MEASURING TRADE COSTS AND THE EFFECT OF AID FOR TRADE FACILITATION IN THE EAST AFRICAN COMMUNITY

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DECLARATION

This thesis is my original work and has not been presented for the award of any degree in any other university.

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This thesis has been submitted for examination with our approval as university supervisors

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ABSTRACT

Empirical studies that link measurement of trade costs, aid for trade and trade diversification are rare. Previous research in this area use direct trade cost measurements like transport charges, tariffs, freight rates and composite indexes as proxies for trade cost. It is within this costing framework that this thesis seeks to make an empirical contribution to literature and fill a methodological gap of constructing a single measurement of trade cost, using trade flows, and subsequently empirically determine how aid for trade and trade cost affect trade outcomes. The broad finding is that bilateral trade costs have been declining between East African Community partner countries. While aid for trade invested in economic infrastructure positively affect exports, and trade costs hinder the extent of Kenya's export trade diversification. Trade flows are used to measure trade costs. With an objective to construct a theoretically consistent measurement of trade costs that account for intra-domestic trade, the use of trade data includes both direct and unobservable cost factors. Since reductions in trade barriers shift resources between the tradable and non-tradable sectors, they change trade flows. Using bilateral trade data between EAC partner countries, a gravity model is used to measure bilateral costs between the countries. The gravity-based measurement provides a good approximation of bilateral trade costs and shows that EAC partner countries' bilateral trade costs have been declining. The empirical verification of the equivalence of tariff costs confirmed that the measurement is explained by traditional gravity variables like distance, borders and membership to Regional Trade Arrangements. The thesis investigates the relationship between aid for trade and export trade within a gravity model. It makes use of data on economic infrastructure, and policy and regulation reforms in Kenya, as reported by the Organization for Economic Corporation and Development Credit

Reporting System. The empirical model estimation determines that aid for trade that improves economic infrastructure and the policy environment is a significant determinant of exports in Kenya. Indeed, Aid for Trade invested in economic infrastructure has a positive and significant effect even when aid for policy is not included in the model and when endogeneity is addressed in the estimations. Finally, using export trade data at Harmonised System for 8 digit level for manufactured goods, the thesis calculates the extent of trade diversification in the extensive margin and empirically determines how trade costs affect trade diversification. The measurement confirm that export of manufactured goods from Kenya to the East Africa Community trading partners is less diversified, and is affected negatively by trade costs as measured by the tariff equivalent bilateral costs. The results reported in this thesis should assist policy makers to understand the patterns and determinants of trade costs, what category of aid for trade is significant in prompting exports, and the extent to which trade diversification can be promoted in Kenya.

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ABBREVIATIONS AND ACRONYMS

APEC	Asian and Pacific Economic Community
CET	Common External Tariff
CIF	Cost Insurance and Freight
COMESA	Common Market for Eastern and Southern Africa
CU	Customs Union
ESCAP	Economic and Social Commission for Asia and the Pacific
EAC	East African Community
EABC	East Africa Business Council
EASC	East Africa Shipping Council
FOB	Free on Board
GATTS	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GoK	Government of Kenya
ICT	Information and Communications Technology
NTBs	Non Tariff Barriers
KIPPRA	Kenya Institute for Public Policy Research and Analysis
ODA	Official Development Assistance
ODI	Official Development Institute
OECD	Organization for Economic Corporation and Development
RTAs	Regional Trade Arrangements
RECs	Regional Economic Community
SADC	Southern African Development Community
SSA	Sub Saharan Africa
UNCTAD	United Nations Commission on Trade and Development
UNECA	United Nations Economic Commission for Africa
UNU-WIDER	United Nation University-World Institute for Development Economic Research
WTO	World Trade Organisation

CHAPTER ONE

INTRODUCTION

1.1 Background

Global trade has steadily increased over time, such that more recent (2011), world imports and exports expanded at 5.9 and 5.0 per cent annually, respectively (UNCTAD, 2012). The expansion in world trade comes after successive multilateral trade negotiations under the General Agreement on Tariffs and Trade (GATTS) and its successor the World Trade Organisation (WTO) in 1995. The outcome of these multilateral trade negotiations has been broad trade liberalisation and binding commitments by countries to minimise measures that distort trade like high tariff policies and product subsidies. Consequently, there has been a gradual decline in applied tariffs rates and international transactions costs across the world. Additional factors that have contributed to increased trade are the Special and Differentiated Treatment (SDT) offered to developing countries by the developed world (Oyejide, 2008), increased regionalisation and economic liberalisation (Iapadre and Luchetti, 2009), and better capital and financial mobility aided by advancement in technology, leading to reduced trade distance and transport charges between countries.

The global picture however, disguises the mixed trade performance occurring in many countries and regions. There is an increasing concern that non-tariff factors such as restrictive policy and regulations, poor trade infrastructure and poor communication continue to restrict international trade flow (Busse *et al*., 2011). In principle, the WTO's Special and Differentiated Treatment accorded to developing countries underscores the fact that countries have differences in their ability to participate in

global trade. Due to regional heterogeneity and income disparities, some countries have not been fully integrated into the global supply chains. These include thirty-one landlocked developing countries around the world whose transaction costs still remain high when compared to their counterparts with coasts. The disadvantage imposed by remoteness, geographical features and income levels makes trade costs remain high in these countries despite an overall decline in global transaction costs. As a result the performance in international transactions between resource rich coastal and landlocked countries with the rest of the world remains different. Arvis *et al.,* (2013) argues that despite the reductions in trade costs over time, the rate of cost decline has been relatively slow in many developing regions. Therefore, when combined with old trade restrictions in these developing countries, their integration into the world trading system has not happened as fast, compared to the rest of the world.

Sub-Saharan Africa (SSA) has not achieved much progress in global trade. This is evident from its marginal share of world merchandize trade (exports and imports) that was about 2.8 per cent of the total world exports and 2.5 per cent of imports between 2000 and 2010 (UNECA, 2013). Besides, the continent largely exports primary commodities and minerals, with manufactured goods exports constituting about 30 per cent of trade (Iwanow and Kikpatrick 2009, UNECA 2013).

Many of the continent's fifty four countries, sixteen of which are landlocked, still lag behind in terms of income levels, growth in trade and trade diversification (Iwanow and Kikpatrick, 2009). In spite of the attempts to improve market access conditions in the continent ranging from the trade liberalisation policies of the early 1980s, trade facilitation measures and formation of regional economic communities (Meyer *et*

al.,2010), aggregate trade levels point at limited intense transactions even among SSA countries (Turkson, 2012).

The marginalisation of SSA in global trade in spite of the continent's abundant natural resources and surplus unskilled labour is a puzzle that has generated much debate. Among the explanations advanced on why the continent cannot leverage on her comparative advantage include poorly executed trade liberalisation policies and weak institutional framework (Iwanow and Kikpatrick, 2009; Turkson 2012). Others are the continent's poor capital endowments which limit investments in modern transport systems and other trade related infrastructure (Turkson, 2012); the hostile geographical features occasioned by harsh tropical climate, long distances and landlocked territories (Sachs *et al*., 2004).

SSA is thus perceived to be a high cost and great risk investment destination with limited opportunities for trade (Iwanow and Kirkpatrick, 2009; Collier and Gunning, 1997). High transactions costs are particularly severe among the landlocked SSA countries where an estimated 60 per cent of trading costs is directly attributed to poor transport infrastructure in comparison to the 40 per cent in coastal countries (Limao and Venables, 2001).

Beyond increasing the prices of commodities for consumers, high costs impose a welfare burden on these countries, by virtue of the uneven distribution of income that arise from international trade. The converse is that reducing trade costs through better trade facilitation gives certain welfare gains to countries (Dee and Findlay 2006). Francois, *et al.,* (2005) determined that a one per cent reduction in trade costs would

increase world income from US dollars 30 billion to US dollars 40 billion per year. In the Asian Pacific Economic Community (APEC) region, the gross domestic product (GDP) of the member countries increased by 0.26 per cent due to improved trade facilitation compared to the 0.14 per cent increase associated with trade liberalization (APEC, 2004). Implementing an Electronic Single Window System in Rwanda reduced cargo clearance time by one day thereby generating between US dollars 8 to 12 million per year in direct savings (OECD/WTO, 2013).

Reducing trade costs can therefore increase the income levels of countries that have projected lower gains from international trade. Subsequently, improving the trade supply chain through trade facilitation is a key trade policy item in many countries, especially in SSA. To reduce trade costs, countries are reducing the thickness of their borders and improving the domestic business environment (OECD/WTO, 2013).

This is being achieved through aid for trade which funds trade facilitation programmes like infrastructure development, policy and regulatory reforms, building of productive capacity, as well as reducing the effects of trade barriers (Lemi, 2014). By implementing better trade facilitation, the countries expect to achieve diversified export portfolio, efficient supply chains, global competiveness and eventual integration into global and regional trading systems. There is limited empirical work linking trade facilitation to trade diversification especially in SSA. The notable literature include Feenestra and Ma (2013), Lee and Kim (2012), Dennis and Shepherd (2011), Persson (2011, 2008); Songwe and Winkler (2012), and Naudé and Riaan (2008). In spite of limited empirical literature that link trade facilitation to

export diversification, the existing literature concurs that improving trade facilitation is one of the ways to promote trade diversification.

Aid that fits into the various Aid for Trade (AfT) categories has been in existence for some time (Cali and te Velde, 2009). Vijil (2012) observes that it has been in existence for about fifty years. In the past, donors have indirectly reduced trade barriers through financing different projects whose goals have not necessarily included trade facilitation (Hallaert, 2012). However, the WTO Hong Kong Ministerial Declaration in Article 57 sought to enhance the financing of aid for trade facilitation, explicitly including AfT as a special instrument to deliver aid and address trade bottlenecks experienced in both developing and least developed countries (WTO 2005 WT/MIN(05)/DEC; Iwanow and Kikpatrick, 2009). This effectively placed AfT high on multilateral trade negotiations and Official Development Assistance policy.

According to the WTO Task Force on AfT, the funds given to developing countries aimed at expanding respective countries' exports, increasing their market access and integrating the countries into world trade (WTO 2005). The four broad categories of use for the funds as outlined by the WTO included: trade policy and regulations, economic infrastructure, increasing productive capacity, and trade related adjustment. AfT facility addressed the instruments, form of AfT delivery and the distinction between aid for trade and other types of development assistance. WTO emphasised that AfT also encompasses the main challenges which increase the costs of trade in poor countries (OECD/WTO, 2011).

While the World Bank parameters of aid for trade facilitation included funding programmes such as macro-economic adjustments, supply side constraints like poor infrastructure, trade regulations and adjustments resulting from trade preference erosion. Similarly, the Organization for Economic Co-operation and Development (OECD) focused on factors which limit trade in recipient countries. The factors include poor infrastructure and transport networks, logistics performance at the ports of entry, conformity to international product standards, enhancing capacity in border procedures and building productive capacity of countries (Hoekman Hoekman and Njinkeu, 2007; Hoekman and Wilson, 2010). Notwithstanding these definitions, aid for trade facilitation revolves around ways and means of making international trade faster, easier, and free from cost-escalating trade barriers in trade marginalised countries and regions.

Since aid for trade facilitation is thus perceived as capable of delivering wholesome gains to trade (Dee and Findlay 2006), the regions perceived to incur high trade costs due to poor trade facilitation measures have received the largest shares of official development assistance (ODA) in form of aid for trade. Table 1.1 depicts the global status of ODA commitment and disbursement between 2002 and 2012.

Funds committed to aid for trade have increased steadily from about US dollar 35.62 million in 2002 to about US dollar 108.67 million in 2012. Sub-Saharan Africa and Asia are the largest recipients of aid for trade. Aid disbursements to SSA increased from US dollar about 10.64 million between 2002 to US dollar 39.87 million by year 2012.

Table 1.1 Global ODA AfT Commitments and Disbursement USD million (2002-2012)

REGION		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sub Saharan Africa	Commitments	14,089.1	17,156.9	20,882.1	22,326.8	27,203.4	34,885	40,153.6	45,138.5	43,150.8	41,113.5	51,452.2
	Disbursements	10,646.16	13,241.41	16,738.1	18,435.73	21,136.9	26,758.4	31,757.5	34,214.0	36,101.6	38,094.2	39,873.6
Asia	Commitments	17,144.2	2,3588.3	33,235.8	31,198.7	31,371.5	36,902.4	44,480.6	45,134.2	46,645.2	46,388.9	45,285.9
	Disbursement	10,211.1	1,3487	18,852.7	26,243.3	25,429.1	28,658.0	32,500.8	35,001.4	37,966.4	39,050.1	37,838.8
North/Cent America	Commitments	19,53.4	2,256.6	2,668	3,318.9	3,553.7	3,244.3	3,412.4	4,552.3	6,253.2	6,240.3	5,456.1
	Disbursement	12,44.7	1,553.6	1,918.6	2,222.7	2,432.2	2,818.4	3,240.2	3,894.5	4,979.5	5,463.7	4,463.6
South America	Commitments	2,441.8	2,970	3,132.1	2,945.2	4,037.3	3,505.8	3,800.0	4,536.7	5,474.6	4,602.1	6,474.4
	Disbursement	1,399.6	2,463.7	2,555.7	2478.7	2,981.6	3,026.2	3,848.6	3,943.9	4,247.5	4,550.0	4,847

Source: OEC/WTO (2014)

Aid for trade disbursement in Asia increased from US dollar 10,211.1 million in 2002 to US dollar 37,838.8 million in 2012. It is noticeable that despite the increasing AfT allocation, there are differences between what donors commit and disburse. The total ODA commitment in 2002 for example was US dollar 35,628.5 million, while disbursement in the same year was US dollar 23,501.56 million. Similarly in 2012, ODA commitments were US dollar 108,668.6 million compared to US dollar 87,023 million in disbursements.

The disaggregation of ODA disbursements (shown in Table 1.2) to SSA highlight the different aid for trade facilitation needs in the continent. Overall, aid flows to the energy, communication, transport and storage sectors collectively termed as economic infrastructure have been increasing. The amount of ODA towards transport and storage increased from US dollar 963.2 million in 2002 to US dollar 4296.7 million in 2012. Over the same period, ODA towards the communication sector increased from US dollar 88.3 million to US dollar 193.5 million, while energy disbursements moved from US dollar 385.6 million to US dollar 2,986.7 million.

The disbursement of aid meant for trade policy reforms in SSA is relatively low compared to aid invested in economic infrastructure. Egypt receives a large portion of such aid for trade policy and regulations (Cali and te Velde, 2009). Increasing infrastructure investment without supportive complementary policy and regulatory reforms lags any possible gains of aid for trade (UNECA, 2013). This is because the poor institutional environment in SSA creates soft trade barriers, at times accompanied with incompatible regional trade arrangements.

