This has to be clearly realized in an equilibrium situation.

The trade resistance factor R can be replaced by two variables D with a negative exponent and P with a positive exponent. For the latter variable, several other variables may be substituted if we want to distinguish between various types of preferential trading areas. Here, we ignore this complication for the sake of simplicity of the model. The trade flow equation, then, would run as follows:

$$X_{ij} = \delta_0 \frac{Y_i^{\delta_1} Y_j^{\delta_3} P_{ij}^{\delta_6}}{N_i^{\delta_2} N_j^{\delta_4} D_{ij}^{\delta_5}} \quad \text{..... (9)}$$

It can be written equivalently as

$$X_{ij} = \delta_0 Y_i^{\delta_1} Y_j^{\delta_3} P_{ij}^{\delta_6} N_i^{-\delta_2} N_j^{-\delta_4} D_{ij}^{-\delta_5} \quad \text{..... (10)}$$

A Theoretical Foundation of the Model: Anderson's Approach (1979)

The gravity equation usually is specified as

$$M_{ijk} = \alpha_k Y_i^{\beta k} Y_j^{\gamma k} N_j^{\xi k} N_j^{\varsigma k} d_j^{\mu k} U_{ijk} \quad \text{..... (11)}$$

Where, M_{ijk} is the dollar flow of good or factor k from country or region i to country or region j, Y_i and Y_j are incomes in i and j, N_i and N_j population in i and j, and d_{ij} is the distance between countries (regions) i and j. U_{ijk} is a log normally distributed error term with $\mathrm{E}(\ln U_{ijk}) = 0$ .Most of the time , the flows are aggregated across goods. Usually, the equation is run on cross- section data and sometimes on pooled data. Typical estimates find income elasticities not significantly different from one and significantly different from zero and population elasticities around -.4, frequently significantly different from zero.

Assumptions: (i) identical homothetic preferences across regions, (ii) products are differentiated by place of origin, (ii) pure expenditure system by specifying that the share of national expenditure accounted for by spending on tradable is a stable unidentified reduced form function of income and population.

A. The Pure Expenditure System Model .The simplest possible gravity-type model stems from a rearrangement of a Cobb- Douglas expenditure system. Assume that each country is completely specialized in the production of its own good (as in a Keynesian-type trade model), so there is one good for each country. No tariffs or transport costs (frictionless trade) exist. The fraction of income spent on the product of country i is (i.e., there are identical Cobb-Douglas preferences everywhere). With cross-section analysis, prices are constant at equilibrium values and units are chosen such that they are all unity. Consumption in value and quantity terms of good i in country j (= imports of good i by country j) is thus

$$M_{ij} = b_i Y_j \quad \text{..... (12)}$$

Where Yj is income in country j. The requirement that income must equal sales implies that

$$Y_i = b_i\left(\sum_j Y_j\right) \quad \text{..... (13)}$$

Solving (13) for bi and substituting into (12), we obtain

$$M_{ij} = \frac{Y_i Y_j}{\sum Y_j} \quad \text{..... (14)}$$

This is the simplest form of "gravity" model. If we neglect error structure, a generalization of equation (14) can be estimated by ordinary least squares, with exponents on Yi, Yj unrestricted. In a pure cross section, the denominator is an irrelevant scale term. The income elasticities produced (disregarding bias) should not differ significantly from unity. The functional form of the gravity equation and a major portion of the explanatory power are encompassed by the expenditure system model.

Using a trade share expenditure system, Anderson (1979) also derives the gravity model which postulates identical Cobb-Douglas or constant elasticity of substitution (CES) preference functions for all countries and weakly separable utility functions between traded and non-traded goods. Here, utility maximization with respect to income constraint gives traded goods shares that are functions of traded goods prices only. Prices are constant in cross-sections; so using the share relationships along with trade (im) balance identity, country j's imports of country i's goods are obtained. Then, assuming log linear functions in income and population for shares, the gravity equation for aggregate imports is obtained. Detailed points about it are rendered in the following subsection.

B. The Trade-Share-Expenditure System Model. The gravity equation of Section A is based on identical Cobb-Douglas preferences, implying identical expenditure shares and gravity equation income elasticities of unity. It could be elaborated by allowing policy induced price differences to produce different expenditure shares in a less restrictive preference form such as the CES, but there is minimum point in the exercise. While a gravity equation is produced by such a framework, the real variables of interest are the non-income-dependent expenditure shares. The gravity equation is a silly specification from an econometric standpoint since it substitutes out the share (which in the Cobb-Douglas case is the only parameter). The following section shows that the gravity equation becomes far more sensible.

Assume that all countries produce a traded and a nontraded good. The overall preference function assumed in this formulation is weakly separable with respect to the partition between traded and nontraded goods: u=u (g (traded goods), non traded goods). Then , given the level of expenditure on traded goods, individual traded-goods demands are determined as if a homothetic utility

function in traded goods alone g( ) were maximized subject to a budget constraint involving the level of expenditure on traded goods. The individual traded- goods shares of total trade expenditure with homotheticity are functions of traded- goods prices only. Within the class of traded goods, since preferences are identical, expenditure shares for any good are identical across countries. Thus, for any consuming country j, θ_i is the expenditure on country i's tradeable good divided by total expenditure in j on tradables; i.e., θ_i is an exponent of g ( ). Let ϕ_j be the share of expenditure on all traded goods in total expenditure of country j and

$$\phi_j = F\left(Y_i N_j\right) \quad \text{..(15)}$$

Demand for i's tradeable good in country j (j's imports of i's good) is

$$M_{ij} = \theta_i \phi_j Y_j \quad \text{(16)}$$

The balance-of-trade relation for country i implies that

$$Y_i \phi_i = \left(\sum_j Y_j \phi_j \right) \theta_i \quad \text{(17)}$$

The left hand side equation (17) indicates value of imports of i plus domestic spending = domestic spending on domestic tradeables on domestic tradeables The right hand side equation (17) shows the value of exports of i plus domestic spending on domestic tradeables .Solving (17) for θ_i and substituting into (16), we have

$$M_{ij} = \frac{\phi_i Y_i \phi_j Y_j}{\sum_j \phi_j Y_j} = \frac{\phi_i Y_i \phi_j Y_j}{\sum_i \sum_j M_{ij}} \quad \text{(18)}$$

With $F\left(Y_i, N_i\right)$ taking on a log-linear form, (17) is the deterministic form of the gravity equation (10) with the distance term suppressed and a scale term appended. More realistically, if trade

imbalance due to long- term capital account transactions is a function of (Y_i, N_i)), we may write the "basic" balance $Y_i\phi_i m_i = \left(\sum_j Y_j\phi_j\right)\theta_i$, with $m_i = m(Y_i, N_i)$ and substitute into (17) and (18). These yields

$$M_{ij} = \frac{m_i\phi_i Y_i \phi_j Y_j}{\sum_j \sum_j M_{ij}} \quad \text{..... (19)}$$

With log-linear forms for m and F, (19) is again essentially the deterministic gravity equation.

The next approach is based on the Walrasian general equilibrium model, with each country having its own supply and demand functions for all goods. Aggregate income determines the level of demand in the importing country and the level of supply in the exporting country. While Anderson's analysis is at the aggregate level, Bergstrand (1985, 1989) develops a microeconomic foundation to the gravity model. He states that a gravity model is a reduced form equation of a general equilibrium of demand and supply systems. For each country, the model of trade demand is derived by maximizing a constant elasticity of substitution (CES) utility function subject to income constraints in importing countries. On the other hand, the model of trade supply is derived from the firm's profit maximization procedure in the exporting country, with resource allocation determined by the constant elasticity of transformation.

The gravity model of trade flows, proxied by value, is then obtained under market equilibrium conditions, where demand for trade flows equals supply of the flows. Bergstrand argues that since the reduced form eliminates all endogenous variables out of the explanatory part of each equation, income and prices can also be used as explanatory variables of bilateral trade. Thus, instead of substituting out all endogenous variables, he takes income and certain price terms as exogenous and solves the general equilibrium system retaining these variables as explanatory

variables. The resulting model is termed as a "generalized" gravity equation.Bergstrand's analysis is based on the assumptions of nationwide product differentiation by monopolistic competition and identical preferences as well as technology for all countries.