Table 1.2: Different ODA AfT Categories to Africa in USD million (2002-2012)

ODA Category	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Transport and Storage	963.2	1190.8	1535.8	1750.4	1952.8	2411.2	2941.9	2893.6	3615.5	4345.9	4296.7
Communications	88.3	92.7	95.0	152.8	151.4	129.1	131.2	172.4	164.6	195.2	193.5
Energy	385.6	460.9	553.0	635.3	769.5	1111.3	1646.4	1964.3	2102.3	2164.4	2986.7
Banking and Financial Services	460.7	244.8	646.2	205.9	224.2	778.0	990.5	1878.3	820.5	904.5	859.6
Business and Other Services	71.7	186.4	181.1	332.0	301.9	471.6	733.6	393.7	524.0	464.9	410.4
Agriculture	681.8	912.2	1040.4	1124.6	1279.1	1633.1	1875.9	2413.5	2650.4	3020.1	2750.9
Forestry	79.8	79.1	88.6	102.8	104.4	115.7	100.5	125.1	250.3	139.4	182.4
Fishing	67.1	100.8	91.3	114.4	94.1	83.6	114.8	210.7	105.0	137.7	147.7
Industry	273.3	159.5	268.5	348.3	355.0	339.0	366.7	429.9	450.7	754.2	845.7
Mineral Resources and Mining	241.1	126.9	87.1	135.6	92.0	90.7	190.6	120.0	77.8	345.5	315.7
Trade Policies and Regulations	359.4	246.9	139.5	199.0	124.4	294.9	214.0	322.5	419.9	326.6	323.2
Tourism	7.0	10.4	10.9	10.6	11.0	16.4	33.1	52.0	30.5	59.2	104.5

Source: OECD (2014).

The distribution of ODA that favours more investment in economic infrastructure relative to other aid categories has generated debate on what category of aid for trade could be effective in addressing trade barriers. Assessing the cost of aid for trade that goes to different categories is not easy to form the basis for aid financing, especially in SSA (Cali *et al.* 2007). OECD/WTO (2013) explains the challenges in designing aid strategies informed by outcomes, better prioritisation and resource allocation. Despite such concerns, two schools of thought explain the effect of aid for trade facilitation. One contends that removing policy and regulatory induced costs is important since policy reforms are low capital investments (Djankov *et al.,* 2006). The other holds that anticipated gains from infrastructure investments are larger, hence more aid for trade should be given to reduce infrastructure deficiencies (Cali te Velde, 2011; Buys *et al*., 2006).

Cali and te Velde (2009) add to the debate by arguing that poor trade facilitation is due to certain market failures in a country which imposes additional costs to importers and exporters. The EAC region (Kenya, Burundi, Uganda, Rwanda and Tanzania) is a case in point. Market failures are manifested in port inefficiencies, poor regional coordination, and inadequate infrastructure (EABC, 2011). The revival of the EAC Regional Trade Arrangements (RTA) in 1999 and formation of a Customs Union in 2005 are attempts to reduce trade costs and improve trade outcomes among member countries. EAC countries have been receiving AfT to address trade barriers and are among the top aid for trade recipients in SSA (OECD/WTO, 2013).

While EAC countries are among the top aid for trade recipients in SSA, poor trade facilitation persists in the region. The World Bank (2013) estimated that operational

inefficiencies at the port of Dar Es Salaam cost the Tanzania economy about US dollar 1.8 billion and approximately US dollar 830 million per year to neighbouring countries that use the port to access world markets. Further, the transport charge per kilometre within the EAC region is approximately 50 per cent higher than in the United States of America. It costs 75 per cent more to export from the region (Northern Corridor Transit Transport Authority 2011). The East Africa Shippers Council (EASC 2014) observes that poor transit conditions make transporting a 20 foot container from Mombasa port to Kampala to cost US dollar 3700, a sum equivalent to the freight costs from China to the port of Mombasa.

Further, multiple and overlapping regulations, burdensome documentations, technical standards, Sanitary and Phyto Sanitary Standards (SPS) and accreditation requirements that are not entirely harmonised frequently disrupt trade flow among the EAC countries (EASC, 2014). Some of these market failures are due to governance constraints and limited information (Cali and te Velde, 2009). Among the EAC partner countries, possible asymmetrical distribution of benefits and costs from regional integration has elicited mutual distrust among partners hence impeding the full realisation of the common market protocol on freedoms of labour, residency and capital, and limited regional investments in infrastructure (Kessides, 2012).

Auxiliary to direct costs are internal border measures like road blocks, delays in weighbridges and border crossings in transit countries. The internal border factors and non-tariff measures result into high cost of trade as they impose an implicit tariff on regional trade. The factors therefore determine the extent of trade by other regional

countries such as the Central African Republic, DR Congo, Congo Brazzaville, Malawi, Zambia, Burundi, Uganda and Rwanda.

Even though the Community in line with the East Africa Community Treaty (1999) in Article 75(5) and East Africa Community Development Strategy (2011-2016) is implementing trade facilitation measures such as one-stop-border posts, 24-hour border operations, trade documents and inspection, electronic customs clearance, harmonising technical standards and investment in the North and Southern transport corridors (International Trade Centre, 2012), EAC member countries are still ranked among the bottom globally on most pf the World Bank[1] trade facilitation indicators. Rwanda, which is the best performing country in EAC is ranked number 46, followed by Tanzania (131), Kenya (136), Uganda (150), and Burundi at position 152 on the ease of doing business. Thus despite tariff reforms under EAC-Common External Tariff (CET), modest improvements in many other trade facilitation indicators negate the effect of regional integration and trade outcomes (Kassides and Benjamin, 2012).

Despite the initial promise on the benefits from aid for trade facilitation, the prevalence of market and governance failures has made both aid targeting and coordination between donors and aid recipient countries difficult (ODI 2013). With multiple channels to deliver aid, but limited evaluation criterion, there is no consensus on the extent of the success of aid for trade so far (Cadot *et al*., 2014; Cali *et al* 2007). After a decade of aid for trade initiatives, there are questions on whether the objectives of aid for trade facilitation that were originally envisaged to address trade

[1] Comparative ranking of EAC countries and the global best performer on LPI is in Appendix I.

barriers in developing countries are being achieved (Cali *et al.,* 2007; Wiig 2008; Hallaert, 2012).

The answer for the role of aid for trade and trade performance is not obvious, given the persistent reports of high transaction costs, especially in the East African region. So far the empirical response refers to changes in Logistic Performance Index, and Ease of Doing Business index as the performance indicators, while others make direct inference by looking at the import and export cost factors to determine improvements in trade facilitation.

However, such assessment does not account for other factors that constitute trade costs and influence trade outcomes. This thesis adds value by using a recent methodology to measure trade costs using intra-EAC trade flows. Improvement in trade facilitation shifts some non-tradable goods into tradable products (Novy, 2011; Turkson, 2012). These changes reflect in the overall trade flows and export basket of countries. This methodology accounts for domestic trade, a deficiency in the previous trade cost measurements. The thesis then examines how the bilateral tariff equivalent trade cost is different for each of the five EAC countries. It then proceeds to determine how aid for trade facilitation relates with trade outcomes in the region and the effect of trade costs on the extent of export diversification of Kenya's goods into the EAC member states. In many respects, non-tariff barriers impede trade performance despite the policy interest to promote deeper regional integration in East Africa. These barriers influence both the direction and content of trade by countries. Therefore, understanding the evolution of trade costs and how aid for trade influence trade is necessary to achieve deeper and wider integration.

This study therefore aims at contributing to the existing literature by: (a) constructing and examining the trends of bilateral trade costs of the EAC countries; (b) determining whether aid directed towards economic infrastructure or trade policy and regulations is significant in promoting trade by Kenya; and, (c) determining how trade costs affect the composition of the exports structure of Kenya.

1.2 Problem Statement

Traditional measurements of trade cost depend on a few observable and quantifiable factors. Such factors alone however, hide the unobservable elements that negatively affect trade. Recent global evidence indicates that non-tariff barriers are important in explaining trade flows. Within the East African Community, the operational inefficiencies at the main ports in Mombasa and Dar Es Salaam, deficiencies in infrastructure along major transport corridors, weak institutions and coordination failures are key determinants of the regions' low global ranking in the Ease of Doing Business. There is some evidence of increase in the application of non-tariff measures, consequently increasing the cost of doing business. Indeed, poor trade facilitation is persistent, notwithstanding the countries receiving aid for trade and committing to eliminate existing non-tariff barriers as per Article 13 of the EAC Customs Union protocol. The extent to which increasing trade barriers and by extension trade costs affects trade outcomes and whether aid for trade is vital in improving trade flows in the EAC countries is not fully understood. This limited knowledge makes it difficult to design effective trade facilitation policies and progression into deeper and wider regional integration. This thesis shall partially fill the empirical gap in measuring trade costs in the EAC and the effect of aid for trade facilitation in Kenya.

1.3 Research Questions

The main research question is: how significant is aid for trade in facilitating trade flows? In addition, this thesis intends to answer the following questions:

i. How trade flows thus costs have evolved between the EAC member countries?

ii. Has aid for trade improved Kenya's inter-EAC trade?

iii. Are trade costs related to the content of exports from Kenya to other EAC trading partners?

1.4 Research Objectives

The broad objective of this thesis is to examine the extent to which aid for trade affects trade flows in EAC countries. The specific objectives are to:

i. Measure and examine the pattern of bilateral trade costs in East African countries.

ii. Assess the significance of aid for trade facilitation on trade flows in Kenya.

iii. Estimate how export diversification is affected by trade costs between Kenya and her East African trading partners.

iv. Draw policy implications from the three objectives.

1.5 Significance and Justification

Trade costs have emerged as the new frontier in explaining trade patterns. The previous measurements of trade costs however, have been incomplete. In East Africa, where imports are intermediate and final goods, trade costs result into more charges to traders, producers and consumers. It is therefore of interest to determine whether between any two pair of countries in the region, the cost of trade is falling or increasing. The use of fees, port charges and indexes to explain trade costs fails to explicitly account for changes in domestic conditions that shift commodities from

being non-tradable into tradable goods. This thesis intends to fill this methodological gap by using bilateral trade flows between the EAC countries. The additional benefit of this approach is the variability over time as trade flow changes, thus it is more useful in determining the trend in costs.

The effect of aid for trade on trade outcomes can either be positive or negative. Since the increased regional funding has not received adequate empirical examination despite the amount of resources dedicated to trade facilitation measures, evidence connecting AfT to better trade outcomes has been ambiguous. There is need therefore, for donors and aid recipient countries to determine the performance of the AfT initiative. This study attempts to establish the relationship between two categories of aid for trade and regional trade flows.

One major contribution from the study is in using bilateral trade flows among EAC partner countries to examine the evolution of trade costs in the region. This accounts for changes over time in the domestic trade environment, without the assumption of bilateral symmetry of trade costs in these countries. The understanding of the pattern of trade costs, whether costs have declined or not, and the performance of aid for trade meant for economic infrastructure, trade policy and regulations is important for policy makers who have a desire for deeper and wider regional integration. The study findings, therefore, should contribute towards the design of better trade policies to improve trade outcomes and diversify regional trade. To the best of my knowledge, few studies have measured trade costs in the EAC region and empirically analysed the effect of aid for trade facilitation on trade among aid recipient countries in SSA. This

thesis should provide a basis for further research on regional aid for trade facilitation and trade diversification.

1.6 Organisation of the Thesis

This thesis is organised into four chapters presented in three essays. Chapter One presents the background and context of the study, including the thesis research problem, questions, objectives and the justification. It gives a background sketch on the flow from trade costs, the use of aid to address trade costs and how trade costs relate to export diversification. Chapter Two introduces the first thesis essay that seeks to determine how trade costs can be measured using trade flow data. It discusses the theoretical underpinnings related to trade cost measurement focusing on the methodology used by Novy (2011). Finally the essay, presents the empirical literature on trade costs. Chapter Three presents the second thesis essay which determines the link between aid for trade and trade performance by Kenya, distinguishing between two channels used to deliver aid; that is funds for economic infrastructure and policy and regulatory reforms. These are subsequently related to the trade outcomes in EAC countries. Chapter Four presents the third essay which explores the relation between bilateral trade costs and extensive export diversification at Harmonised System (HS) 8 digit classification for the manufacturing sector in Kenya to her EAC trading partners. It starts by computing the measurement of export diversification in the extensive margin of Kenya. The measurement is subsequently related in gravity model estimation to bilateral trade costs of the EAC trade partners.

Chapter five gives the summary, conclusion and policy implication for the three essays.

CHAPTER TWO

MEASURING AND EXAMINING THE PATTERN OF BILATERAL TRADE COSTS IN EAST AFRICAN COUNTRIES

2.0 Background and Problem Statement

International trade costs, when defined to include less quantifiable and observable elements have been demonstrated to be large (Milner and McGowan 2013). Anderson and van Wincoop (2004) determined that non-tariff factors add-up substantially into trade costs. These non-tariff factors include technical standards, institutional elements like policies, regulation and contract enforcement, quality of infrastructure and the cost of information asymmetry.

Consequently, non-tariff barriers (NTBs) have been identified as a recent increasing impediment to international transactions. It is estimated that NTBs inflict higher levels of obstacles compared to tariff measures (Balistreri *et al.,* 2014; Thangavelu 2010). For developed countries, Anderson and van Wincoop (2004) found that NTBs impose up to 170 per cent *ad valorem* tax equivalent. Thus due to poor infrastructure and institutional constraints, these countries, especially in Sub Saharan Africa (SSA), suffer several trade barriers (Versailles, 2012). For example, the effect of transport costs on exports is almost five times that of tariffs in many countries in SSA, Latin America and the Caribbean (De, 2007). The cost per day when trucks are stationary while awaiting border clearance within the Common Market for Eastern and Southern Africa (COMESA) - Southern African Development Community (SADC) - EAC region is estimated to be between US dollar 200 and US dollar 400 (Pearson 2011).

Besides increasing the cost of goods and services, trade barriers result into welfare losses, which Anderson and van Wincoop (2003) estimate to be 10 per cent of the national income. Trade costs limit the variety of goods that are available to consumers and traders. At the firm level, the costs reduce profits and wages which eventually penalise a country's exports (De, 2009). As such, trade costs offer partial explanation to differences in international trade flows (Coe *et al*., 2002) and the reasons behind the puzzle of 'missing international trade' highlighted by Obstfeld and Rogoff (2001).

In the presence of high trade costs, the relative advantage in the production of particular commodities is diminished leading to poor trade performance. For instance, between 2000 and 2010, SSA's share of world imports was only 2.5 per cent and 2.8 per cent for exports (UNECA 2013). Similarly in the EAC region, exports were a measly 0.4 per cent of world exports and 0.1 per cent for imports (ibid). Further, non-tariff barriers continue to hinder intra-EAC trade in goods, capital and services despite the ratification of a common market protocol by partner states (Mutai 2015).

However, empirical studies in international trade costs have largely focused on the effect of reducing road transport charges, tariff rates, ocean freight and air transport charges, and how they explain international trade patterns (Milner and McGowan 2013, Havemanet *et al*., 2009). Thus despite policy interests to understand and address trade costs, past research approaches have put emphasis on price aspects of international trade costs but ignored the non-quantifiable elements. Such one sided analysis tend to underestimate the effect of costs in determining the direction, volume and content of trade.

Turkson (2012) and Novy (2011) used bilateral trade data to establish trade costs between pairs of trading countries. Turkson (2012) however, examined the trade costs of the EAC as a single trading block and compared it with other RTAs in SSA. This regional approach fails to account for the bilateral trade performance between individual EAC member countries. Trade figures capture the implicit and difficult to quantify non-tariff factors that affect international and domestic trade. Novy (2011) asserts that due to data limitations and practical difficulty to include every factor that constitutes trade cost using trade figures is more useful. Using bilateral trade data reduces the possibility of omitting the immediate factors which influence international trade. The methodology is dynamic and accounts for changes in the trade cost of a country as reflected by the patterns of trade over time. Therefore it can be useful in examining trade costs between member countries of a Regional Trade Arrangement.

This chapter therefore answers the following questions: How have trade costs evolved between EAC partner countries since the formation of the RTA? Are there any differences in the bilateral costs among the partner countries? How much is the trade cost measurement explained by traditional gravity model variables?

2.1 Objectives of the Study

The broad objective hence is to construct a theoretically consistent measurement of bilateral costs between EAC partner countries. The specific objectives are to:

i. Determine the trend of bilateral trade costs of EAC partner countries.
ii. Examine whether there are significant differences between the bilateral trade costs.
iii. Estimate how gravity model variables explain trade cost and their measurement.
iv. Draw policy implications from on bilateral trade costs in the EAC region.

2.2. Trade Costs: Definitions, Theory and Measurement

Trade costs have been defined broadly to mean the expenses incurred above the factory cost of production, including transportation and tariffs when goods are traded internationally (Irarrazabal *et al.*, 2013; Jacks *et al*., 2008; Anderson and van Wincoop 2004; Obstfeld and Rogoff, 2001). APEC (2011) suggests that trade costs are the resource expenses incurred along the supply chains in international trade. They can also be defined as the expenditure incurred from the time goods leave the factory gates up to the final point of consumption.

Some of these expenses are due to poor trade facilitation measures, non-tariff barriers and cost of business services (Balistreri et al., 2014). De (2007) used "soft" trade facilitation measures and "hard" infrastructure barriers to infer costs. For illustration, business services tend to include activities such as banking, insurance, information and communication technology (ICT) and professional services like legal advice and transportation (Balistreri *et al.,* 2014). Trade costs include such less observable aspects that are termed as non-tariff measures.

Conventionally, varied approaches such as summary indices and direct measurements like freight charges are used to capture the multifaceted nature of trade costs. Much literature dwells on how these factors influence the volume and pattern of international trade. Apart from trade outcomes, the evolution of trade costs is necessary to understand the flow of foreign direct investment (FDI), firm outsourcing, and establishment of regional trade agreements (Turkson, 2011).

In an attempt to explain the dilemma of disappointing trade performance, Limao and Venable (2001) attributed the poor trade flow to, among other factors, poor transport infrastructure that increased the transaction costs in SSA. The average costs of transporting a standard 20 foot container within the continent was about US dollar 1,649, which is relatively high compared to US dollars 889 in the Organisation for Economic Corporation and Development countries. Other factors that contribute to escalating trade costs include resource limitations and policy induced barriers such as multiple regulations, inadequate infrastructure, inefficiency at ports and geographical remoteness (ITC 2009; UNU-WIDER 2007; Novy 2007, Ndulu *et al*., 2005).

Previous studies that inform the context of this essay (Edwards and Ondedaal, 2008; Clark *et al*., 2004; Amajdi and Yeats, 1995) on trade costs focused mainly on the relationship between particular cost elements and trade flows. The few notable studies on measuring trade costs include (Turkson, 2012; Head and Ries, 2001 and Novy, 2011). These studies measure trade costs using trade flows, since explaining costs using the direct and observable factors is seen as less exhaustive. The direct measurements of trade costs disregard certain factors such as border effects, language barriers, time delays and product standards, which despite not being easily observable and quantifiable, add onto the total expense. Therefore, understanding how to measure trade costs is not only important in satiating empirical curiosity, but also in formulating trade policy.

The East African Community and the Custom Union in 2005 attempted to reduce the direct costs of trading among the member states. The Customs Union Common External Tariff (CET) reduced tariff charges under a three band tariff structure of 0

per cent for finished products, 10 per cent for semi-processed products and 25 per cent for raw materials (EAC, 2005). Further progression into a Common Market in 2009 was an additional initiative intended to eliminate trade policy limitation. Consequently, there have been increased investments in road networks, automation of ports and customs services, and border crossing procedures.

While the EAC regional integration is out to reduce trade barriers and facilitate easy movement of goods and services within the region, there is limited evidence on how trade costs have been evolving beyond tariff reforms under CET. For example, operational inefficiencies in Dar Es Salaam port increased the costs by 22 per cent and 5 per cent tariff equivalent for containers and bulk cargo for traders using the port respectively (World Bank, 2013). The economic loss arising from this inefficiency was approximated at US dollar 1,759 million and US dollar 850 million to the neighbouring countries like Burundi, Rwanda and Uganda respectively (World Bank 2013). Associated revenue leakages for the Tanzanian economy is thought to be US dollar 157 million according to World Bank (2013).

Recently, the use of indexes has been employed to measure the extent of trade costs. This involves compiling an index measure that accounts for different aspects of trade restrictions. Indexes capture single aspects of trade policy like tariffs. For illustration, the tariff reductions on trade flows in the region can be captured using indirect measurement of the trade barriers. The extent of trade restrictions using the trade restrictive index for the five EAC member countries is shown in Table 2.1 considering all trade (All), agriculture trade (agric) and manufacturing trade (MNF). The World

Bank's (2012) Overall Trade Restrictive Index[2] (OTRI) highlights the restriction rates when all trade is considered to range from 8.5 per cent to 53 per cent, under applied tariffs rates, and from 13 per cent to 54 per cent based on MFN tariff rates. The Market Access Overall Trade Restrictive Index (MAOTRI) which is based on applied tariff rates ranges from 13 per cent to 23 per cent.

Accordingly, agricultural trade in the region experiences high trade restrictions compared to manufacturing trade on the applied and Most Favoured Nation (MFN) tariff rates. The possible explanation for more restriction in agricultural trade is linked to increasing application of SPS and technical standards on agricultural products trade. Overall Trade Restrictive Index (OTRI) is higher compared to Overall Trade Restrictive Index-based on Tariffs (OTRIT) that covers all product trade and agricultural products trade. This underscores the use of non-tariff barriers in the region since OTRI captures both tariff and non-tariff barriers.

[2] For OTRI and MATRI definition see Appendix I

Table 2.1 OTRI and MOTRI in Percentage EAC (2012)

Country	Indices based on applied tariffs												Indices based on MFN tariffs					
	OTRI			OTRIT			MAOTRI			MAOTRIT			OTRI			OTRIT		
	All	Agric	MNF	All	Agric	MNF	All	Agric	MNF	All	Agric	MNF	All	Agric	MNF	All	Agric	MNF
Kenya	12.2	40.1	6.4	9.5	25.6	6.1	22.5	27.7	11.5	2.3	2.9	1.2	13.1	42.6	6.9	10.3	28.1	6.6
Uganda	8.3	12.0	7.3	7.4	8.0	7.3	24.8	31.7	2.3	8.1	10.4	0.6	12.9	25.7	9.4	12.0	21.8	9.4
Burundi	7.0	6.8	7.1	7.0	6.8	7.1	23.5	42.9	1.5	1.0	1.7	0.2	9.9	10.9	9.7	9.9	10.9	9.7
Rwanda	10.8	7.0	11.7	6.9	7.0	6.8	20.4	24.7	17.4	1.3	2.6	0.4	17.2	22.5	16.1	13.3	22.5	11.3
Tanzania	53.3	39.1	55.0	8.6	17.0	7.5	13.8	19.4	7.1	4.1	6.3	1.6	54.1	42.8	55.5	9.4	20.6	8.0

Source: World Bank (2012)

Key:

i. OTRI-Overall Trade Restrictive Index.

ii. OTRIT-Overall Trade Restrictive Index Tariffs.

iii. MOTRI-Market Access Trade Restrictive Index.

2.3 Theoretical Considerations of Trade Cost

The standard theoretical structure of trade costs originates from the gravity model which posits that trade between two countries is analogous to the gravitational forces as explained by the size of the countries and inversely to the distance between them. The lineage originates from two families within the gravity model. The first as explained by Turkson (2012) identified conditional General Equilibrium related to Heckscher-Ohlin endowment theory. This is drawn from the works of Tinbergen (1962) and Anderson (1979). The main assumption under the General Equilibrium is the separation between a country's production and consumption choices. The second account of trade cost is explained under unconditional General Equilibrium structure and non-separability of production within a country.

Further theoretical development follows McCallum (1995) who refined Anderson's (1979) theory to explain the border effect on trade between Canada and USA. McCallum (1995) found that Canadian provinces traded more among themselves by a factor of 20 compared to their transactions with states in the US. This was after accounting for the effects of distance and the economic size of the regions in Canada and the US. The findings were later challenged by Anderson and van Wincoop (2003) who clarified the real border effect on trade flows.

Anderson and van Wincoop (2003) used a multi-country general equilibrium structure in an Armington world, with homothetic preferences and Constant Elasticity of Substitution (CES) utility function. They faulted McCallum (1995) findings for overestimating the effect of borders on trade flows due to omitted variables. Since trade flows between trading countries are also influenced by some resistance or

barriers, the authors argued for the inclusion of a multilateral resistance term in the gravity model.

Additional theoretical modification based on the unconditional general equilibrium (Eaton and Kortum, 2002) explained how productivity and market structure (Turkson 2012) determine who and what gets traded internationally. The development and attempt to explain the theoretical structure in gravity model have resulted into studies like Head and Ries (2001) as well as Head and Mayer(2004) that improved on the baseline gravity model.

Novy (2011) through a micro-formulation of trade cost measurement included all factors influencing both home and international trade flows. In the Novy trade flows model, factors that change within a country over time and influence trade get captured in the international trade data. He assumed no specific functional form in the methodology. The Novy (2011) approach conforms to the theory in the earlier work by Anderson and van Wincoop (2004) that included multilateral resistance terms, Eaton and Kortum (2002) who modelled technology and market distribution, and Chaney (2008) and Melitz and Ottaviano (2008) model that included heterogeneous firms, with both fixed and sunk costs. These authors produced a tractable gravity model in line with earlier traditional gravity arguments on factors influencing trade.

The subsequent refinements of the gravity model and the underlying theories make it more appropriate in explaining trade costs in empirical work, aside from using distance, borders and resistance terms as explanatory variables. Trade flows within gravity captures unobserved factors and addresses the limitations imposed by data

which are inherent in factors of trade costs thus making trade flow useful for current research of costs measurement (Turkson, 2012).

2.4 Measurement of Trade Costs

The evolution in measuring trade costs goes back to the gravity model pioneered by Tinbergen (1962) and the seminal work on trade flows by Anderson (1979). Subsequent research (McCallum 1995; Wei 1996; Trefler 1995) used the traditional gravity as done by Tinbergen (1962) and Anderson (1979). The improvement in the gravity model resulted into the 'theoretical' gravity family found in Head and Ries (2001), Eaton and Kortum (2002), Anderson and van Wincoop (2003, 2004). These models estimated trade barriers using different cost measurements. Yet despite the broad findings that trade costs offer a strong explanation for reduction in trade flows (Novy, 2011, Hummels, 2007, Anderson and van Wincoop 2003, Eaton and Kortum 2002, Obstfeld and Rogoff, 2001), minimal empirical work on how to measure these trade costs (e.g. Head and Ries 2001, Anderson and van Wincoop, 2003, Turkson 2012, Novy, 2011) have been undertaken, especially in SSA.

The previous attempt to infer trade cost has been restricted to direct and observable measurements such as tariff rates, transaction and transport charges, custom fees and international freight charges over the cost of factory production when goods are traded (Arvis, Duval, Yann, Shepherd, Ben and APEC, 2011). Therefore, empirical literature on trade costs tends to infer their magnitude by examining indirect measurement (Turkson, 2012). This involves using composite indexes like Trade Restrictive Indices (Hoekeman and Nicita 2008). Arvis *et al.*, (2013), however, pointed out that using such measures like Tariff Trade Restrictive Index (TTRRI) and

Overall Trade Restrictive Index (OTRI) developed by the World Bank are heavily dependent on the original dataset and exclude important factors like culture, language, border effect and transport costs. However, these factors are important determinants on the extent of transacts by countries. Greenaway *et al.* (2009), however, noted that it is difficult to measure and include all the factors affecting international trade when inferring trade costs. Many of these trade factors are not easily quantifiable and observable.

Jacks *et al.* (2008) asserted that few empirical works over the last 130 years have examined and measured the constituents of trade cost. Therefore, the full extent of the nature and effect of trade costs on international trade remain inconclusive (Novy, 2011), more so in SSA.

The direct measurements for trade cost subsequently tend to examine transport and freight charges, customs fees and tariffs. These however greatly vary depending on the domestic market structure in transport routes, trade facilitation measures in the countries and policy design particular to specific regional trade arrangements. Table 2.2 illustrates the cost incurred by exporters and importers at the two EAC sea ports. The table shows that Mombasa port shore handling charges are higher at 105 compared to Dar Es Salaam port (90) for domestic importers. It is also more costly for domestic exporters using Dar Es Salaam port (90) relative to Kenya's 56 shore handling charges.

Table 2.2: Cost of Exporting and Importing through Mombasa Port Compared to Dar Es Salaam Port (May-June 2014)

Container					
Indicators		**Shore Handling Cost**		**Wharfarge**	
Port	**Trade**	**20 Foot**	**40 Foot**	**20 Foot**	**40 Foot**
Mombasa	Exports-Domestic	56	56	70	105
	Imports-Domestic	105	105	70	105
	Exports-Transit	40	40	70	105
	Import-Transit	85	85	70	105
Dar Es Salaam	Exports-Domestic	90	90	1.0% Ad valorem	
	Imports-Domestic	90	90	1.6% Ad valorem	
	Imports -Transit	80	80	1.25% Ad valorem	
	Exports-Transit	80	80	1.0% Ad valorem	

Source: East Africa Shipping Council (2014)

The distinctive feature in the table is the application of *ad valorem* wharfarge charges[3] in Dar Es Salaam. The Table demonstrates that it is costly to import through Dar Es Salaam port where domestic and landlocked countries incur 1.6 per cent and 1.25 per cent respectively, on wharfarge. This is high relative to Mombasa port that charges 70 per cent and 105 per cent for 20 foot and 40 foot containers, respectively. These two ports, however serve a wider regional hinterland, thus are important in determining the extent of trade flows into and out of the EAC region.

Road and rail transport costs in the region are also relatively high depending on the corridors. Table 2.3 shows what it costs to move a 20 foot container along the main transit corridor in the region. The transport cost along the northern corridor

[3] Wharfarge Charges (cargo dues) is fee levied by port authorities on importers and exporters using the port facilities to move goods through the port.

originating from Mombasa port to parts of DRC and South Sudan is high compared to the central corridor which starts from Dar Es Salaam port.