The micro-foundations approach also claims that the crucial assumption of perfect product substitutability of the 'conventional' gravity model is unrealistic as evidence in recent times has shown that trade flows are differentiated by place of origin. Exclusion of price variables leads to misspecification of the gravity model. Anderson (1979), Bergstrand (1985, 1989), Helpman & Krugman (1985) and so on agree with this view. Their studies show that price variables, besides to the conventional gravity equation variables, are also statistically significant in explaining trade flows among participating countries.

General speaking, a commodity conveys from a country where prices are low to a country where prices are high. Therefore, trade flows are expected to be positively related to changes in export prices and negatively related to changes in import prices. However, price and exchange rate variables can be omitted only when products are perfect substitutes for one another in consumer preferences and when they can be transported without cost between markets. This structure, of course, leads us to the standard Heckscher-Ohlin (H-O) setting (Jakab, 2001 as cited in Rahman, 2006).

Analyzing the theoretical foundations of gravity equations, Evenett and Keller (1998) explain three types of trade models. These models vary in the way specialization is obtained in equilibrium. These are:

(1) Technology differences across countries in the Ricardian model,

(2) Variations in terms of countries' different factor endowments in the H-O model,

(3) Increasing returns at the firm level in the Increasing Returns to Scale (IRS) model.

These are the perfect specialization models, and are considered as limiting cases for a model of imperfect specialization. But empirically imperfect product specialization is important. In real life, though technologies and factor endowments are different indifferent countries, they change over time and can be transferred between countries. Trade theories just explain why countries trade in different products but do not explain why some countries' trade links are stronger than others and why the levels of trade between countries tends to increase or decrease over time. This is the drawback of trade theories in explaining the size of trade flows. Therefore, while trade theories cannot explain the extent of trade, the gravity model is successful in this regard. It permits more factors to consider explaining the extent of trade as an aspect of international trade flows.

The H-O and Ricardian theories of trade contradict with the trade in real world. In the HO model, the larger the differences in the factor endowments between two countries, the larger will be the trade (Rahman, 2006). However, Linder (1961) hypothesis goes with the trade in real life. It suggests that more similar the countries are in per capita income, larger is their bilateral trade. That is, "absolute value of the difference" of per capita income in any two countries will have a negative effect on their bilateral trade

Hence, the above analyses indicate that there is theoretical foundation in applying gravity model on international trade flows. Next, we will see the application of gravity model in SADC trade flows' determinants.

4.1.2 Gravity Model for the Present Study

The gravity model of bilateral trade hypothesizes that the flows of trade between two countries is proportional to their gross domestic product (GDP) and negatively related to trade barriers between them .Empirical works have provided a number of alternative specification for the gravity model .In the context of international trade, the basic formulation of the gravity model equation is as follows:

$$X_{ijt} = \beta_0 Y_{it}^{\beta_1} Y_{jt}^{\beta_2} N_{it}^{\beta_3} N_{jt}^{\beta_4} D_{ij}^{\beta_5} U_{ijt} \quad \text{..... (20)}$$

For estimation purposes, the basic gravity model is most often used in its log-linear form. Hence, this is equivalently written using natural logarithms as:

$$\ln X_{ijt} = \ln\beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln N_{it} + \beta_4 \ln N_{jt} + \beta_5 \ln D_{ij} + \ln U_{ijt} \quad \text{..... (21)}$$

Where

X_{ijt} = total bilateral trade between country i to country j in year t;

Y_{it} = GDP of country i in year t

Y_{jt} = GDP of country j in year t;

N_{it} = population of country i in year t;

N_{jt} = population of country j in year t;

D_{ijt} = distance between two country i and j

U_{ijt} =log normal error term

ln = the natural logarithm operator

Trade theories based upon imperfect competition and the Hecksher-Ohlin models justify the inclusion of the core variables: income and distance merely. However, most researchers incorporate additional variables to control for differences in geographic factors, historical ties, exchange rate risk, and even overall trade policy for the fact that trade flows between nations can be affected by factors besides to the core variables (GDP, population, distance). Hence, it is common to expand the basic gravity model by adding other variables, which are thought to explain the impact of various policy issues on trade flows.

In the case of gravity equations used to estimate the impact of regional trade arrangements, dummy variables are added for each RTA under critical examination. Furthermore, in order to avoid capturing by these dummy variables the impact of other influences on trade, other dummy variables are added to control for common language and common border. Thus, the augmented gravity model incorporates other variables and thus by introducing these variables in to equation (21), the basic formulation of the model can be extended as follows:

$$\ln X_{ijt} = \ln\beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln GDPPC_{it} + \beta_4 \ln GDPPC_{jt} + \beta_5 \ln GDPPCDIFF_{ijt} + \beta_6 \ln D_{ij} + +\beta_7 \ln IF_{it} +$$

$$\beta_8 \ln IF_{jt} + \beta_9 \ln TR_{it} + \beta_{10} \ln TR_{jt} + \beta_{11} CL_{ij} + \beta_{12} Border_{ij} + \beta_{13} SADCT_{ij} + +\beta_{14} SADCX_{ij} + \ln U_{ijt} \quad \textbf{(22)}$$

Where,

$IF_{i\,(j)}$= infrastructural level of trading nations at time t

CL= common language between country i and j;

IM_{it} =import to GDP ratio of country i at time t which measures openness

IM_{jt} = import to GDP ratio of country j at time t which measures openness

$GDPPC_{it}$= GDP per capita income of exporting countries at time t.

$GDPPC_{jt}$= GDP per capita income of importing countries at time t

$GDPCDIFF_{ijt}$=the per capita GDP difference between country i and j at time t

Border= common border between country i and j

SADC= regional dummy, takes the value one when a certain condition is satisfied, zero otherwise.

We incorporate GDP per capita income rather than population in equation (22) because population is appropriate when aggregate export data is used while for specific export product, GDP per capita income is preferable. Although not exhaustive, our list includes most other variables used in the literature. Nonetheless, there is no agreement on which variables beyond the core factors to include in the gravity model. Second, there are mixed results on the estimated impact of each variable to bilateral trade.

Hypotheses for Gravity Model Variables

Economic theory advocates the hypothesis that income, population, transaction costs, and the presence/absence of trading agreements will affect bilateral trade of a country. In the gravity model, a country's income or economic size is measured by both GDP and per capita GDP. Trade should theoretically rises when GDP increases, so GDP is expected to have a positive effect on trade.

Expected signs for GDP per capita income may be positive or negative. The reasons for ambiguity are: with the higher per capita income if the country enjoys economies of scale effect, then the coefficient $GDPPC_{it}$ would be positive; alternatively due to absorption effect if the country exports less, then $GDPPC_{it}$ would be negative. Similarly, if importing countries demand more country i's goods due to higher income, $GDPPC_{jt}$ would be positive (absorption effect for importing goods); on the other hand due to economies of scale effect in importing countries, if more goods are produced in country j, then GDPPCjt would be negative.

Distance in the gravity model is used to measure the transport length and cost or other physical obstacles to trade. Hence, distance is seen as a restriction or friction to trade and is expected to have a negative relationship towards trade. Distance could be also related to a lack of knowledge of the legal, a proxy of remoteness and institutional characteristics of far away countries. The variables explained, so far, constitute the basic gravity model.

Two hypotheses exist on the effect of the difference between two countries' levels of per capita income (helps to test for the Linder Hypothesis and the HO-trade theory). On the one hand, countries with similar levels of income per capita will exhibit similar tastes, produce similar but differentiated products and trade more amongst themselves. This is the essence of the so-called Linder Hypothesis. A negative sign on the per capita GDP difference variable will support the hypothesis. On the other hand, GDP per capita differences are highly correlated with differences in factor endowments and hence smaller differences could reduce trade, especially inter-industry trade driven by comparative advantage which resembles to HO- trade theory. There is an implicit policy implication from this hypothesis for the economies of SADC. A variable trade-GDP ratio

(as a proxy indicator of openness) is included in the model. Theoretically, this variable should have positive impact on bilateral export flows.

Another variable added in the augmented gravity model is common language, which not only indicates that the country shares the same language, but in some cases same colonizer, leading to shared cultural linkages. Therefore, a common language between any two countries is expected to increase their bilateral trade. Common border also indicates that any two trading partners share common territorial boundary while they trade .Since sharing common border is assumed to facilitate trade activities among nations , its coefficient is expected to have positive sign.