Table 2.3 Cost of Road Transport for a 20 Foot Container from the Ports (USD) 2014

Port of origin	Nairobi	Kampala	Kigali	Bujumbura	Goma	Juba
Mombasa	1,045	3,700	4,800	6,500	7,000	7,500
Dar Es Salaam	N/A	4,600	4,300	4,500	4,700	N/A

Source: East Africa Shippers Council (2014)

Equally, the rail freight rates along the central corridor serving Dar Es Salaam port are lower, since it costs an average of US dollar 1.24 for standard TEU per kilometre compared to the US dollar 2.66 average cost from Mombasa port. Therefore, traders using Tanzania rail services pay three times less based on the average freight cost per kilometre. Table 2.4 summarises the cost of transportation in year 2014 from the two main East Africa sea ports using rail services.

Table 2.4 Rail Charges Per TEU, Kilometre, Tone from Mombasa and Dar Es Salaam

Origin	Destination	Distance	Rates per TEU(USD)	USD per km	USD per tonne	USD per tone/km
Mombasa	Nairobi	530	1,450	2.74	48.33	0.091
	Kampala	930	2,400	2.58	80	0.086
Dar Es Salaam	Kipiri-Mposhi	1,860	2,000	1.08	66.67	0.016
	Tunduma	970	1331	1.37	44.37	0.031

Source: East Africa Shipping Council (2014)

Transportation cost per tonne per kilometre along the northern corridor is equally high. It costs US dollar 0.86 per tonne per kilometre to transport a tonne of goods from Mombasa to Kampala, while the cost to Tunduma per tonne per kilometre is US dollar 0.31.

Beyond the direct measurement and composite indexes of trade costs, time has been used as an indirect metric to measure costs (Nordas *et al.*, 2006). Time is expressed either by the number of days or hours that it takes to move commodities over a certain distance. Indeed, the time it takes to clear exports and imports has effects on domestic industry competitiveness. Indian firms for example suffer a 37 per cent cost disadvantage to ship goods from Mumbai to America, relative to Shanghai on account of delays and inefficient ports (OECD 2005). Within East Africa, EASC (2014) identified the time taken to prepare export and import documents, clearance procedure, custom processes, and moving commodities over land as the key contributors to either delays or faster trade.

The importance of time in commerce is reinforced by the new business environment with demands for just-in-time deliveries. The effects of time therefore extend to influencing volume of trade and composition of commodities. Hummels (2001) approximated that the tariff equivalent of time given by 0.8 per cent improvement over 20 days is equivalent to 16 per cent tariff rate for US exports. Nordas *et al*., (2006) citing Djankov *et al*. (2006) found that a 10 per cent increase in time reduces trade by 5 and 8 per cent. According to Pearson (2011), it costs about US dollar 200 to US dollar 400 per day for immobile trucks at border crossings in the COMESA-SADC-EAC region. In this context, time escalates the cost of trading since delays in

one country, especially coastal transit countries or at the border crossings, result into spill-over effects on the trade outcome by other countries.

The EASC (2014) reported that it takes 46 days to export to Burundi followed by Uganda (33 days), Tanzania (31 days), Rwanda (30 days) and Kenya (26 days). This resembles the Wold Bank (2012) as shown in Table 2.5 indicating the time and cost to export and import. The comparative highlight of the findings is the number of days for export trade in Burundi, Tanzania and Rwanda which seem to have become longer, while Kenya and Uganda decreased the time to export between 2011 and 2012.

Table 2.5 Time and Costs to Export and Import in EAC (2011-2012)

Country	Time to Export (no of days)	Time to Import (no of days)	Cost to Export (US$/container)	Cost to import (USD/container)
Kenya	26	24	2,055	2,190
Uganda	33	31	2,800	3,015
Tanzania	18	24	1,255	1,430
Rwanda	29	31	3,275	4,999
Burundi	35	54	2,965	4,855

Source: World Bank World (2012)

Table 2.5 highlights the fact that Tanzania had the shortest time to export taking 18 days and 24 days to import in 2011. While Uganda and Burundi had the longest number of days to export or import, Uganda traders took 33 days and 31 days, respectively. Traders in Burundi required 35 days to export and 54 days to import.

Rwanda had the highest costs to export or import despite not being among the worst performers in terms of number of days. The limited improvement in the number of days for trading is an indicator of the increased non-tariff measures among regional partners.

The forgoing discussion demonstrates how different factors converge to influence trade costs and eventually trade flows in a country. Due to the difficulty in quantifying some of the elements in trade cost, previous empirical work has been restricted to the direct measurements of trade cost. Without disregarding the importance of direct measurements, changes in domestic environment and costs that would shift some commodities between tradable and non-tradable goods are ignored by using prices. Therefore, beyond the traditional gravity variables like distance, freight charges and resistance, such measures of costs are incomplete. It is in this regard, that we use trade flow data to measure costs of trade. The use of trade flows address the gap in previous literature that bases measurement on direct factors hence the relevance of this study.

2.5 Empirical Literature

Empirical studies on trade costs have largely relied on the quantifiable and observable components of trade costs used in gravity models. Until recently, composite index and direct cost variables have been extensively used to explain trade costs. The seminal work of Tinbergen (1962) proved that bilateral trade flows depend greatly on the distance between countries. McCallum (1995) on large intra-trade among Canadian provinces compared to inter-trade with US states generated a puzzle on the extent to which borders between countries affect regional trade.

In resolving the border puzzle, Anderson and van Wincoop (2003) argued that by failing to account for multilateral resistance, McCallum (1995) overestimated the extent to which borders affect trade flows. Anderson and van Wincoop (2004) address this by including a multilateral resistance term in a gravity model to add to the theoretical foundations seen in McCallum (1995). Novy (2011) explains that geographical distance in a gravity framework assumes some arbitrary underlying cost structure. A similar view is expressed by Irarrazabaal *et al* (2013) who argue that additive trade costs are present in international trade arena. Further criticism is that traditional gravity ignores certain factors and is thus prone to biased estimations and is static to changes brought about by advancement in transportation. Novy (2011) used a micro-analytic method following Head and Reis (2001), Head and Mayer (2004), and later Turkson (2012) and Jacks *et al.* (2012) to estimate a complete trade cost by using bilateral trade data. Jacks *et al* (2012) averred that this method addressed some of the gaps detected in the earlier gravity models.

The pioneering work of McCallum (1995) explained the border effect of 10 Canadian provinces and 30 American states using data from these regions. When distance and economic size were accounted for, the result showed that intra-provinces trade was 22 times higher than inter-state-provinces trade. This was due to difficulties in border crossing which reduced smooth flow of trade.

Limao and Venables (2001) used data for shipping freight rates to explore the determinants of trade cost and subsequently trade volumes from Baltimore (US) to various destinations across the world. Their findings showed that it is more expensive to trade if a country is landlocked, with transport expense being 58 per cent higher

than a coastal country. However when infrastructure is improved, the cost is cut to about 46 per cent, with better infrastructure along the transport corridor reducing the burden to 51 per cent. Limao and Venables (2001) further explored how trade in SSA predicted trade costs in a gravity model. Their conclusion was that high transport cost in the continent is a major hindrance to trade. For illustration the authors agree that it costs four times more to transport goods from Uganda to Chad compared transporting goods from Baltimore to Germany. The attempt to deduce trade cost from trade flows is illuminating.

However, the authors mentioned other possible factors influencing trade but failed to account for them by reverting to the use of quantifiable and observable cost factors. The use of distance is perceived as static (Novy, 2011) as it ignores improvements in transport systems, which has a reducing effect on trade distances. Further, only road, rail and telephone infrastructure are used, yet port inefficacies due to poor facilities have both inbound and outbound effects on trade flows.

Anderson and van Wincoop (2004) addressed some of the gaps identified in the MacCallum (1995) study by including multilateral resistance term. Using similar data for 30 US states and Canadian provinces, they found that inter-province trade was 16.4 times that of state-province which was lower than the 22.2 per cent reported by MacCallum (1995). They posit that multilateral term helps to explain how border barriers hinder trade. The authors demonstrate how greater resistance between Canadian provinces and their trading partners explained trade patterns compared to lower intra-states barriers.

Whereas most of the studies reviewed alienated the direct factors constituting trade costs by not including tariffs in a pre-WTO period when tariffs were prominently deployed as trade policy tools, the computation of the multilateral resistance terms suffers from missing observations. Furthermore, countries implement different tariff structures hence the assumption that symmetry of trade costs between bilateral traders fails to hold under different tariff structures.

To understand how trade costs affect trade in the countries, De (2007) augmented a gravity model for 10 Asian countries: India, China, Malaysia, Thailand, Indonesia, Japan, Korea, Singapore, and the administrative regions of China (Hong Kong and Taiwan). He used both OLS and 2-SLS for estimation and found that imports were negatively affected by the infrastructure index, transport costs and tariffs. Indeed when tariffs and transport costs were reduced, imports increased by about 1.6 and 5.7 respectively. Improvement in infrastructure by 10 per cent in both exporter and importer countries enhanced trade by 1.5 per cent and 5.9 per cent respectively.

Despite the marginal improvement in estimation results between the 2-SLS and the OLS on the other hand and estimation using observable and quantifiable cost indicators on the other, the aggregation of trade data makes the study less conclusive (Limao and Vanables 2001). The effect of trade cost is not homogenous across goods. For example, Sanitary and Phyto Sanitary (SPS) requirements lack a metric equivalent, yet SPS impact highly on trade of food products.

Dennis and Sheperd (2007) studied export diversification in 118 developing countries. They disaggregated around 10,753 products in eight-digit harmonised system of classification. To distinguish trade cost variables, the study used applied tariffs data from ITC-CEPPI Market Access Map, which they complemented with indicators in the *Doing Business* reports published by the World Bank. Distance was a proxy for international trade cost. The conclusion was that high transportation costs negatively affected trade. A 10 per cent decline in export costs was accompanied by 3 per cent gain in export diversification. When international transport costs were reduced, there was a 4 per cent increase in diversification. The own tariffs elasticity was -0.6 compared to that of distance of -0.4. The costs to export and entry were determined as -0.4 and -0.1, respectively. Therefore, the cumulative impact of these costs was to hinder export diversification of these developing countries.

Bergstrand, *et al.,* (2007) conducted an *ex-ante* Computable General Equilibrium (CGE) analysis using data extracted from Robert Feenestra compilation to determine possible welfare gains if tariffs are eliminated in 67 countries worldwide. They found out that there would be a 6.9 per cent welfare gain globally. Rather than use externally generated elasticities, this was derived from gravity estimation and the effects of tariff elimination (meaning trade cost reduction) simulated. The comparative statistics yielded similar results to those of Anderson and van Wincoop (2004) under symmetric bilateral trade cost. The paper provides valuable insights, although the interpretation is not definite since the authors only address one sector and one input while trade costs do not have equal effects on different commodities and sectors.

Hoekman and Nicita (2008) measured trade costs in developing countries with 104 importers and exporters for each trade category. The variable of interest was TTRI and OTRI to indicate costs in a gravity model. Findings showed that when TTRI fell by 10 per cent there was a 2 per cent increase in trade, further removal of Non-Tariff Measures (MTN) enhanced trade by about 1.8 per cent. Logistics facilitate better trade according to the findings. A one per cent fall in Logistics Performance Index resulted into about 50 per cent expansion of both imports and exports. These findings conform to findings of doing business indicators surveys. However, though the indexes are direct and computable, assignment of weights in the calculation of the indices may not be random.

Portugal-Perez and Wilson (2009) undertook a study on trade cost in SSA using a gravity model to estimate the *ad valorem* tariff equivalents when indicators in trade cost are improved. Their results showed that trade costs in SSA were higher than trade costs in other developing regions. Equally, trade costs were found to explain about 55 per cent of global trade before World War I and 33 per cent of global trade after World War II. Jacks *et al.* (2008) found trade costs to have fallen in tariff equivalent by 23 per cent between the United Kingdom, the United States and other 18 trading associates in the four decades before World War I. The method used to measure episodes of global trade from 1870 to 1913; from 1921 to 1931; and finally 1950 to 2000, were based on a micro analysis.

Ramli *et al.* (2012) assessed the role of Information Communication Technology (ICT) infrastructure in reducing trade cost within the Association of South East Asia Nations (ASEAN)-5 countries: Thailand, Malaysia, Indonesia, Philippines, and

Singapore from 1908 to 2009. The results showed that availability of mobile and fixed telephony services reduced trade costs. However, Limao and Venables (2001) questioned the use of CIF-FOB ratios as a proxy measure for trade costs on the grounds of measurement errors due to misreporting by countries and bias due to aggregation of imports. It is possible that countries with high transport costs import low cost commodities and are indiscriminate about the supply sources of products.

Heng and Yean (2010) found that transport costs have declined over time, when they profiled the components in transportation costs for electrical and electronic imports by Malaysia from US using the Free on On Board (FOB) and Cost Insurance and Freight (CIF) costs. The drawback in this study is that import data is extracted as reported by the US. This fails to account for the possible requirement of just-in-time deliveries in international supply chains. This means better logistic measures in the US destination compared to Malaysia, yet trade facilitation in one country affects trade performance in partner countries. Additional improvement to include electronic export data from Malaysia does enrich the work.

Novy (2011) derived the tariff equivalent of trade costs in gravity model following earlier theoretical work of Anderson and van Wincoop (2004), and Eaton and Kortum (2002) frameworks with similar theoretical gravity model. Therefore Novy (2011) used different demand elasticities that entail results depending on the elasticity parameter chosen. Novy (2011) clarified that irrespective of the parameter choice, models eventually collapse into similarity gravity models. Due to regional integration that requires member countries engage in joint projects, the results are valid irrespective of the origin of policy reforms.

A new strand of empirical work has shifted to the use of more observable trade flows to infer trade costs. Novy (2011) for example used trade flows to infer the evolution of tariff equivalent estimate of trade costs. The author used IMF directions of trade statistics for aggregate US trade data. He found that bilateral trade costs had declined in the US relative to her trading partners. Therefore, the tariff equivalent in transport costs was 10 per cent. Since bilateral trade relations with the US are used among countries, he demonstrated further refinement to the use of composite measures. In relation to other previous research in this area, tariff equivalent of 47 per cent (when GDP is used in the calibration) are consistent with other findings like the 46 per cent of Anderson and van Wincoop (2004).

Novy's (2011) approach includes the less observable trade barrier that affects trade flows within countries. Thus, it is more conclusive and avoids the possibility of omitting relevant factors, which are easily ignored when using direct measurement of costs. However, by using the method, it is not easy to pinpoint the reduction in costs due to individual country trade reforms, unless the cost of measurement is estimated against the usual direct trade cost indicators of countries to attribute such a relationship.

Arvis *et al*,(2013) estimated trade for developing countries using the World Bank income group classification in 128 countries and Economic and Social Commission for Asia and the Pacific (ESCAP) trade cost data. The authors selected merchandise trade in agricultural commodities and manufactures. The results indicate that trade costs have dropped rapidly in per capita terms, while new aspects like trade facilitation and logistics are increasing in prominence. Low income countries trade

costs were about 2.5 times higher than high income groups. The *ad valorem* equivalent was remarkably high at 275 per cent in the year 2009. Using regional classification, East Asia had lower trade costs compared to SSA in the two commodity classifications. Trade in manufactures and agriculture was 105 per cent and 201 per cent tariff equivalent in East Asia, and 355 and 305 per cent in SSA, respectively.