Infrastructural level: This index is computed using 4 variables from WDI database (2008): the number of kilometer of roads, of paved roads, of railways, and the number of telephone sets/lines per capita of country i (j) at time t. The first three variables are divided by the land area to obtain a density. Thus, each variable obtained is normalized to have a same mean equal to one. An arithmetic average is then calculated over the four variables, for each country and each year, without taking into account the missing values. It is anticipated to have a positive impact on trade flow between any trading partners.

The remaining variables in equation (22) are regional dummy variables designed to capture the influence of regional trading agreements on trade flows among nations. Since, bilateral trade agreement plays important role in determining trade among partner countries, a dummy variable for bilateral agreements has been incorporated in the model. Introducing regional dummy variables helps to estimate the trade effects of SADC regional bloc using equation (22), which is the interest of the then study.

Therefore, following Coulibaly (2004), two dummy variables SADCTij and SADCXij, are introduced to capture intra-bloc and extra export effect of the SADC as a whole in the following way:

SADCT= 1 if both partner belongs to SADC, [other wise 0] (capturing intra bloc trade)

SADCX= 1 if the exporting country i is member of SADC and the importing country j belongs to the ROW [zero otherwise] (capturing bloc exports to the ROW).

In our estimates "SADCTIJ" captures the total intra-regional trade bias. The dummy "*SADCXIJ*" captures the extra-regional export bias where a negative and significant coefficient indicates that member countries have switched to export to members rather than non-members. This can be interpreted as trade diversion which results in a member country preferring to export to members rather than non-members.

In nutshell, a positive coefficient SADCTij measures intra-bloc export creation and negative coefficient shows intra-bloc export diversion. A positive coefficient SADCXij measures net export creation while negative coefficient measures net export diversion. The interpretation of these dummy variables is not straightforward. Its impact depends on the relative efficiency of SADC members, compared to the efficiency of partners. If the SADC is formed with the most efficient supplier, then any increase in intra-RTA trade should be welfare increasing and therefore intra –SADC should be interpreted as trade creation. If, on the contrary, the RTA is not formed with the most efficient supplier then the interpretation of intra-SADC depends on the extent to which intra-trade flows substitute less-efficient domestic production or more efficient foreign suppliers' trade.

4.2 Data Description

Majority of the empirical literature on gravity model use total bilateral trade flows as dependent variable. However, Cernat (2001) suggests that the use of bilateral export flows arguing that for a given pair of countries, with total bilateral trade one cannot distinguish between the impacts of RTA formation on exports from non-member to RTA members from that on exports from the RTA member to the non-member. For the present study, bilateral export flow (proxy for total bilateral trade) is used as dependent variable.

Again, since this study employs disaggregated data, export values are categorized in to four sectors: agricultural commodities, fuels and mining, heavy manufacturing and light manufacturing sectors (for details, see appendix III). Data on the countries added in the sample for the current study before1999 are not available. Thus, this scarcity of data for most of countries in the sample as reporter forces this study to use data ranges from the period 2000 to 2007 (8 years only). Moreover, the year 2000 coincides with the beginning of the implementation of trade protocol of SADC trade agreements which was signed in 1996 and helps to assess the post implementation effects of trade agreements on SADC's trade flows. All observations are also annual values.

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Sampling Procedure

Our study covers a total of 30 countries. The countries are chosen on the basis of importance of trading partnership with SADC members and availability of required data. Eight countries of SADC (out of fourteen countries): Botswana, Malawi, Mauritius, Namibia, South Africa, Tanzania, Zambia and Zimbabwe are incorporated in the sample as reporter countries. We could not include Angola, Democratic republic of Congo and Lesotho as these countries have no data

for most of the years of our sample period. Seychelles, Swaziland and Mozambique are not also part of the sample members for the reason that the sample countries represent more than three – fourth out of total trade flows in the SADC while these countries have insignificant share in the region's total trade flows.

How ever, all members of SADC are included as the partner countries in the sample taken for this study to examine level of intra regional trade. From EU, ten countries are taken because it serves as a major trading partner of SADC. These are UK, Germany, France, Italy, Netherlands, Austria, Portugal, and Belgium, Luxembourg and Spain. Next to EU, Asian countries are the second important trading partner for the region. As a result, five countries are chosen from Asian countries: India, China, Japan, Hong Kong and Indonesia. USA is also included in the sample since it takes the third position of SADC's export destination.

Sources of Data and Variable Measurement

In equation (22), X_{ijt} is the current U.S dollar value of total bilateral exports from country i to country j in year t extracted from COMTRADE data base. Y_{it} and Y_{jt} are nominal GDP of country i and country j in year t in U.S dollars respectively. To assure comparability of GDP data across countries, Purchasing Power Parity (PPP) equivalents of GDPs are used for all countries in the sample.

Data on GDP per capita income level and difference in current U.S dollar value are taken from World Development Indicator (WDI) CD-ROOM, 2008. Variable D_{ijt} is the direct air distance in kilometers between the capitals of country i and country j available at Indonesian website: www.indo.com/distance . Level of infrastructure of the country i (j), computed as an average of

the density of road, railway and the number of telephone lines per capita is accessed from the World Development Indicator (WDI) CD-ROOM, 2008. Trade –GDP ratio data is also taken from (WDI) CD-ROOM, 2008. Lastly, information on common language and border is accessed from World Fact Book (2008).

When we come to the dependent variable data description (export value), this study uses COMTRADE data base, developed by the United Nations Statistics Division. The COMTRADE data base, developed by the United Nations Statistics Division provides yearly statistical data on imports and exports in value (U.S dollars) by commodities and partners countries. The COMTRADE data base, in its complete details, comprises 3121 different products that are classified according to the Standard International Trade Classification System (SITC-Revision3).In the current task, export values are classified under four sectors based on Keck and Piermartini (2005) sectoral aggregation (for details, see appendix III)..

Missing value data handling

Missing of data for some countries, sectors and years in international trade statistics is a common phenomenon. Countries which do not declare their exports in each sector to their partners or which do not export to their partners are identified in the same way, i.e. with a missing value. Hence, our data are not censored at zero. Except in fuel and minerals sector, the actual number of observations in the rest three sectors represents more than two- third of potential number.

CHAPTER FIVE: ESTIMATION RESULTS AND DISCUSSION

5.1 Econometric Method

Various ways of estimations are employed for panel data gravity model specification: an ordinary-least squares (OLS) estimation, fixed effect estimation, random-effects estimation, feasible generalized least-squares (FGLS) panel estimation, and Tobit estimation. The use of different panel data methods, such as random or fixed (within) effect estimators, allows for various assumptions regarding trade flows to be analyzed and tested.

The Within equation treats the bilateral specific effects as fixed, thereby giving unbiased parameter estimates for time-varying variables. However, since the regional dummies are defined over the whole period of the RTA, these variables would only vary when there are changes in membership during the period. So, the fixed-effects model does not allow the estimation of the effects of RTA with fixed membership. Another problem with the fixed-effects model is that, since the within-method ignores the cross-sectional nature of the data, the interpretation of the regional dummies coefficients does not exactly answer the question of this paper, namely what are the effects of SADC regional integration scheme on region's trade flow ?

As an alternative to the fixed effect specification, the coefficients for the time-invariant variables could be estimated by using a random effect (RE-) technique, which assumes that explanatory variables are uncorrelated with random effects. Additional reasons for choosing random effects method against fixed effect relies on hausman test results which demonstrate that random effect

is preferred to fixed effect(details are given in appendix I in table10). Further more, the interest of this study is to assess the effects of regional integration on SADC's trade flows which is one aspect of trade policy analysis where as for structural analysis purpose, fixed effect is preferable. Hence, modeling the bilateral effects as random variables is more appropriate. In the absence of correlation between the explanatory variables and the specific bilateral effects, the Generalized Least Squares (GLS) estimation provides consistent estimates of the coefficients.

However, variables like GDPs or infrastructure may be correlated with bilateral specific effects. Even, ''the regional dummy variables may be endogenous by being correlated with unobservable (omitted) variables that are correlated also with the decision to trade'' (Baier and Bergstrand, 2002). The Hausman test (1978), based on differences between Within and GLS estimators, assures that GLS estimator is biased and then some explanatory variables are endogenous.

The usual way to deal with this issue is to consider instrumental variables estimation proposed by Hausman and Taylor (1981).The Hausman and Taylor estimator is based upon an instrumental variable estimator which uses both the between and within variation of the strictly exogenous variables as instruments. The definition of the explanatory variables as exogenous or endogenous is a testable hypothesis.

5.2 Discussion

Before proceeding to the discussion of empirical results, it should be noted that the current empirical analysis differs in some important respects from many gravity models found in the literature. The first stems from the way bilateral trade data is constructed, i.e. this study uses export values as dependent variable for the aforementioned reasons. Furthermore, total export

value is disaggregated in four sectors. The dependent variable is total merchandise export value for each sector alluded above, in log-linear form, between pair of 8 SADC members as reporting countries and other 16 non member countries including all SADC members as partner countries.

So, estimation and tests are carried out for each sector separately and thereby apply separate analysis for the estimation results of four sectors. First, analysis for the selected tests will be provided. Then, discussion for regression results of equation (22) for each sector will be followed.

5.2.1 Tests

Different tests have been conducted to choose the appropriate estimation method for the specified panel gravity model of equation (22) and for detecting endogenity problem among the explanatory variables. Here, the tests are separately done for each sector listed above.

I .Random effect Vs Fixed effect

As mentioned earlier, our all four sectors gravity models suggest [see in the appendix I random versus fixed effect test in Table 10] that, based on the Hausman tests, random effect model of Panel estimation is the appropriate strategy to be adopted. So the results of random effect technique would be discussed here for the said four sectors model. In these models, the intercept term in random effect method is considered to be random variable, instead of fixed country specific variable, and the slope coefficients are considered to be the same for all countries.

II. Endogenity of explanatory variables

As table (9) in appendix I is evident, the gravity model equation (22) results for all sectors reveal that when any one explanatory variable become dependent variable in equation (22) over the remaining regressors, there are R^2 values in each sector above the overall R^2 of the full model. According to Klien's rule of thumb (Klien, 1962), this condition indicates the existence of multicollinearity problem among the variables.

According to test table 9 for multicolinearity in appendix I, equation (22) of this study considers the variables of GDP, GDP per capita, trade to GDP ratio and infrastructural level index as most endogenous explanatory variables .Almost similar variables are obtained in all sectors' model as endogenous variables .As Matyas (1997, 1998) suggests, they are instrumented with their one year lag. Consequently, results are improved to some extent.

Random Effect Estimator Vs Instrumental Variables

The Hausman test for the appropriateness of using instrumental variable reveals a $\chi^2(14) = 23.89$ for agricultural sector model and $\chi^2(14) = 28.41$ in light manufacturing sector model, which are significant at 10 % and 5% respectively. Hence, this test rejects the null hypothesis according to which there would be no correlation between the bilateral specific effects and the explanatory variables. The GLS estimator is thus biased, and the use of the instrumental variable method is justified for agricultural commodities and light manufacturing sector models. However, χ^2's value for fuels and minerals , and heavy manufacturing sector is insignificant

implying that employing instrumental variable is inappropriate or using it does not improve the model's efficiency (see table 11 in appendix I).All estimates are checked for heteroskedasticity.

5.2.2 Analysis of Results

Our workhorse gravity model equation (22) has been estimated using random effect estimation technique and by applying instrumental variable where it is justifiable with panel data for the aforementioned reasons.

Table 6: Regression results of all four sectors model together

(log *of export value of each sector as dependent variable*)

Variable/Coefficients	Model (I)	Model (II)	Model (III)	Model (IV)
logYIT	.98*	1.23*	1.27*	.80*
	(12.83)	(8.01)	(12.82)	(10.16)
logYJT	.70*	.23***	1.08*	.87*
	(8.75)	(1.82)	(12.91)	(10.31)
logGDPPCIT	-.52*	.78*	.14	.67*
	(-5.99)	(3.76)	(1.14)	(7.64)
logGDPPCJT	-.37*	.34***	-.11	-.04
	(-3.59)	(1.73)	(-0.89)	(-0.35)
logGDPPCDI	.24*	-.32**	-.09	.15**
	(3.18)	(-2.24)	(-0.95)	(1.99)
logDIJ	-2.38*	-.67**	-1.38*	-2.33*
	(-9.96)	(-2.23)	(-6.71)	(-10.19)

logIFIT	1.01*	1.23 *	1.25*	2.09*
	(11.36)	(5.79)	(11.53)	(23.05)
logIFJT	.21***	.36**	.59*	-.09
	(1.79)	(2.07)	(5.01)	(-0.69)
logTRIT	.21*	-.96*	-.06*	.42
	(4.45)	(-4.67)	(-6.10)	(-7.62)
logTRJT	-1.15	-2.57*	-2.02	-2.10**
	(1.24)	(-3.16)	(-0.30)	(2.38)
CLIJ	.13	-.83**	.56*	.86*
	(0.72)	(-2.51)	(2.84)	(4.52)
BORDERIJ	1.80*	2.10*	2.35*	2.11*
	(7.07)	(5.53)	(8.54)	(8.10)
cons	3.57	-3.65*	-18.35	-1.70
	(1.03)	(-0.60)	(-4.72)	(-0.42)
Number of obs	1594	610	1542	1568
Over all R^2	0.39	0.51	0.44	0.52

Note: Model classification is on the basis of the dependent variable used for regression of equation (22).Model I=agricultural commodities export value, Model II fuel and minerals export value, Model III =heavy manufacturing export value and Model IV= light manufacturing export value.

The numbers in Parentheses are t-value and *, **and *** show at 1%, 5% and 10 % significance level respectively. All variables except dummy variables are in logs.

Equation (22) is estimated taking all variables for every sector considered in this study separately. When agricultural commodities export value is dependent variable, except common

language, all variables are found to be significant .The coefficients for GDP and infrastructural level index for both exporting and importing countries are in line with the predicted theory (positive sign). This indicates that agricultural commodities export value of SADC increases with GDP and coefficients are close to unity as suggested by the theory and as reported by, for instance, Aitken (1973), Soloaga and Winters (2000) and Egger and Pfaffermayr (2000).

Distance which is a proxy of transportation cost is obtained `with the expected negative sign and is statistically significant. The elasticity of bilateral trade to distance is superior to unity (-2.38) and trade in agricultural commodities increases with the level of infrastructure of each country, as in Limao and Venables (2001).

GDP per capita income coefficient for both trading partners is negative and significant. The estimation results on table (6) for GDP per capita income of both exporting and importing countries show that GDP per capita income has negative impact on bilateral export flows of agricultural commodities. In other words, increasing per capita income in the exporting country results in the rise of the absorption capacity of the domestic market while increasing per capita income in importing countries contribute to the economies of scale of the domestic industry. However, the GDP per capita income difference is positive which supports the HO-theory; countries with different factor endowments trade more each other than that of with similar endowments.

If two countries share a common border, agricultural commodities export flow between them could be [exp {(0.13)-1} =0.13] more than two otherwise similar countries. The coefficient of

trade -GDP ratio of exporting country is positive while negative for importing countries. This shows that it is possible that increased openness of the SADC member countries could boost intra-regional trade in agricultural commodities in the region. This might be by abolishing all trade barriers imposed on international trade against their partners However, the reverse is true for importing countries. The descriptive summary for all variables included in the agricultural export value dependent variable of equation (22) is attached in appendix I of table 12.

Regression results with fuel and minerals export value as dependent variable which is shown on table (6) exhibit that all variables included in the regression are significant but GDP and GDP per capita incomes for importing countries are slightly significant. Regarding to their coefficients' sign, the core variables of gravity model such as GDP for both exporting and importing is found with the expected positive sign. We also find the traditional negative sign on distance. GDP per capita income for both origin and destination countries is positive indicating economies of scale effect for exporting and absorption effect for importing countries.

Unlike to the regression result table of agricultural commodities export value sector model, GDP per capita income difference is found negative and significant endorsing Linder hypothesis (similar countries trade more each other than dissimilar countries do).This Linder hypothesis emphasizes show that income similarity as the driver of trade instead of income differences. The regression result of table 6 is also evident that infrastructural level index for exporting and importing nations is as hypothesized positive sign and significant.

Amazingly, common language between trading nations is found significant with unusual negative sign .One possible reason for the negative sign of language dummy may be the nature of data employed in this study .The data used here is a formal recorded data of international trade and hence language might have minimal impact on such nature of trade. But, the need of language in facilitating international trade is strong in smuggling, unregistered border trade. However, border is obtained significant with positive sign as expected. Further more, Trade –GDP ratio for both trading nations is found significant but with an unusual negative sign indicating that openness policy adopted by SADC members does not encourage fuel and minerals export value. The descriptive summary for all variables included in equation (22) with fuel and minerals export value dependent variable is given in appendix I table 12.