Turkson (2012) extended this approach and estimated trade costs for SSA bilateral trade. The author used data from the trade and production database from the Centre d'Études Prospectives et d'Informations Internationales (CEPII). There were 155 countries in the sample from different Regional Trade Arrangements (RTAs) with 34 countries from SSA. The broad finding was that relative trade costs had declined in most RTAs, except in SSA. This is indicated by a 271.5 per cent tariff equivalent for Africa. SSA when compared to other regions had had significantly different structure of trade costs as seen in various reports on the continent (e.g. World Bank Ease of Doing Business) and empirical studies (e.g. Portugal-Perez, 2008). Even though intra-SSA trade cost compared to other regions are slightly lower, this is no consolation since there are real differences in trade costs among the regional trade arrangements in SSA. The EAC trading block had the lowest trade cost with a tariff equivalent of 153.1 per cent compared to a 174.4 per cent estimated in the Economic Community of West Africa States (ECOWAS). However, using regional blocks makes it difficult to make a proximate prediction about bilateral cost levels. Furthermore, it is inconclusive to decipher possible welfare gains due to a decline in trade costs.

2.5.1 Literature Overview

The literature reviewed indicate that trade costs are important in determining international trade flows. Further, non-tariff factors result into higher levels of trade protection more than tariffs. Some of the important non-tariff factors isolated in the literature include, distance, tariffs, fees, transport costs, borders and language barriers. Yet according the reviewed literature, only quantifiable and observable factors are prominently used to measure trade costs and how they influence trade flows. This ignores un-observables and non-quantifiable factors. One of the reasons for this is the practical difficulty to include all factors affecting trade.

Therefore, the attempt by this essay to estimate costs using bilateral trade flows is filling the empirical gap on how to measure costs without ignoring important factors affecting trade. The advantage of the methodology rests on the ability to capture even non-quantifiable and unobservable factors previously ignored although they influence trade flows. Furthermore, it addresses the changes in trade flows between countries due to improvements in domestic and international trade condition. The intuition is that when trade costs fall, countries are expected to trade more with one another.

2.6 Theoretical Framework

A general equilibrium framework is used variously to derive trade cost measurement under gravity models. Anderson and van Wincoop (2003) assumed single product endowment and many countries to model trade costs. The preferences are homothetic, while love for variety by consumers drives their consumption choices. Chaney (2008) presents heterogeneous firms which produce distinct commodities. Thereafter, the firms incur only fixed costs to trade. Melitz and Ottaviano (2008) extend the analysis

to include firms incurring some variable but no fixed costs, but to enter particular markets, the firms acquired some sunk cost. There is no constant elasticity of preferences within the model.

The theoretical derivation by Eaton and Kortum (2002) is extended from Dornbush Fischer and Samuelson (DFS) 1977 model. There are arbitrary numbers of countries whose productivities are randomly determined for each good and geographic locations of the country. The underlying assumption is that each country supplies some good from the basket of different products to the rest of the world. In order to sell, the firms supplying a particular product must be the lowest cost producers overall. The probability of this occurring is influenced by Frenchet distributions that define how productivity gets apportioned. As demonstrated by Novy (2011), a gravity equation following the Ricardian exposition can be achieved.

This is shown in equation 1, where x_{ij} is the gravity equivalent defining trade exports from country *i* to country *j*, as a function of productivity advantage between countries, input costs and income spent on imports. The detailed derivation of Eaton and Kortum (2002) measurement of trade costs from DFS model is demonstrated in Appendix II.

$$x_{ij} = \frac{T_i (c_i t_{ij})^{-\vartheta}}{\sum_{i=1}^{j} T_i (c_i t_{ij})^{-\vartheta}} y_j \quad \text{.....1}$$

It is noted that the overall absolute productivity advantage defined by T_i determines how countries are able to produce different goods. A higher figure means more varieties. The Frechet factor ϑ greater than 1, is common among the countries and

gives the variations in productivity between them, while c_i is country i's input costs, and y_j the expenditure of importer j on country $i's$ products.

2.7 Empirical Model Specification

In order to measure trade costs, the study follows Eaton and Kortum (2002) as extended by Novy (2011) and used by Turkson (2012) to derive a tariff equivalent of trade costs using trade data of selected SSA countries. The derivation of a tariff equivalent is based on equation 1.

In order to address the less obvious nature of C_i and T_j, Novy (2011) derived the tariff equivalent by using a similar approach as Anderson and van Wincoop (2003). The solution for a multilateral resistance term involves multiplying the bidirectional trade flows both domestically ($x_{ii}x_{jj}$) and internationally ($x_{ij}x_{ji}$). Novy (2011) then links the bilateral trade cost $t_{ij}t_{ji}$ and domestic trade cost variable $t_{ii}t_{jj}$ with the ratio of domestic trade $x_{ii}x_{jj}$ over bilateral trade $x_{ij}x_{ij}$ to get a tariff equivalent τ trade costs measure (domestic relative to international trade) as:

$$\tau_{ij} = \left(\frac{t_{ij}t_{ji}}{t_{ii}t_{jj}}\right)^{\frac{1}{2}} - 1 = \left(\frac{x_{ii}x_{jj}}{x_{ij}x_{ji}}\right)^{\frac{1}{2\vartheta}} - 1 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

Since countries are assumed to enjoy different productivities which confer certain comparative advantage in particular goods. The trade costs measure depends on a randomly distributed Frechet parameter ϑ of the country (Novy, 2011).

When ϑ parameter is low the conclusion is that countries are dissimilar in productivity. Therefore heterogeneity forms the basis for bilateral trade, with high

dissimilarities meaning more trade. However, if countries have different productivity levels, and little trade is happening between them, this is an indication that some trade barriers are hindering international trade. Equation 2 is then related to bilateral trade flow data to compute a tariff equivalent trade cost measurement. This is beneficial since it fits both the use of cross sectional and panel data which is relevant for regional trade studies.

Further, this essay determined the relation between the constructed measurement of trade costs and variables traditionally identified to explain costs in gravity models. Thus a pooled regression of the regional trade cost in natural log of tariff equivalent trade costs τ_{ij} as the dependent variable is estimated against the traditional gravity model variables. Consequently, the estimated linear equation where continuous variables are in logs is given as;

$$\ln \tau_{ij} = \beta_o + \beta_1 \ln D_{ij} + \beta_2 Bord_{ij} + \beta_3 Sea_{ij} + \beta_4 lang_{ij} + \beta_5 EAC + \mu_{ij} \text{ .....3}$$

Where:

D_{ij} = the geographical distance between EAC countries and the trading partners,

$Bord_{ij}$ = is a dummy variable to show whether EAC countries share borders,

Sea_{ij} = a dummy that captures whether the two countries have a sea port,

$Lang_{ij}$ = a dummy variable to show whether the countries share common language, and

EAC_{ij} = the dummy of whether two countries belong to the EAC Customs Union.

2.7.1 Explanation of Variables

Distance : This is the main variable in the benchmarking gravity model (Tinbergen, 1962). The measurement is based on CEPII calculations of bilatéral distance for 225 countries worldwide. There are two types of distance in the CEPPI data set. The simple distance that use longitudes and latitudes between cities weighted by distance between the largest cities in a country ; the second distance is calculated based on the distance between two large cities and weighted by the share in a city to the overall population in a country (Mayer and Zignago 2011). The capital cities have been centres of commercial activities. The formation of EAC further improved trade along the border towns. The latter measurement of distance which is based on the city weighted with population is suitable and hence is used in this essay. The variable is expected to positively relate to the trade costs measurement.

Borders**:** CEPII also has information on whether countries share borders or not with one another. A dummy of one denotes that countries have a common border and zero otherwise. The expectation is that sharing of borders is negatively related to trade costs.

Sea port **:** The existence of a sea port should reduce the costs of trade since goods are offloaded and moved to final destinations. Landlocked countries have additional transit challenges. A categorical variable of one is used if either only one country has a sea port or if two countries have ports and zero otherwise. The expectation is that the presence of a sea port is negatively related to trade costs.

Common Language : Language eases transactions and is a proxy for informational contraints. A dummy of one is used when two countries speak the same language and zero otherwise. When language is common in countries, they should trade more as this should enhance knowledge of local market conditions.

Customs Union : When entering a Customs Union, countries commit to a common external tariff that effectively reduces tariff barriers between them. The dummy takes a value of one if a country is a member and zero otherwise. This is used to check the relation between membership to RTA and trade costs. The expectation is that belonging to EAC lowers trade costs.

2.8 Data, Sources and Descriptive Analysis

The bilateral trade data for analysis is taken from the various EAC Facts and Figures which report the trade values in million US dollars. The EAC publishes the annual trade values in aggregate figures on what is exchanged by the five EAC member states amongst themselves. The study uses total trade figures for the EAC countries within the period of 2001 to 2012, which falls within pre and post formation of the EAC Customs Union. It is thus useful in tracing the changes in trade cost.

Due to the limited data on domestic trade especially for developing countries, as Novy (2011) explained, domestic trade can be measured by subtracting total exports from total income (i.e. $x_{ii} = y_i - x_i$) on the assumption that markets clear Wei (1996). This study follows a similar approach as Anderson and van Wincoop (2004), using GDP data due to limited production data in East Africa. The use of GDP data gives

marginally higher estimates since services trade may not be captured by bilateral trade data, yet they are used in GDP calibration.

The study builds a database containing about 110 bilateral relations for the whole sample period (that is 5*4/2=10 times 11 years). Further, aggregate trade flow data covers all sectors. The data on distance (in kilometres) between the economic capitals of the trading partners were obtained from CEPII (at www.cepii.fr). Elasticity is central when calculating trade cost (Turkson 2012; Novy, 2011). Thus, the study uses Frechet parameter ϑ which is theoretically consistent with Eaton and Kortum (2002) DFS extension.

2.9 Descriptive Statistics

The study sought to assess the evolution of trade costs inferred from bilateral trade flows of the five EAC member countries. Table 2.6 provides a summary of statistics. It is noticeable that there is no much variability in the tariff equivalent trade costs in the region. The mean of tariff equivalent is 1.11 with a standard deviation of .35. Since this is a measure of international trade costs relative to domestic costs, the indication is that traders incur similar internal costs as those of trading across the borders. However, bilateral trade flows are much more varied indicating possible skewed trade patterns in favour of some EAC countries. The mean value of exports in US dollars is 74 million, with a standard deviation of about 136. The variability in trade flows is illustrated using how Kenya trades with her EAC partners in Tables 2.7, 2.8, 2.9, and 2.10. Kenya's trade with Uganda is not as highly varied as with Rwanda and Burundi. The implication is Kenya's trade with Uganda has been consistent over

time. A detailed pair-wise decomposition of other bilateral trade flows and cost relations are reported in Appendix III.

Table 2.6: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Tariff equivalent trade cost	229	1.117205	.3546261	1.81	46
Xij (exports from country i to j)	240	74.70333	136.0417	0	855.2
Xji(exports from country j to i)	237	75.02743	136.5714	0	855.2

On average, it takes about 33 days to import into Kenya and 30 days to export from the country. The tariff equivalent trade costs are highest between Kenya and Burundi (at 1.11), while Uganda has the lowest tariff equivalent cost (0.58). Indeed, this confirms the observed relation with Uganda as the leading trade partner for Kenya within the EAC block. Generally, Kenya enjoys a positive trade relation (exports from Kenya shown here by Xij) with all her trade partners (exports by partners to Kenya is given by Xji).

Table 2.7: Summary Statistics of Kenya Bilateral Trade Relations to Uganda

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij-Kenya and Uganda	12	511.35	153.33	307.8	855.2
Xji- Uganda and Kenya	11	159.41	105.41	59.1	296
Tariff equivalent trade cost	11	.58	.063	.47	.68

Table 2.8: Summary Statistics of Kenya Bilateral Trade Relations to Tanzania

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij-Kenya and Tanzania	12	298.86	130.20	141.1	541.2
Xji-Tanzania and Kenya	12	109.07	75.37	0	221.9
Tariff equivalent trade cost	11	.69	.084	.57	.81

Table 2.9: Summary Statistics of Kenya Bilateral Trade Relations to Rwanda

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij-Kenya and Rwanda	12	86.94	43.26	0	152.6
Xji-Rwanda and Kenya	12	27.89	14.25	0	59
Tariff equivalent trade cost	11	.783	.0403	.72	.84

Table 2.10: Summary Statistics of Kenya Bilateral Trade Relations to Burundi

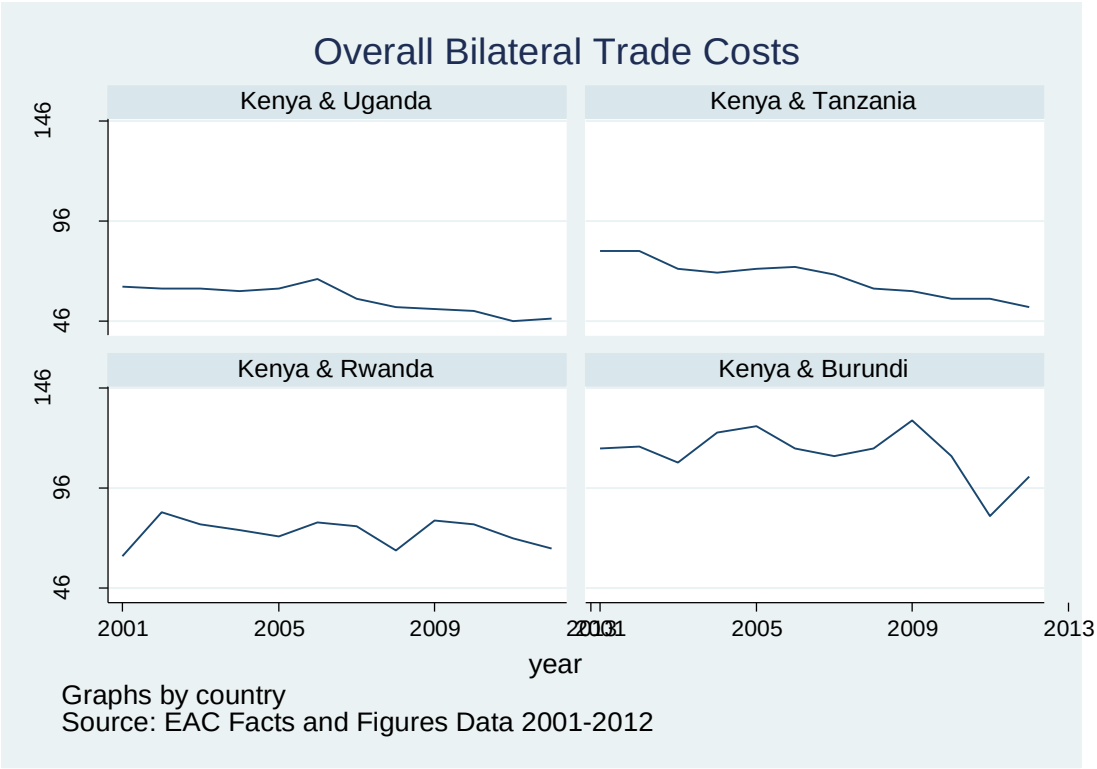
Variable	Obs	Mean	Std. Dev.	Min	Max
Xij-Kenya and Burundi	12	36.67	19.65	0	68.9
Xji-Burundi and Kenya	12	2.108	4.011	0	14.7
Tariff equivalent trade cost	11	1.147	.124	.83	1.3

Source: Author's calculation

2.10 Discussion of Results

To illustrate the variability in bilateral trade costs associated with trading between EAC countries and partners within the bloc, trade costs estimates were obtained for bilateral trade flows. As illustrated in Figure 2.1 to Figure 2.4, the tariff equivalent trade costs between EAC countries have been declining relative to their domestic costs, except in Burundi where the trade costs appear higher. Thus relative to her domestic trade costs, Burundi's bilateral trade in the region has not been declining. The implication from the model is that declining trade costs means that bilateral trade is increasing between any of the two trading EAC countries. In addition, this highlights the trade cost reducing effect (increasing trade flows) that membership to an RTA confers. Thus, the increasing trade costs trend over the period of study in Burundi indicates that her bilateral trade with other EAC partners is falling. Kenya's bilateral trade cost with Uganda is the lowest, compared to other EAC countries; while the bilateral tariff equivalent with Burundi is the highest but experienced a steep decline in year 2009.