Again, when heavy manufacturing export value is on the left side of regression equation (22), all core variable of gravity model, GDP for exporting as well as importing and distance are significant with anticipated positive and negative sign consecutively. For both origin and destination nations, GDP per capita income is insignificant for both exporting and importing nations. The coefficient of per capita GDP differential between SADC members and country j is also found to be insignificant.

Infrastructural level of both trading partners is obtained in line with theory, positive sign and significant. The trade-GDP ratio which is a proxy for openness of countries bearing a negative sign is found significant for exporting countries while it is not different from zero for importing countries. What is more, common language and border are obtained significant with expected

positive sign. The descriptive summary for all variables included in the heavy manufacturing export value equation is provided in the appendix I of table 12.

At the end , as table 6 regression results with light manufacturing export value as dependent variable show that GDP of exporting and importing countries , GDP per capita income and infrastructural level index of exporting countries and distance are found to be significant with expected sign. GDP per capita income and infrastructural level index of importing countries coefficients are found to be not different from zero.

Like in agricultural commodities export value regression result, per capita GDP differential is obtained to be significant and has positive sign which again supports the H – O hypothesis in the light manufacturing export value model. On top of this, trade-GDP ratio of importing countries is obtained insignificant. However, the trade-GDP ratio variable of exporting, a proxy for the openness is significant but with unexpected negative sign. Common language and border are as expected with positive sign and significant. For descriptive summary of all variables added in the regression, see appendix I of table 12.

Regional Dummy Variables Results in All Sectors

When we come to the variable interest of this study, the results in table (7) below display regional dummies effects vary from sector to sector. Referring to this regression result table, intra trade dummy coefficient for fuel and minerals as well as heavy manufacturing sectors model fits with the expected positive sign and found significant.

Table7: Regression Results of Regional Trade Agreement Dummy Variables (2000-2007)

Variable/coefficients	Model I	Model II	Model III	Model IV
SADCTIJ	-3.51*(3.61)	4.49 *(5.13)	2.21* (-4.15)	-1.95***(-1.94)
SADCXIJ	3.51*(3.61)	-4.49*(5.13)	-2.21*(4.15)	1.95***(1.94)

- Note: Model classification is on the basis of the dependent variable used for regression of equation (21). Model I= agricultural commodities export value, Model II fuel and minerals export value, Model III =heavy manufacturing export value and Model IV= light manufacturing export value.
- SADCTIJ takes the value unity when both countries are current members of the bloc. A positive coefficient indicates trade creation.
- The regional dummy, SADCXIJ takes a value of unity if only if the exporting country is a current member of the bloc and the importing countries are part of the ROW. A positive coefficient indicates an open bloc, while a negative coefficient suggests trade diversion.
- The numbers in Parentheses are t-value and *, **and *** show at 1%, 5% and 10 % significance level respectively.

The results suggest that the positive sign of intra – SADC dummy is associated with intra-bloc export creation for the two sectors mentioned above. If two countries are the members of SADC, an export flow between them is 8812% [exp{ (4.49)-1} =88.12] and 811 %[exp{ (2.21)-1}=8.11] more than two otherwise similar countries for fuel and mineral sector , and heavy manufacturing sectors respectively (see table 8). Nevertheless, the extra –SADC dummy coefficient for these sectors demonstrates negative sign implying that extra –SADC trade diversion in fuel and minerals, and heavy manufacturing sectors is registered for the given sample year of study. In other words, intra-trade export increases at the costs of reduction in extra-regional export.

However, the intra-regional dummy for agricultural commodities export and light manufacturing sectors is unexpectedly negative implying that countries located within these regions do trade less with each other over and above the levels predicted by the basic explanatory variables for the

given sample years of this study. Put it differently, there was intra-SADC export trade diversion in agricultural and light manufacturing sectors.

Table 8: Calculated percentage change equivalents in the respective estimated intra and extra dummy coefficients of SADC (2000-2007)

Variable/coefficients	Model I	Model II	Model III	Model IV
SADCTIJ	-95	8812	811	-86
SADCXIJ	3244	-98	-89	603

- Note: Model classification is on the basis of the dependent variable used for regression of equation (21). Model I= agricultural commodities export value, Model II fuel and minerals export value, Model III =heavy manufacturing export value and Model IV= light manufacturing export value.
- As the dependent variable is in logarithm form , the percentage effect of dummy variables is calculated by subtracting one from the exponent of the regression dummy coefficient shown in table 7 and then multiplying the result by 100.i.e. [{exp (coefficient)}-1]*100.

With regard to extra trade dummy, table (7) reveals a positive sign for the two sectors indicating that SADC's trade out side of the has grown at the expense of declining trade with in the region it self which is interpreted as SADC's openness (extra-SADC export trade creation) in agricultural commodities and light manufacturing exports.

It is interesting to observe that export value in agricultural commodities and light manufacturing between two countries would increase by 3244% [exp {(3.51)-1} = 32.44] and 603% exp {(1.95)-1} = 6.03] consecutively if there is no a bilateral trade agreement between the countries compared to the country pairs with bilateral trade tie. The elasticity for dummy variables is obtained from the expression $e^{b}-1$, where e is the exponential function raised to b (the regional dummy coefficients value in table 7).The estimates in table 8 suggest that during the 2000-2007 periods, members of SADC traded with the rest of the world in agricultural and light manufacturing sectors by 32.44 and 6.03 more than they trade with in the region respectively.

The second objective of this study is assessing the level of intra -trade and extra- trade level of SADC. The extent of intra-bloc export creation in SADC member countries is much higher in fuel and minerals than that of heavy manufacturing products. With regard to the extent of extra – SADC export trade creation, it is larger in agricultural commodities and lesser in light manufacturing products. The lowest level of intra –SADC trade is exhibited in agricultural sector while the highest level is recorded in fuel and minerals sector. The reverse is registered for extra-SADC trade level.

Comparison of Regional Dummy Results with Others' Findings

Our results, showing a positive and significant intra SADC trade effect in fuel and minerals, and heavy manufacturing sectors differ from a number of previous studies such as Chauvin et al (2002), Kalaba and Tsedu (2008) who observe that given SADC countries have concentrated and similar comparative advantages, their static analysis suggests that the room for further trade within SADC is limited.

Moreover, Kalaba and Tsedu (2008) state that despite impressive growth in total exports between2000 and 2006, intra-SADC trade remains weaker. However, similar results are observed in agricultural commodities and light manufacturing sectors indicated by negative intra SADC trade coefficients where as these are in contrary to the results found by Maasdorp (1999), Keckand Piermartini (2005) indicating that there is considerable scope for greater intra-regional trade in grain and other food products, and for greater cross- border investment in agriculture and agro-industry.

The positive intra - SADC trade observed in fuel and minerals, and heavy manufacturing sectors is in line with Lewis et al (1999) results. Regional dummy effect results of this study are also consistent with Alemayehu and Haile (2002) in agricultural and light manufacturing sectors for having a negative intra –SADC trade where as it differs from them for extra –SADC trade for the same sectors. Similarly, in fuels and minerals, and heavy manufacturing sectors' model, the negative extra –SADC trade result observed in table7 is analogous with their findings however contrary results are discovered for intra –SADC dummy variable. Further more, as of Rahman et al (2006), SADC appears to have been intra-bloc export creating and net export diverting which is consistent with our results for fuel and minerals, and heavy manufacturing sectors where as opposite to the results found in agricultural commodities and light manufacturing sectors .But their findings are attributed to cross section gravity model specification.

In general, what matter, is the current study differs from previous empirical works for being it employed disaggregated data. Hence, the deviation of this study's results from the previous results might be attributed to the use of disaggregated data unlike to others. Additional reasons are provided below.

Possible Reasons for Unexpected Results of Intra and Extra -SADC Trade

There may be various reasons for negative intra and extra SADC trade for the given sample period. For instance, for the negative intra SADC trade exhibited in agricultural sector, one possible reason may be the importance of agricultural sector in SADC economies. Agricultural sector plays a vital role in the economies of Southern African countries, not only as a producer of food but also the largest employer of its population. Naturally, member states will seek to protect

their sensitive sectors. International experience has indicated that the agricultural sector is the most likely to give rise to major negotiating difficulties. In short, the absence of extra trade diversion might owing to the fact that many of the SADC members examined have not been able to fully implement the intra-RTA tariff elimination schedules proposed in 1996. Most of the members of the SADC are small economy and rely on similar comparative advantage such as agricultural dominant economy. As of Alemayehu (2009), this signifies little or no chance to exchange with in the region. Hence, it is not surprising to see the negative of intra –SADC trade in this sector.

More over, it is worthwhile to mention here that substantial size of informal intra-regional trade in SADC countries is not captured in the official statistics that has been used in this study and thus underestimates the actual bilateral export flows between them. Records from the Southern Africa informal cross border food trade monitoring initiative indicate that between July 2004 and March 2005, over 70,000 MT of maize was informally exported to Malawi by Mozambique, mainly from the Zambezia Province through the Milange-Muloza border post (Bata et al, 2005).

Another possible reason might be the fact that most SADC exports comprise mineral and agricultural commodities. Although the region is potentially a significant market for its own products, the bulk of these exports are bound for extra-regional markets (DPRU, 2001). Further, DPRU (2001) puts that a significant level of tariff protection under SADC creates a disincentive to purchase from within the region –thus indicating potential to expand intra SADC export expansion through the Free Trade Agreement (FTA). In a similar vein, the opportunity exists to increase intra-regional trade between SADC and non- SADC countries. However, in many cases, this will require a relaxing of protectionist attitudes towards sensitive (and some not so sensitive)

products. Until this is accomplished, the true benefits of a free trade arrangement are unlikely to be felt in the SADC region (DPRU, 2001).Besides, trade potential in the SADC countries can be hampered by the political conflicts which should be taken into cognizance to promote intra regional trade in SADC countries.

Similarly, for extra- trade diversion effects in fuels and minerals, and heavy manufacturing sectors may be the exclusion of Angola from sample of this study where representing a significant share and destining its market out side Africa in fuels and minerals .This may underestimate the trade flow of fuels and minerals to nonmember partners.

Moreover, the large residuals obtained from the gravity equation between SADC countries and former colonial powers suggest that the trade flows due to former colonial relationship might reduce to the benefice of intra SADC trade (Chauvin et al, 2002).Chauvin et al (2002) also note that except important structural changes take place in SADC countries, trade potential for the region seem low.

External market conditions have also been a critical factor in the marginalization of Africa in global trade. Tariff escalation and high tariff peaks in traditional export markets have contributed to Africa directing its resources to production in low value sectors rather than diversifying its export base from raw materials to intermediate or processed products. This is especially true in the agricultural sector which hinders the expansion of intra –SADC trade.

The continued reliance on exports of a few primary commodities represents one of the main reasons for the low growth in exports to the South African market and low levels of intra-Africa

trade on the import side. On top of this, as incomes rise in southern African countries, consumers demand greater choice in the variety of products and increasingly sophisticated products. In the absence of capacity for local production, increased demand for imports of such products provides an opportunity for South African exporters of processed and high value products to take advantage of opportunities in such markets which are exhibited in SADC's fuels and minerals, and heavy manufacturing sectors.

ECA (2004) suggests that greater intra-African trade is hampered by inadequate infrastructure that acts as a major source of comparative disadvantage. High transaction costs related to infrastructure impede greater trade. Africa has the highest transport costs compared to other regions in the world. Transport costs in Africa are estimated at 13% while industrialized countries have transport costs of 5.5 %(ECA, 2005).The quality of countries' institutions is also important in the context of trade. Corruption in African economies is often cited as a major deterrent to potential investors and traders.

For positive intra and negative extra –SADC trade in heavy manufacturing sector, one possible reason might be manufactured goods from SADC countries not only faced high import barriers in the developed countries, but also were not competitive. This is equivalent to say that SADC countries prefer to trade with in the region realizing their uncompetitiveness in heavy manufacturing products in the global market.

CHAPTER SIX: CONCLUSION AND POLICY IMPLICATION

6.1 Conclusion

This paper is attempted to investigate the effects of regional trade agreement for the case of SADC's trade with its major trading partners using an augmented gravity model when disaggregated data is employed. For this purpose, panel data is considered. A particular emphasis is given to the analysis of gross trade creation and trade diversion effects, resulting from the creation of SADC regional bloc across sectors.

The results for other than the regional dummy factors in the gravity model of this study paint a familiar picture of the findings in the gravity model literature except they vary from sector to sector. Bilateral trade flows are positively related to GDP and negatively related to distance in all sectors. Other variables such as GDP per capita income of exporting countries affects SADC's exports in fuel and minerals, heavy manufacturing and light manufacturing sectors positively but negatively for agricultural sector. However, it is insignificant for heavy manufacturing sector. Except in fuel and minerals sector, GDP per capita income of importing countries is directly related with exports of SADC in the rest sectors but it is not different from zero for both heavy and light manufacturing sectors.

In agricultural and light manufacturing sectors, the GDP per capita income difference supports the HO effect trade theory while it favuors the Linder hypothesis effect in fuel and minerals sector. Regarding to infrastructural level index, except in light manufacturing sector model for importing countries, it is found in line with what is hypothesized (positive sign) and significant

for both trading partners .However, as compare to importing countries, the magnitude of infrastructural index is larger (almost above unity) in exporting countries for all four sectors .

Common border is found significant and positive sign in all sectors .Trade- GDP ratio, the proxy for openness of the SADC economy affects SADC's export positively in agricultural and light manufacturing sectors and negatively in fuel and minerals, and heavy manufacturing sectors.

Finally, turning to the variable interest of this study, the regression results for regional dummy display different sign and magnitude on SADC's export trade across sectors considered under the study. This implies that this study's results for some sector deviate from the previous empirical findings for the same region. In general, the formation of SADC regional scheme enhances intra regional trade in fuel and mineral, and heavy manufacturing sectors, where as it reduces trade with in the region in agricultural commodities and light manufacturing sectors.

SADC's trade with the ROW has boosted in agricultural commodities and light manufacturing sectors but has failed to increase extra trade in fuel and mineral, and heavy manufacturing sectors owing to regional integration effect. In a nutshell, intra-SADC export trade creation has occurred in fuel and minerals, and heavy manufacturing sectors where as SADC maintains openness in agricultural commodities and light manufacturing products exports exhibiting that extra-SADC export trade creation in these sectors. In other words, even though the extent varies from sector to sector, extra-SADC trade diversion is exhibited in fuel and minerals, and heavy manufacturing sectors but negative intra trade is registered in agricultural commodities and light manufacturing products. This is interpreted as intra-SADC export trade diversion in agricultural and light manufacturing sectors.

During the sample period of this study, the level of intra and extra trade of SADC vary from sector to sector. Highest intra-SADC trade and extra –SADC trade are registered in fuel and minerals sector, and agricultural sector respectively.

6.2 Policy Implication

An increase of trade among SADC countries will imply either an openness of Southern African market, a changing of specialization of SADC countries or a reduction of protection on sensitive goods like agricultural commodities. The quality and strength of effective institutions in SADC is also essential in overcoming obstacles for promoting greater trade. This helps to facilitate the implementation of trade protocol and achieve its final goals at the scheduled time.

It is also anticipated that with removal of tariff barriers under the SADC, a large part of the informal trade will come under statistical record of formal trade. Reduction in tariff barriers and non-tariff barriers within the region raise intra-regional trade in the SADC region. Elimination of trade barriers and structural rigidities originating from adverse political relationship could also lead to substantial increase in intra-SADC trade.

Caveats and Prospective Study

Individual countries and time dimension effects which enable us to identify the effects of regional trade agreements on individual member as well as nonmembers are not considered. This study does not also analyze net effects of trade creation and diversion which help us to analyze the welfare effects of regional integration. It only covers period from 2000 to2007. Besides, we do not go further in disaggregating the export data to more detail commodity rather we remain at sectoral level. Further more, simulation of trade potential of SADC at sectoral level is not carried out. The above enumerated limitations are an indication of future research study on the topic.