Figure 2.1: Trends of Bilateral Tariff Equivalent Trade Cost for Kenya (2001-2013).



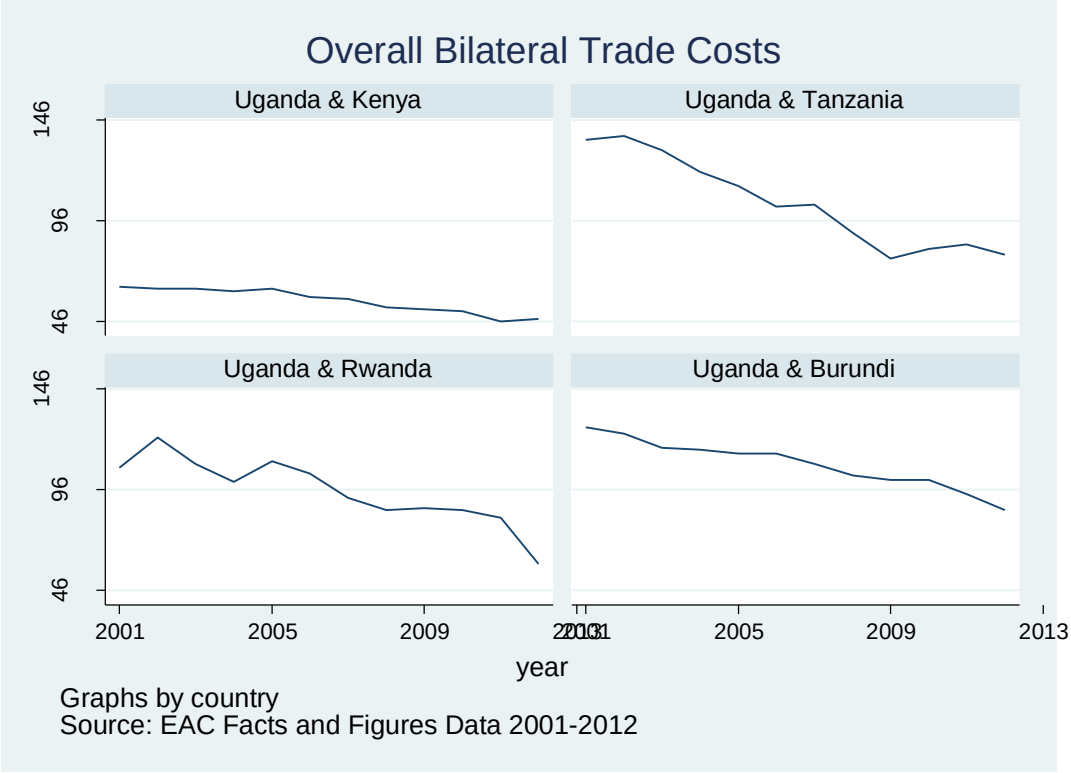
It is important to note that Rwanda and Burundi trade costs with Kenya do not have a smooth trend, with periods of declining and increasing tariff equivalent trade cost meaning decreasing trade flows. The possible reason for the decline after 2009 can be traced to the two countries (Rwanda and Burundi) becoming members of the EAC Customs Union. Table 2.11 shows the differences in the bilateral tariff equivalent cost of Kenya's EAC trade patterns.

Table 2.11 Différences in Average Trade Cost of Kenya and the Rest of EAC (2001-2013)

Country	**Kenya and Uganda Mean=56.91667**				
	Difference	**t-Stats**	**Pr(|T|>|t|)**	**Pr(T<t)**	**Pr(T>t)**
Kenya and Tanzania	-10.41667	-3.1198	0.0050	0.0025	0.9975
Kenya and Rwanda	-17	6.0863	0.0000	0.0000	1.0000
Kenya and Burundi	-56.66667	-13.6653	0.0000	0.0000	1.0000

There is statistically significant high mean for tariff eqivalent trade costs of Uganda ralative to the rest of Kenya's EAC trading partners. In other words, Uganda has a high trade flow with Kenya. The avarage trade costs difference with all the other EAC partners are statitically significant from zero given their t-test, indicating the heterogenous cost structure faced by Kenya within the region. Figure 2.2 shows how Uganda trades with her neighbours in the region.

Figure 2.2: Trends of Bilateral Tariff Equivalent Trade Costs for Uganda (2001-2013).



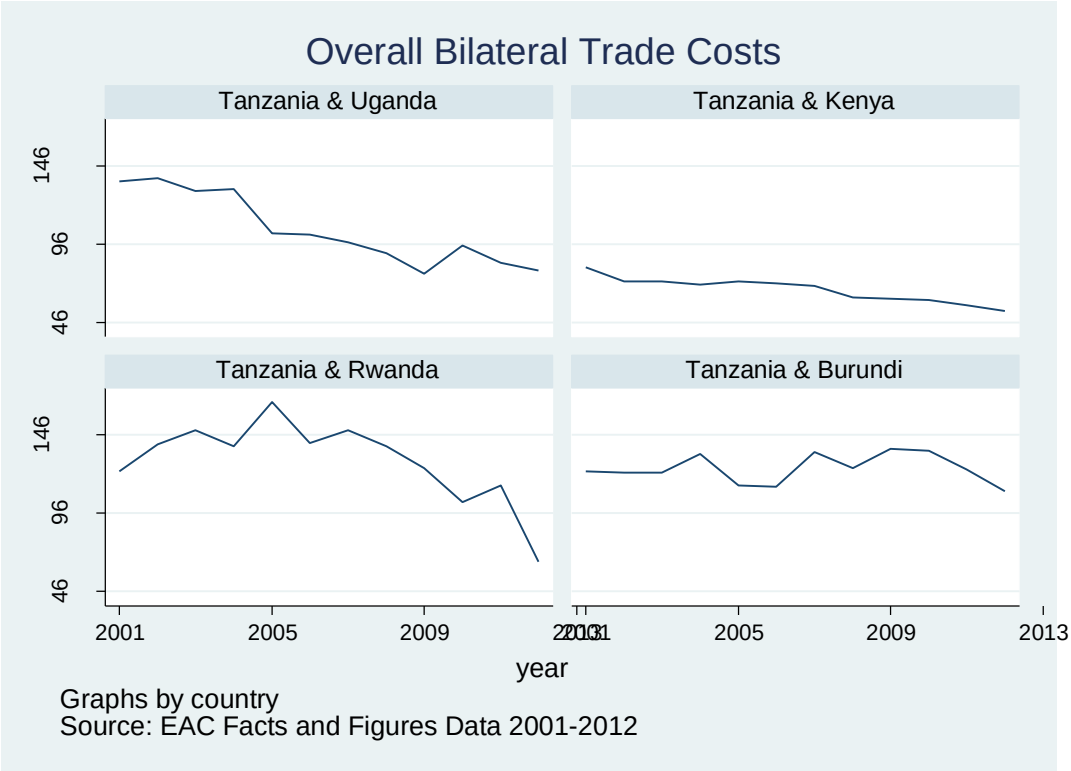
The general trend is that average Tariff Equivalent trade costs for Uganda relative to her domestic costs have been declining. Kenya relative to other EAC countries has the lowest cost with Uganda, while trade costs with Tanzania and Burundi are the highest. The t-test on the differences of the partners' trade costs is shown in Table 2.12.

Table 2.12: Differences in Average Trade Cost of Uganda and Rest of EAC (2001-2013)

Country	Uganda and Kenya Mean = 56.16667				
	Difference	**t-Stats**	**Pr(|T|>|t|)**	**Pr(T<t)**	**Pr(T>t)**
Uganda and Tanzania	-48.58333	-7.1515	0.0000	0.0000	1.0000
Uganda and Rwanda	-39.16667	-7.5885	0.0000	0.0000	1.0000
Uganda and Burundi	-52.66667	-13.3730	0.0000	0.0000	1.0000

Burundi's average differences of the bilateral tariff equivalent trade costs with Uganda is highest compared with other EAC countries, while the average trade costs of Kenya and Uganda is 56.1. There is a significant cost difference between Uganda and her partners. This possibly reflects the differences in costs incurred by Uganda traders along the Northern Corridor originating from Mombasa port in Kenya and the Central Corridor from Dar Es Salaam port in Tanzania. Tanzania's estimated trade costs are illustrated in Figure 2.3.

Figure 2.3: Trends of Bilateral Tariff Equivalent Trade Cost for Tanzania (2001-2013).



The bilateral trade costs of Tanzania with Kenya relative to her domestic costs are lowest compared to the other EAC partner countries. Since Tanzania and Kenya have port facilities, the inference is that not crossing another country in between reduces the cost for domestic traders. Rwanda and Burundi show periods of increasing cost though in line with the general decline, especially after 2009 when the two countries joined the EAC Customs Union.

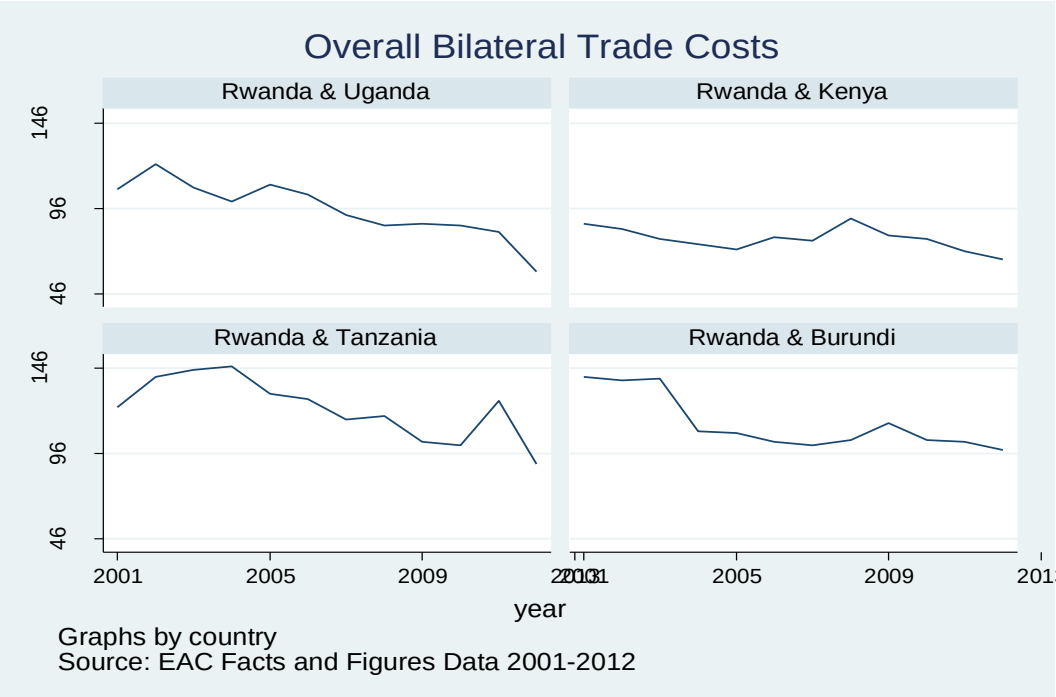
Table 2.13: Differences in Average Trade Costs of Tanzania and Rest of EAC (2001-2013)

Country	**Tanzania and Kenya Mean = 105.1667**				
	Difference	**t-Stats**	**Pr(|T|>|t|)**	**Pr(T<t)**	**Pr(T>t)**
Tanzania and Uganda	38.5	5.5472	0.0000	1.0000	0.0000
Tanzania and Rwanda	-62.83333	-7.8487	0.0000	0.0000	1.0000
Tanzania and Burundi	-57.91667	-16.3241	0.0000	0.0000	1.0000

Table 2.13 reveals that Tanzania's bilateral trade costs are different with all her trading partners. Tanzania's trade costs with Kenya are low compared to her cost with Uganda and are statistically significant. Trade costs are also higher for Tanzania and Rwanda in comparison to costs between Tanzania and Burundi even though both have high trade costs relative to Kenya and Tanzania.

Rwanda's evolution of trade cost is highlighted in Figure 2.3. Rwanda's bilateral trade costs with other EAC countries show a general declining trend. Compared with other EAC partner countries, Rwanda's bilateral trade cost with Kenya is the lowest explained in part by Rwanda's trade reforms, and bilateral trade arrangements on the implementation of the Customs Union protocol with Kenya. The country's trade cost with Tanzania and Uganda shows a steady decline especially after 2005.

Figure 2.4: Trends of Bilateral Tariff Equivalent Trade Cost for Rwanda (2001-2013).



The t-test in Table 2.4 indicates that there are significant differences in bilateral trade costs between Kenya and Tanzania. The average trade cost with Kenya is lower compared with Tanzania and Uganda, explained in part by Rwanda's bilateral agreement on free movement of labour from Kenya under the provisions of the EAC common market protocol

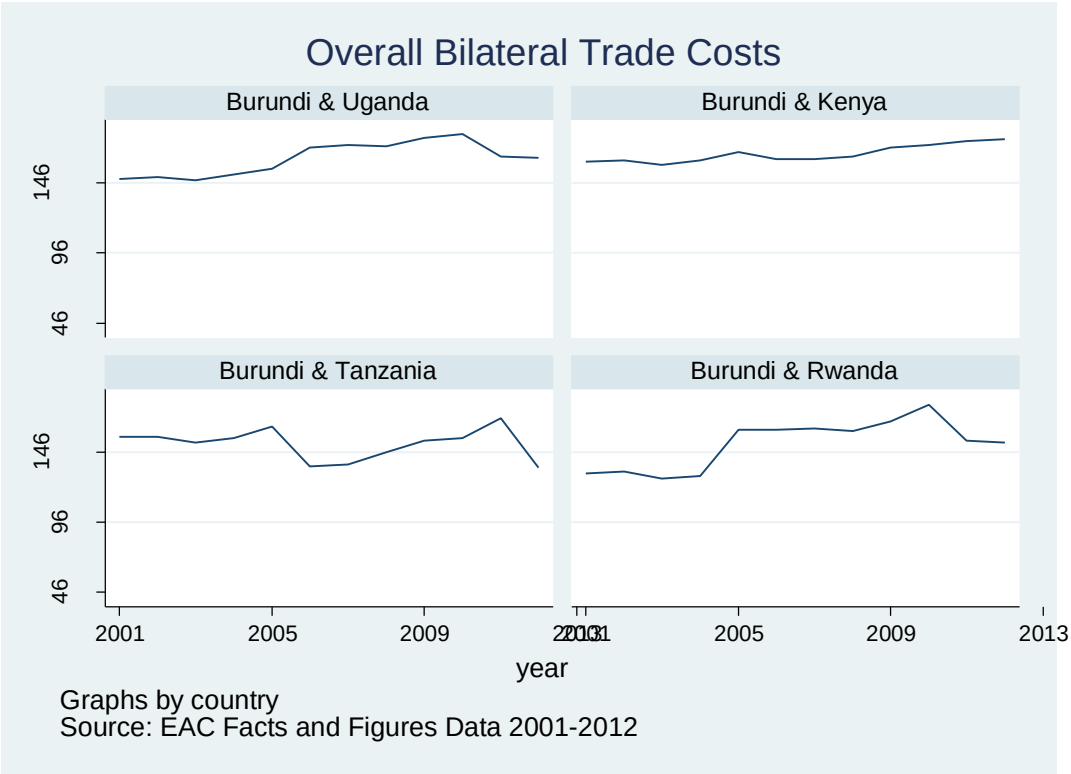
Rwanda's average bilateral trade costs relative to Tanzania and Burundi are high compared to her average cost with Uganda. The difference though is not to be statistically significant for Burundi, meaning that the cost is the same as Uganda.