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APPENDICES

Appendix I: Regression results and test tables

Table9: Multicollinearity test

	Original R^2=0.43	Original R^2=0.51	Original R^2= 0.44	Original R^2=0.55
Dependent Variable	Model (I) (R^2)	Model (II) (R^2)	Model (III) (R^2)	Model (IV) (R^2)
logYIT	0.61	0.61	0.61	0.61
logYJT	0.89	0.89	0.89	0.89
logGDPPCIT	0.60	0.60	0.60	0.60
logGDPPCJT	0.85	0.85	0.85	0.85
logGDPPCDI	0.77	0.77	0.77	0.77
logDIJ	0.84	0.84	0.84	0.84
logIFIT	0.36	0.36	0.36	0.36
logIFJT	0.75	0.75	0.75	0.75
logTRIT	0.58	0.58	0.58	0.58
logTRJT	0.86	0.86	0.86	0.86
CLIJ	0.33	0.33	0.33	0.33
BORDERIJ	0.46	0.46	0.46	0.46
SADCTIJ	0.90	0.90	0.90	0.90
SADCXIJ	0.90	0.90	0.90	0.90

Note: Model classification is on the basis of the dependent variable used for regression of equation (21). Model I= agricultural commodities export value, Model II fuel and minerals export value, Model III =heavy manufacturing export value and Model IV= light manufacturing export value.
* All R^2's are from random effect regression result.

Implication: the above four sectors' models are not free from multicollinearity problem.

Table 10: Model Selection Test- Fixed vs Random Effect Models

Test type	Model I	Model II	Model III	Model IV
Hausman	χ^2 (13)=-27 (p= -27.87)	χ^2(13)=-30 (p= -30.55)	χ^2(13)=-5.7 (p= -5.70)	χ^2(13)=41 (p=0.001)
Significance level	At any level	At any level	At any level	At 1%,5%&10%
Decision	For H_0	For H_0	For H_0	ForH_1(againstH_0)

Note: Model classification is on the basis of the dependent variable used for regression of equation (21). Model I= agricultural commodities export value, Model II fuel and minerals export value, Model III =heavy manufacturing export value and Model IV= light manufacturing export value.
* Where H_0: random effect estimator is consistent

H_1: fixed effect estimator is consistent

* high (low) hausman test prefer fixed (random) effect .

Conclusion: except light manufacturing sector, all sectors model justified random effect in both tests.

Table11: Hausman test for random effect estimator Vs instrumental variable

Test type	Model I	Model II	Model III	Model IV
Hausman	$\chi^2(14) = 23.89$ (p= 0.0473)	$\chi^2(14) = 0.94$ (p= 1.0000)	$\chi^2(14) = 16.38$ (p= 0.2906)	$\chi^2(14) = 28.41$ (p= 0.0125)
Significance level	Significant at 5%and 10%	Insignificant at any level	Insignificant at 5%and10%	Significant at 5%
Decision	For H_1	For H_0	For H_0	For H_1

Note: Model classification is on the basis of the dependent variable used for regression of equation (21). Model I= agricultural commodities export value, Model II fuel and minerals export value, Model III =heavy manufacturing export value and Model IV= light manufacturing export value.

* Where, H_0: random effect estimator is consistent

H_1: using instrumental variable is appropriate

** **Conclusion**: using instrumental variable is justified for Model I and Model IV. Model II and III prefer random effect estimator.

Table 12: Summary statistics for all sectors together

Variable	Obs	Mean	Std. Dev.	Min	Max
Dependent variables					
XIJTA	1594	54100000	295000000	3	9850000000
XIJTFM	630	41600000	139000000	1	1540000000
XIJTHM	1542	109000000	915000000	1	32900000000
XIJTLM	1568	47700000	180000000	3	2180000000
Explantory variables					
YIT	1856	58700000000	115000000000	356000000	417000000000
YJT	1856	1180000000000	2370000000000	712000000	1380000000000
GDPPCIT	1856	3462.55	3655.864	266.061	12121.37
GDPPCJT	1856	17533.82	17816.2	170.725	103125
GDPPCDIF	1856	16538.85	16796.89	3.005	103125
DIJ	1856	5795.625	4012.949	252	16955
IFIT	1856	.1002521	.1294353	.0245666	.4429103
IFJT	1856	.3601648	.3654684	.0114448	1.390241
TRIT	1856	76.95396	25.67176	19.35008	129.7811
TRJT	1856	59.90903	57.17522	3.987224	244.4658
CLIJ	1856	.5086207	.5000604	0	1
BORDERIJ	1856	.125	.330808	0	1
SADCTIJ	1856	.4482759	.4974514	0	1
SADCXIJ	1856	.4482759	.4974514	0	1

Note: XIJTA=agricultural export value, XIJTFM=fuel and minerals export value, XIJTHM=heavy manufacturing export value and XIJTLM= light manufacturing export value

AppendixII: description and aggregation of sectors based on Keck and Roberta Pier martini (2005)

Traded commodities are divided in the following four sectors (Sector Aggregation)

Agricultural commodities	Animal agriculture, i.e. animal products nec; raw milk; wool, silkworm cocoons; cattle etc.; meat; meat products, Sugar cane and beet, Paddy rice; wheat; cereal grains nec; oil seeds; crops nec; vegetables, fruit, nuts, Food products, i.e. vegetable oils and fats; dairy products; processed rice; food products nec; sugar; beverages and tobacco products
Fuel and minerals	Fuels and minerals, i.e. coal; oil; gas; minerals nec;
Heavy manufacturing	Heavy manufactures and metals, i.e. chemical, rubber and plastic products; paper products and publishing; wood products; petroleum, coal products; mineral products nec; metals; ferrous metals; metals nec; metal products
Light manufacturing	Light manufactures, i.e. motor vehicles and parts; transport equipment nec; electronic equipment; machinery and equipment nec; forestry; fishing; manufactures nec

Source: COMTRADE CD-ROM DATA BASE

Appendix III: Graphical Representation of Trade Creation and Trade Diversion Effects

The analysis of the welfare effects of RTAs originated with Viner (1950). Two possibilities arise when a group of countries forms a union with a common tariff barrier against outside countries. One is that higher-cost production within the union may displace lower-cost production in countries outside the union. In effect, world output is reduced and some countries outside the union are made worse off. This occurs in the case of goods for which the union tariff is greater than the unit money-cost differences between the union and non-union sources. Second, lower-cost imports from one member may displace domestic production in another member country. In this case, world output increases, and the union members benefit without any loss to outside countries. Since both displacement and diversion can occur simultaneously when many goods are traded, one must examine each case in the union individually to determine the predominant effect on members and on world output (Viner 1950). Moreover, lower internal prices due to preferential policy induce an expansion in domestic consumption.

The basic Viner model provides a partial equilibrium analysis of effects of customs unions. He made a series of orthodox assumptions .The outline of Viner's model contains economic relationships depicting demand, supply and trade in homogeneous goods by three representative consumers: the home country (H), a partner member country (P), and a non-member country (N) which represents the rest of the world.

N is assumed to be the most efficient producer of good X, which is imported by H after the imposition of a tariff of T_H on good X. H, on the other hand, is most efficient producer of good Y which is imported by P after a tax of T_P on good Y .Look figure 1(a) below at the tariff inclusive price of home country on good X, with production of good X is Q_H^S and consumption of good X at Q_H^D , the import value of H is given by area (b+f+k) and tariff revenue is given by area (b+f).