Table 2.14 Differences in Average Trade Cost of Rwanda and Rest of EAC (2001-2013)

Country	**Rwanda and Uganda mean=**95.25				
	Difference	**t-Stats**	**Pr(|T|>|t|)**	**Pr(T<t)**	**Pr(T>t)**
Rwanda and Kenya	17.16667	3.2976	0.0033	0.9984	0.0016
Rwanda and Tanzania	-27.25	-3.8522	0.0009	0.0004	0.9996
Rwanda and Burundi	-18.41667	-2.7251	0.0124	0.0062	0.9938

Figure 2.5 illustrates Burundi's average cost with her trading partner countries. Of all the EAC countries, Burundi's bilateral trade cost shows an increasing trend. Indeed, Burundi and Kenya have a steady increase in trade cost, while Uganda, Tanzania and Rwanda experience trade cost fluctuations. The explanation is that relative to domestic trade costs, Burundi is not addressing the domestic trade costs factors that would convert local non-tradable into tradable and retain possibly high barriers against Kenyan goods. Thus, Burundi's poor trade performance in the region is hence reflected by the rising trade costs with other EAC trade partners.

Figure 2.5: Trends of Bilateral Tariff Equivalent Trade Cost for Burundi (2001-2013)



The test for differences as reflected in Table 2.15 shows that Burundi's average bilateral trade costs with Kenya is low compared to her trade with Tanzania and it is significantly different, while Uganda, though low, has no statistical difference implying that Burundi's trade costs relative to domestic costs are the same as her trade costs with Tanzania. While Burundi's trade costs with Rwanda are marginally high compared to trade costs with Tanzania, the difference is not statistically significant.

Table 2.15: Differences in Average Trade Costs of Burundi and Rest of EAC (2001-2013)

Country	Burundi and Tanzania mean=166.6667				
	Difference	t-Stats	Pr(|T|>|t|)	Pr(T<t)	Pr(T>t)
Burundi and Kenya	14.91667	4.0633	0.0005	0.9997	0.0003
Burundi and Uganda	11.5	2.4457	0.0229	0.9885	0.0115
Burundi and Rwanda	-.0833333	-0.0138	0.9891	0.4946	0.5054

Table 2.15 demonstrates that save for Burundi, all EAC countries have declining bilateral trade cost relative to their domestic trade costs. It also demonstrates that Rwanda and Burundi have periods of fluctuations in the bilateral trade costs. The fluctuations indicate the possibility in the application or existence of non-tariff barriers within the two countries.

2.11 Estimation Results

To empirically determine how far the traditional gravity variables are consistent in explaining the tariff equivalent trade costs, the gravity variables were introduced in a regression equation. Novy (2011) used both geographical variables and institutional factors in his regression. We estimated pooled regional panel, including all the countries, since the gravity control variables are common between the countries. The control variables are commercial distance, membership to EAC RTA, sharing of borders, language, and presence of a sea port as the control variables. Since all the control variables, except distance, were time invariant, fixed effects estimation would wipe all the time invariant variables. Therefore random effect estimation would give consistent estimates without the loss of time invariant variables; the estimation was performed including robust standard errors.

The results from the estimation indicate that key gravity variables had the expected signs and they were significant. All the variables together explain about 40 per cent variation in the bilateral trade cost within the EAC region. The low R-square is tolerable since the model included only variables traditionally used in gravity models.

Table 2.16 gives the relation of trade costs with the variables. Distance significantly increases trade costs among the trading partners: a 1 per cent increase in distance raises the cost of trade by about 0.06 per cent. Border procedures significantly increase trade costs given the positive coefficient of the variable. In particular when countries move from not having common border point to sharing border points, trade costs were determined to increase by about 7.9 percent, this mainly due to border procedures that escalate the costs of trade across the borders.

Having an ocean port reduces trade costs significantly by 38.68 percent, meaning that landlocked countries find it costly to trade since they have to access the ocean ports by transiting through other territories with potential trade barriers. Joining the EAC trade arrangements reduce costs of trade by 14.22 percent. The reasons include to the formation of Common External Tariff under the customs union and reduction in non-tariff measures due to common market, while not sharing a language increased bilateral trade costs by 4.67 per cent though not a significant determinant of trade costs. Languages are linked to the ease of transaction and acquiring local information, thus sharing a language is deemed to facilitate transactions. The estimation only included the traditional variables used in gravity estimates thus explaining the low adjusted R-square in the estimation results. The factors included were informed by the

computation of the trade costs measurement, since all other factors which affect trade and change overtime are taken to be reflected in the trade flow figures.

Table 2.16: Estimation of Tariff Equivalent Trade Cost

Variables	(1) Dependent variable: Log of Trade Costs
Membership to EAC-Customs Union	-0.1422***
	(0.0273)
Sharing common language	-0.0467
	(0.0563)
Having sea port	-0.3868***
	(0.0256)
Sharing borders	0.0790***
	(0.0253)
Bilateral distance	0.0006***
	(0.0001)
Constant	1.0619***
	(0.0904)
Observations	228
R-Square(within)	.39
R-Square(between)	.65
R-Square(Overall)	.40
Wald chi2(5)	3293.43
Prob>chi2	0.0000
Number of groups	12

*** p<0.01, ** p<0.05, * p<0.1

2.12 Summary, Conclusion and Policy Implications

This study sought to examine the evolution of trade costs between EAC member countries, and testing if there was difference in the estimated bilateral trade costs. This was achieved by constructing a theoretically consistent trade cost measurement using intra-EAC trade flow data, and find out if there were any significant bilateral differences. The approach is consistent with the theoretical foundations of gravity

model used to study trade costs (Novy 2011). Further, the estimates are comprehensive as they capture factors that are not easily observable though they significantly affect trade between countries.

Additionally, unlike the previous method of measuring trade costs from traditional gravity variables like distance, the trade flows approach in which costs change over time fits well the data obtained from domestic and international trading activities which are affected by changes in transport and communication technologies. Thus the use of trade flows method to measure trade costs is better than the use of geographical distance between countries, that certainly does not change with time.

The study went further to verify the difference in the estimated tariff equivalent trade costs for each of the EAC countries. It tested the trade costs measure against the variables originally used in gravity model to infer how they relate with trade cost estimates from random effects model.

The results show that trade within EAC has been increasing with the general decline in trade costs among partners. Kenya is identified as a leading exporter since her trade costs have declined with all the partners to an average of 0.5 of tariff equivalents over the period of study. Therefore, the expansion in Kenya's trade performance can be attributed to the decline in her bilateral trade costs with partner countries. Uganda, the leading destination for Kenya's export, has experienced the least decline in bilateral costs of about 0.56 of tariff equivalent. One also draws a similar conclusion to explain why Burundi has the least trade among the regional partners. The bilateral tariff equivalent trade costs of Burundi with the rest of EAC partners have an upward

trend, which undermine bilateral trade. The test for any difference in trade costs shows that Kenya, Uganda and Tanzania face varying trade costs between their trading partners. Rwanda faces similar trade costs as Uganda and Burundi, while there are no differences in the costs faced by Burundi in Uganda, Rwanda and Tanzania.

The second objective of this essay was to determine the relationship between the trade costs and traditional gravity variables. The study assumed similarity of the control variables in both models. It therefore estimated a pooled regional panel using EAC as a single block. Distance has, over the years, been the benchmark for trade costs measure. Indeed, the study finds that it is positively related to trade costs confirming earlier works that the far apart countries are, the less they trade. Since distance is reduced through better transport systems, this particular finding is important for the design of policies intended to support joint investment in better transport facilitation.

The study also finds that partners with access to a sea port experience lower trade costs. The implication of this is that landlocked member countries incur high costs to access international markets. Moreover the speaking of different languages in member countries is trade limiting because it increases the cost of acquiring information about local markets. In addition, belonging to the EAC-RTA is trade enhancing, since it reduces certain trade costs components. The policy implication is to deepen regional integration and address border procedures both at the port and at the border between the countries.

APPENDIX I

Trade Dependency Index

Trade dependence index given by $\frac{\sum_s X_{ds} + \sum_s M_{ds}}{GDP_d} \times 100$ is also called the openness index. It measures the ratio of international trade to total value of net output as given by the gross domestic product. Where d is the country of study, s is the set of all other countries, X is the total bilateral exports, M is the total bilateral imports and GDP is the gross domestic product of the country under study. The index ranges from 0 to + ∞. A high index value indicates a more open economy, although the index can be biased by factors like economic size and policy shocks.

Overall Trade Restrictiveness Index (OTRI): It is used to determine how trade policies create distortions in a country's imports. The index measures uniform tariff equivalent of the country tariff and non-tariff barriers (NTB) that would generate the same level of import value for the country in a given year. The tariffs used are based on the MFN tariffs applied to all trading partners, or the applied tariffs, which takes into account the bilateral trade preferences.

The OTRI_T is the index that only focuses on the tariffs of each country. No NTBs are considered in the calculation of OTRI_T. Similar to OTRI, tariffs can be based on both MFN and applied tariffs.

Market Access Overall Trade Restrictiveness Index (MAOTRI): This addresses trade policy distortions on exports imposed by the trading partners of a country. It measures the uniform tariff equivalent of the partner country tariff and non-tariff barriers (NTB) that would generate the same level of export value for the country in a given year. Tariffs can be based on the MFN tariffs which applies to all trading partners, or the applied tariffs, which take into account the bilateral trade preferences.

Tariff-only Market Access Overall Trade Restrictiveness Index (MAOTRI_T): only focuses on the tariffs of the trading partners of each country. No NTBs are

considered in the calculation of MAOTRI_T. Similar to MAOTRI, tariffs can be based on both MFN and applied tariffs.

Table: A1: Logistics Performance Index of EAC Countries

						Global leader
	Kenya	Tanzania	Uganda	Rwanda	Burundi	Singapore
Logistics Performance Index						
Aggregate score	2.43	2.65	2.82	2.27	1.61	4.13
Efficiency of customs procedures	2.08	2.17	2.82	2.19	1.67	4.1
Percentage of cargo Inspected	25%	un	75%	un	60%	1%
Infrastructure quality	2.16	2.14	2.35	1.88	1.68	4.15
Ease of International shipping	2.69	2.91	3.02	2.27	1.57	3.99
Timeliness of delivery	2.88	2.97	3.52	2.76	1.67	4.39
Cross border Trade Indicators						
Import documents	7	8	9	8	10	4
Export documents	8	8	7	8	9	4
Import days	24	31	34	31	54	4
Export days	26	29	37	29	35	5

Source: World Bank (2010, 2012)

a. A score of 1 is the worst, 5 is the best.

b. Un –information was not available.

APPENDIX II: DORNBUSH FISHER SAMUELSSON DFS-MODEL

This part demonstrates the derivation of the Eaton and Kortum (2002) trade model and Diagne *et al,*. (2012), who employ DFS 'ice-berg view' of trade costs by letting the producer be given by *i* while the importer is indexed by *m.* The efficiency of country *i* in producing continuum of commodities $j \in (0,1)$ is given by $z(j)$.

The input cost for producer *i* is represented by the price of industrial labour denoted by w_i

The cost of producing one unit of intermediate agricultural product *j* is $\frac{w_i}{z_j}$ assuming constant returns to scale. Following the "Ice-berg" view, trade costs for a unit from country *i* to country *m* means producing *dmi* units. Importers in country *m* are assumed to share and maximize the constant-elasticity-of-substitution (CES) utility function as:

$$U_m = \left[\int_0^1 Q(j)^{(\sigma-1)/\sigma} d_j\right]^{\sigma/(\sigma-1)} \quad \text{Subject to} \quad X_m$$

Equation 1

Q_j, is the amount of purchased goods, $\sigma \succ 0$ is the elasticity of substitution among the capital and intermediate products and X_m is aggregated total spending/imports by country.

Under perfect market conditions the price of commodity *j* that *m* pays from country *i* is given by:

$$P_{mi}(j) = \left[\frac{w_i}{Z_i(j)}\right] d_{mi}$$

Equation 2

The above equation gives the unit cost of production multiplied by the geographical barrier. The rationality assumption ensures importers in country *m* source from the most competitive price for agricultural capital or intermediate product *j,* from all source countries *i,* up to *N* countries as:

$$P_n(j) = \min\{P_{ni}(j); i = 1.....N\}$$

Equation 3

EK (Eaton and Kortum, 2002) defines (z_j) and its associated price as a random variable, the distribution of prices is defined by extreme value distribution, country *m* chooses the least-cost supplier, therefore the Fréchet extreme value distribution of random variable (Zj) is expressed as:

$$F_i(z) = \Pr[Z_j \leq z] = \exp(-T_i, z^{-\theta})$$

Equation 4

Where *Ti* > 0 is the state of technology in country *i*, and defines the location of yield distributions, with higher T_i meaning higher yield in country *i*. θ > 1 influences yield distributions, such that a lower θ implies a broader agricultural product yield distribution for each agricultural product in each country.

Under comparative advantage frameworks high-productivity agricultural products will be exported and low-productivity agricultural products will be imported. Note that $P_{mi}(j)$ defines the price that country *i* supplies to country *m* as random variable. Therefore, cumulative distribution function is derived by incorporating the price equation (2) into the yield distribution (4) for $\forall$ *p*>0. As demonstrated by EK (2002), the probability that country *i* supplies country *m* at the lowest price is:

$$\Pr[P_{mi}(j) \leq \min\{P_{ns}(j); s \neq i\}] = \frac{T_i(w_i d_{mi})^{-\theta}}{\sum_{i=1}^{N} T_i(w_i d_{mi})^{-\theta}}$$

Equation 5

The above equation shows that *m*'s probability of buying from *i* is conditional on the state of technology (T_i), represented here by manufactured product yield in country *i* the trade costs between *m* and *I*, (d_{mi}) and the cost of land in *i* (w_i). Due to better technology, lower input cost and trade barriers, country *i* exports a wider range of goods to country *m*. The equation above relates *m*'s share of spending on agricultural products from *i* such that X_m is country *m*'s total spending on agricultural products, and X_{mi} is *m*'s spending on capital and intermediate agricultural products from country *i*, with *i* = *m* when a country is in the domestic market. The sum from all supply sources gives $\sum_{i=1}^{N}(X_{mi}/X_m)$.