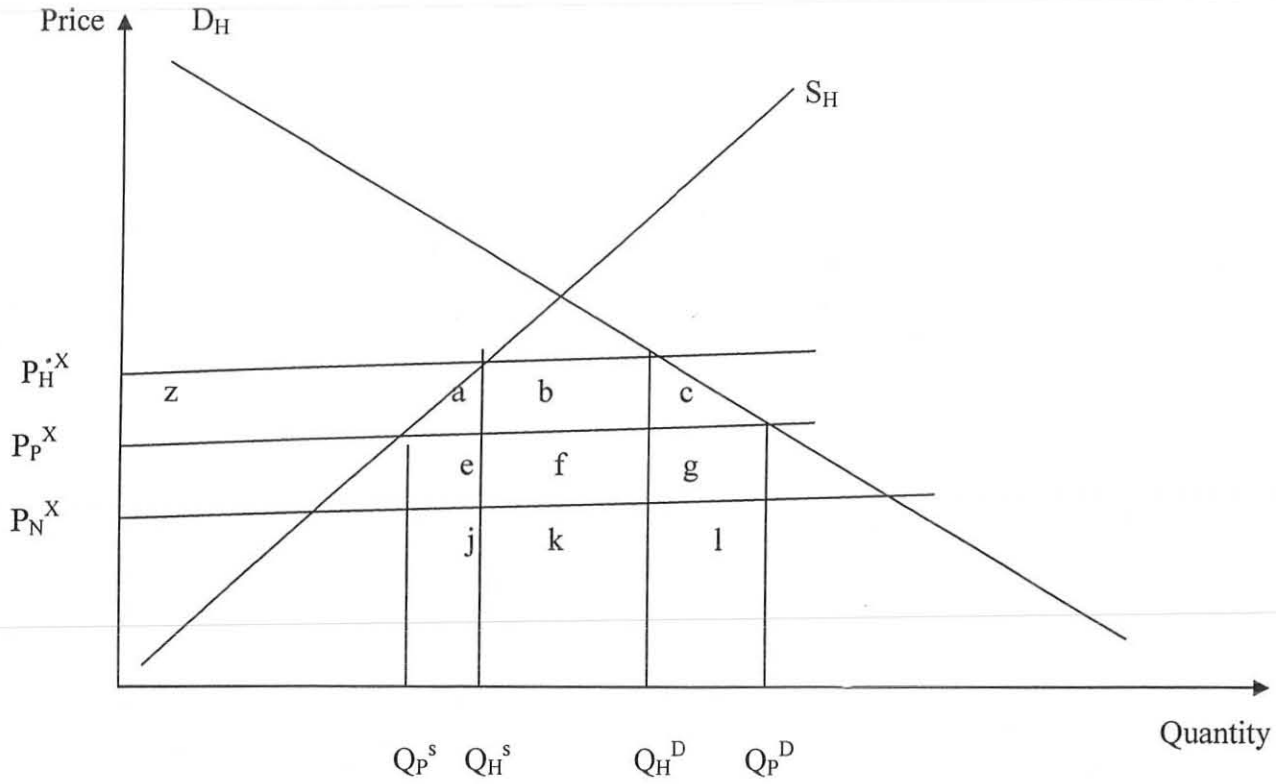


Figure 1(a): Country H (least-efficient producer of good x)

Mean while, a custom union is formed between H and P .This implies that tariffs are eliminated on trade between H and P. H eliminated its tariff on imports of good X from P .This causes H to switch its source of exports of good X from N to P .The price H pays for imports of good X is P_P^X. New import value is given by area (e+j) + (f+k) + (g+l).Trade creation corresponds to the expansion of home country imports of good X, evaluated at the border price P_P^X .Trade creation is given by area (e+j) +area (g+l). Economically, trade creation refers to the substitution in both home country production and consumption at the lower –price per unit of good X produced by country P than were previously available from the rest of the world, area (g+l).

The replacement of exports from efficient producers in non –members countries by exports from less efficient producers in member countries is termed as ***trade diversion.*** In figure 1 , trade diversion is resulting from regional integration arrangements is equal to the entire value of imports of good X ,evaluated at the border price P_N^X by the home country from N ,i.e. area k. the change in economic surplus is given by area (a+b+c+z).

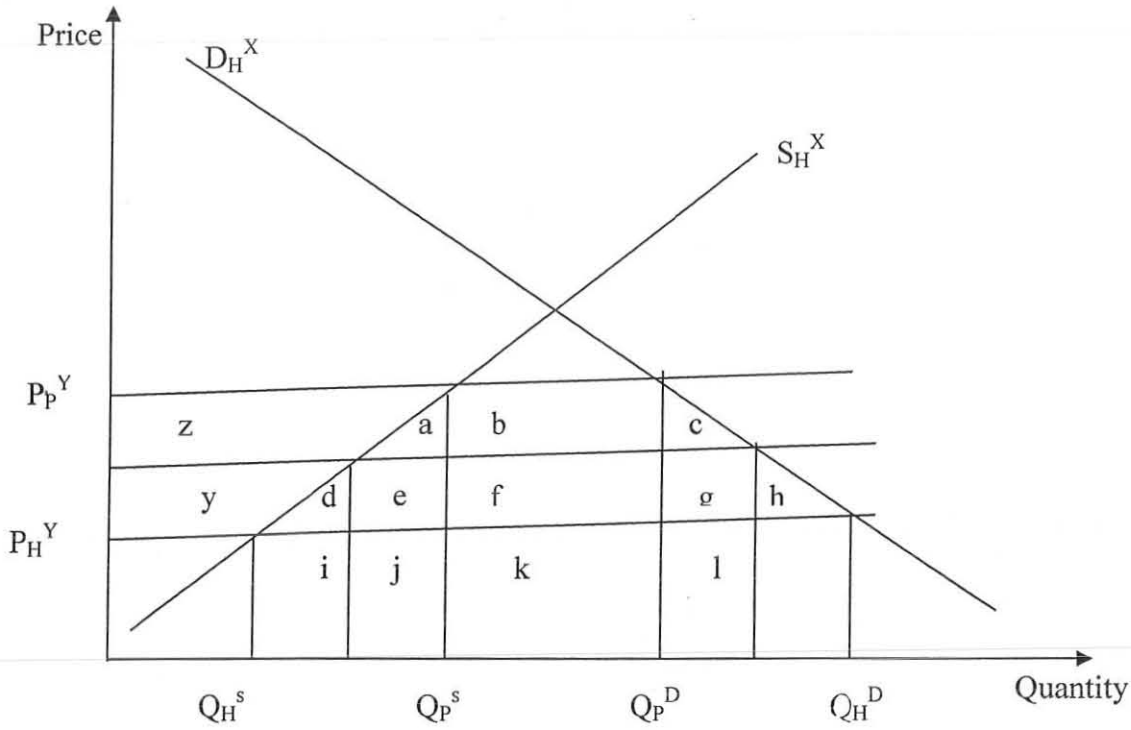


Figure 1(b): Country P (least-efficient producer of good Y)

It can be shown that the CU has qualitatively different effects on trade of the partner. Because the home country is the lowest –cost producer of good Y, elimination of tariffs on good Y from the home country results solely in trade creation .No diversion of previous exports from N occurs in connection with the increase in imports by the partner country. More over, the expansion of exports of good Y from home country to the partner country give rise solely of substitution in production and consumption in country P of lower –cost units of good Y produced in the home country than were available to the previously to the partner through domestic production of imports from N .

Before the custom union, import of good Y= area (b+f+k)

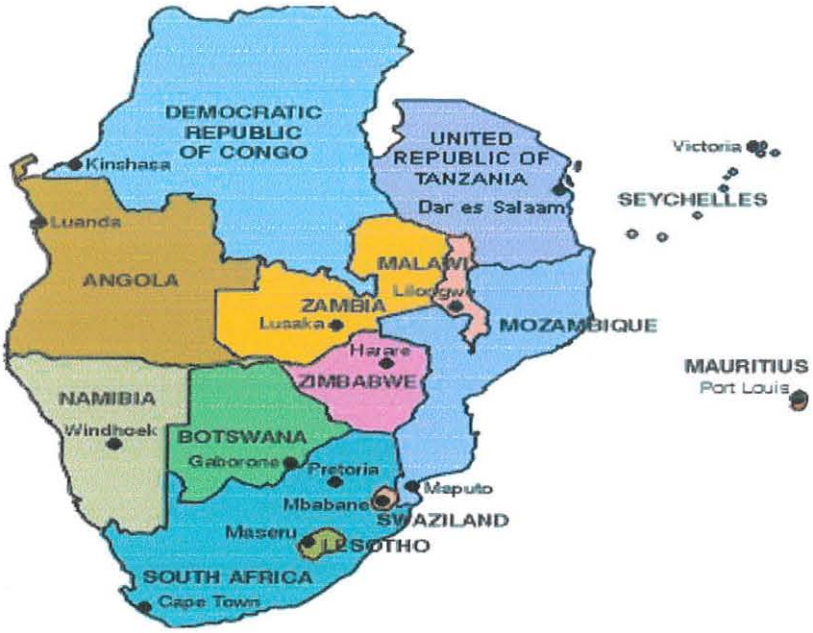
After CU is formed, imports of good Y in P expands to (i+j+k+l+m).Thus, in P

- Trade creation =area (i+j+l+m)
- Change in consumer surplus =area (a+b+c+d+e+f+g+h+z+y).
- Production effect =area (a+d+e)
- consumption effect =area (c+g+h)
- change in tariff revenue =area(b+f)

Appendix IV (a): Symbol of SADC regional integration



AppendixIV (b): Map of SADC Members



Declaration

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other university, and that all source of materials used for the thesis have been duly acknowledged.

The examiners' comments have been dully incorporated.

Declared by:

Name: Mengesha Yayo

Signature: _____

Date: June 30/2009

A. U. L. LIBRARY

Confirmed by Advisor:

Name: Girma Estiphanos (Dr.)

Signature: _____

Date: June 30/2009

Place and date of submission: ADDIS ABABA, June 30.