Due to the assumption of continuum of goods, the share of country *m* expenditure used to trade from country *i* is equal to equation (5), hence giving the following

$$\frac{X_{mi}}{X_m} = \frac{T_i\left(w_i d_{mi}\right)^{-\theta}}{\sum_{i=1}^{N} T_i\left(w_i d_{mi}\right)^{-\theta}}$$

Equation 6

Equation (6) is linked to data on trade shares and the initial determinants of why countries trade, like yield (T_i, θ), geographic barriers (d_{mi}) and price of agricultural product land (w_i). Where X_m is country's *m* total spending of which X_{mi} gives the Cost Insurance and Freight (CIF) on goods from *i*. Equation (6) therefore links to the theoretical foundation of a standard gravity equation since it posits that bilateral trade is a function of importers total expenditure and negatively related to geographical barriers. Exporters' total sales is given as Q_i which is expressed as:

$$Q_i = \sum_{m=1}^{N} X_{mi} = T_i c_i^{-\theta} \sum_{m=1}^{N} \frac{d_{mi}^{-\theta} X_m}{\Phi_m}$$

$T_i c_i^{-\theta}$ can be solved and substituted back into (6) while bringing equation (5) to give;

$$X_{mi} = \frac{\left(\frac{d_{ni}}{p_n}\right)^{-\theta} X_n}{\sum_{m=1}^{N}\left(\frac{d_{mi}}{p_m}\right)^{-\theta} X_m} Q_i$$

Equation 7

This equation gives a standard gravity equation; exporters' total sales Q_i and importers total purchases X_m enter the equation with unit elasticity. The geographical barrier is deflated by any importers price level P_m, competition reduces the price P_m reducing country *i*'s, access to *m* markets similar to geographical barriers. Thus, $(d_{mi} / p_m)X_m$ is the market size (GDP) of the buying country *m* as perceived by the exporter country *i*.

APPENDIX III

Constructed Bilateral Trade Flows and Tariff Equivalent Trade Costs among EAC Member Countries

Uganda and Kenya

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(Export from Uganda-i to country Kenya-j)	12	155.5167	108.4802	0	296
Xji(Exports from Kenya to Uganda)	12	511.3167	153.3772	307.5	855.2
Tariff Equivalent Trade Cost	11	.57	.0570964	.46	.63

Uganda and Tanzania

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij Exports from Uganda-i to Tanzania-j)	12	41.05	38.32074	0	94.7
Xji(Exports from Tanzania to Uganda)	12	27.08333	27.46796	0	89.1
Tariff Equivalent Trade Cost	11	1.070909	.2225064	.77	1.38

Uganda and Rwanda

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(Exports from Uganda-I to Rwanda-j)	12	70.25833	74.33571	0	192.1
Xji(Exports from Rwanda to Uganda)	12	2.083333	2.180423	.1	6.3
Tariff Equivalent Trade Cost	11	1.176364	.1954621	.87	1.52

Uganda and Burundi

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(Exports from Uganda-i to Burundi-j)	12	24.38333	22.67874	0	63.6
Xji(exports from Burundi to Uganda)	12	1.4	1.075344	0	4.3
Tariff Equivalent Trade Cost	11	1.153636	.1259581	1.01	1.43

Tanzania to Uganda

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(Exports from Tanzania-I to Ugana-j)	12	50.10833	84.6084	5.5	307.8
Xji(Exports from Uganda to Tanzania)	11	46.22727	37.32528	5.7	94.7
Tariff Equivalent Trade Cost	11	1.075455	.2215113	.77	1.38

Tanzania to Kenya

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(Exports from Tanzania-i to Kenya-j)	12	122.5667	66.40085	35.3	221.9
Xji(Exports from Kenya to Tanzania)	12	307.1417	112.6515	141.1	470
Tariff Equivalent Trade Cost	12	.68	.0675547	.57	.81

Tanzania to Rwanda

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(exports from Tanzania-i to Rwanda-j)	12	28.86667	38.54884	1	101
Xji(Exports from Rwanda to Tanzania)	12	3.4	2.521544	.6	7.9
Tariff Equivalent Trade Cost	12	1.270833	.1655546	.99	1.49

Tanzania to Burundi

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(Exports from Tanzania-i to Burundi-j)	12	23.50833	17.92984	1	67.4
Xji(Exports from Burundi to Tanzania)	12	.7333333	.3576014	.1	1
Tariff Equivalent Trade Cost	12	1.283333	.1168008	1.13	1.55

Rwanda and Uganda

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(Exports from Rwanda-i to Uganda-)	12	2.166667	2.17604	.1	6.3
Xji(Exports from Uganda to Rwanda	11	96.54546	83.41593	12.9	228.6
Tariff Equivalent Trade Cost	11	1.12	.2056696	.85	1.52

Rwanda and Kenya

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(Exports from Rwanda-i to Kenya-j)	12	30.275	11.43194	16.5	59
Xji(Exports from Kenya to Rwanda)	12	99.8	71.29194	1	286
Tariff Equivalent Trade Cost	12	.8166667	.1556998	.7	1.29

Rwanda and Tanzania

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(Exports from Rwanda-i to Kenya-j)	12	3.3	2.612905	.6	7.9
Xji(Exports from Kenya to Tanzania)	12	22.75	29.37632	1	86.2
Tariff Equivalent Trade Cost	12	1.296667	.171535	1.01	1.5

Rwanda and Burundi

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(Exports from Rwanda-i to Burundi-j)	12	2.566667	2.25281	.4	6.2
Xji(Exports from Burundi to Rwanda)	12	3.008333	2.18859	1	8.6
Tariff Equivalent Trade Cost	12	1.206667	.1223507	1.04	1.4

Burundi and Uganda

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(Exports from Burundi-i to Uganda-j)	12	1.15	1.256619	0	4.3
Xji(Exports from Uganda to Burundi)	12	28.825	22.88426	0	63.6
Tariff Equivalent Trade Cost	11	1.631818	.1248053	1.48	1.81

Burundi and Kenya

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(exports from Burundi-i to Kenya-j)	12	1.858333	4.111062	0	14.7
Xji(Exports from Kenya to Burund)	12	36.15	19.85051	0	68.9
Tariff Equivalent Trade Cost	12	1.651667	.0558949	1.59	1.76

Burundi and Tanzania

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(Exports of Burundi-i to Tanzania-j)	12	.175	.2632835	0	.6
Xji(Exports from Tanzania to Burundi)	12	19.7	12.29745	0	39.8
Tariff Equivalent Trade Cost	12	1.534167	.0980221	1.36	1.7

Burundi and Rwanda

Variable	Obs	Mean	Std. Dev.	Min	Max
Xij(Exports form Burundi-I to Rwanda-j)	12	2.5	2.588085	0	8.6
Xji(Exports from Rwanda-	12	2.333333	2.31412	.4	6.2
Tariff Equivalent Trade Cost	12	1.499167	.1876388	1.27	1.8

CHAPTER THREE

THE EFFECT OF AID FOR TRADE ON KENYA'S INTER-EAST AFRICA TRADE

3.0 Background and Problem Statement

The reduction in global trade costs occasioned by decline in tariffs rates after the formation of WTO and various RECs brought up new challenges that countries encounter in attempting to integrate into the global trading system. With more goods being traded, countries required, for example, to improve their transport systems or custom clearance.

For developing countries, the preferential market access in the Northern countries never meant much in terms of trade because of their inability to exploit the export market opportunities (Oyejide, 2008). Trade reforms through tariff liberalisation have therefore not achieved much in terms of increasing trade and development outcomes in developing countries (Huhne *et al*., 2013). Of concern is the ability of developing countries to produce and efficiently sell in these developed markets. Addressing non-tariff barriers within the exporter developing countries and those imposed by importers is a policy concern for many developing regions. Additional challenges for these developing countries include less diversified exports, poor trade promotion and slow adjustment to global trade reforms (OECD/WTO 2011).

Even though developing countries enjoy preferential market access in the North, their inability to integrate into global supply chains has shifted concern away from the

traditional trade barriers previously making-up trade costs, to other trade impediments that are less visible or quantifiable but negatively affect international trade.

The existing non-tariff factors still add substantial costs thus resulting into high transaction charges, delays in customs and border clearance. These trade barriers result into loss of business opportunities due to the high transaction costs they impose on these countries (Vijil, 2012; Busse *et al*., 2011). As a result, low income regions endure global uncompetitivenes caused by untimely and unpredictable deliveries, with equally expensive supply chains (Hoekman and Njinkeu, 2007).

Whereas world maritime costs have fallen to an average cost of 6.5 per cent of the import costs in developed countries, it remains 7.8 per cent or around 22 per cent high for developing countries (UNCTAD 2011). The cost is even higher in SSA, which is estimated to be 68 per cent more costly compared to developed countries or 10.6 per cent the costs of imports (ibid). In addition, other transaction costs such as transport and insurance are still high, with transport cost constituting 7.7 per cent cost of exports. This is much higher than the global average of 3.7 per cent (UNECA 2013). Samuelson (1953) observes that high transport costs melt away some goods along the transportation chain.

The apprehension is that previous trade reforms in developing countries have failed to integrate these countries into the world trading system (Oyejide 2008). One avenue identified to facilitate developing countries to integrate into the global economy is aid for trade (Suwa-Eisenman and Verdier 2007). Official development assistance (ODA) was redesigned during the WTO Hong-Kong Ministerial conference in 2005, to

explicitly include funds for trade facilitation above regular development aid. It was acknowledged that trade reforms defined within trade facilitation goes beyond reducing cumbersome border procedures to include whole trade supply chains. Thus, with limited public resource and capacity, the reforms were deemed costly to implement in many developing countries (Harllert 2012).

Does a relationship exist between aid for trade and trade outcomes? Aid policy makers hold that aid stimulates trade flows (Llyod *et al*., 2010). The references are made to the different channels used in delivering aid for trade. Aid proponents assert that addressing supply side constraints improves the productive capacity, allows firms to diversify and reduces transactions delays, thus integrating firms into global supply chains (ODI, 2013, Busse *et al*., 2011). Aid for trade is thus seen to serve a complementary role to domestic savings, investment promotion and economic growth through induced public expenditure (Vijil and Wagner, 2010, Suwa-Eisenman and Verdier, 2007; Adam and Bavan, 2006).

There is however an ambiguous relationship between aid for trade and recipient countries international trade flows. The finding in literature is mixed and results are not conclusive. This is partly due to different perceptions by countries on what trade facilitation is. The benchmark however is that aid for trade facilitation initiatives should complement and address trade specific needs of each country or region. Suwa-Eisenmann and Verdier (2007); Hallaert (2010); Busse *et al*., (2011); Vigil and Wagner (2010); and Cali *et al.* (2007) are in agreement that aid for trade reduces transaction costs and leads to increased trade. Winters and Xavier (2015) on the contrary, suggest that the effect of aid for trade is minimal on trade outcomes.

Similarly, the possibility of aid triggering "Dutch Disease" if not sustained in the long run, means that aid could undermine trade outcomes in the recipient countries (Barder, 2006). The empirical gap is whether aid for trade results into better trade between the recipient countries (inter and intra-regional trade). Previous works have examined the effect of aid for trade between the donors and aid recipient countries.

This chapter therefore answers the following questions: How does aid for trade affect trade among developing countries? Is aid for trade for infrastructure more important compared to aid for policy and regulation reforms?

3.1 Objectives of the Study

The broad objective of the study is to determine how aid for trade facilitation affects trade outcomes. The specific objectives are to:

i. Determine how aid for policy and regulations affect export trade.
ii. Establish the extent of aid for economic infrastructure on export trade.
iii. Draw policy implications on the effect of aid for trade facilitation in Kenya.

3.2 Justification for the Study

Even though there are various arguments about the observed positive relationship between aid and trade flows, such associations are inferred using the donor-aid recipient trade relations. But whether such a relationship between aid and trade outcomes exists amongst recipient countries alone, is yet to be verified. Furthermore the desire to promote regional trade demands choosing between competing national and regional policy priorities. Therefore the choice between trade policy reforms or

investment in infrastructure depends largely on domestic and regional economic community (REC) development goals.

Yet giving high priority to investment in infrastructure for example, without complementary trade policy reforms is likely not to produce the desired trade outcomes. Determining whether aid for economic infrastructure has greater effect on trade flows relative to aid meant for trade policy or vice versa in increasing regional trade flows should enrich the policy choices within the REC. This analysis is important for two main reasons. First, it is not easy to choose between policy reforms and infrastructure investment since it is not clear which one would be more effective in trade facilitation. Second, there is an increasing desire to promote South-South trade, such as the formation of EAC-COMESA-SADC tripartite, which offer important trade opportunities for members of the EAC.

This study therefore seeks to fill the empirical gap by building on previous literature focusing on the South-South trade, while giving attention to aid for trade meant to address for economic infrastructure and trade policy constraints. The study goes beyond the effect of two trade facilitation measures (aid for trade policy and infrastructure) and the aggregated EAC trade flows into the wider eastern Africa countries. It also introduces economic infrastructure and trade policy variables to determine the relationship between these factors in the presence of aid for trade disbursements.

3.3 Trade Structure in East Africa

East African countries have a long history of cooperating in terms of economic, cultural and political levels from the early twentieth century with the formation of the

first East Africa Community in 1919 (Shams and Busse 2003; Kesssides and Benjamin, 2012). This involved a Custom Union between Kenya and Uganda in 1919. Tanganyika later joined the Union in 1923 (Mahona and Mjema, 2014). Closer economic ties were established by the formation of the East Africa Common Services Organisation in 1961 to cater for common services such as rail, road, and postal services in the region. The organisation ceased to operate when the first EAC was formed in 1967. However, ideological and political differences between the countries eventually led to the collapse the first EAC in 1977.

The 'new' EAC is therefore a second attempt to foster deeper regional cooperation and improve the general welfare of East Africa citizens. The treaty establishing the second EAC was signed on 30th November 1999, and came into effect in 2001 after ratification by three founding countries namely: Kenya, Uganda and Tanzania. A key development has been the inclusion of Rwanda and Burundi in the new East African Community in year 2009. These countries anticipate enhanced socio-economic development of member states to more trade and investment, sustainable growth and equitable development (Rutaihwa and Rutatina, 2012).

The traditional purpose of forming regional blocks has been to promote trade flows among member countries. Within the region, there has been an increase in trade flows between EAC countries, more so after the formation of the common market in 2010 which established the "four freedoms.' The freedoms are movement of goods, labour, services and capital (Mahona and Njema, 2014). While trade promotion has remained a core purpose, there is also increasing recognition of the possible welfare benefits that can accrue due to regional cooperation (Kassides and Benjamin, 2012) and as a

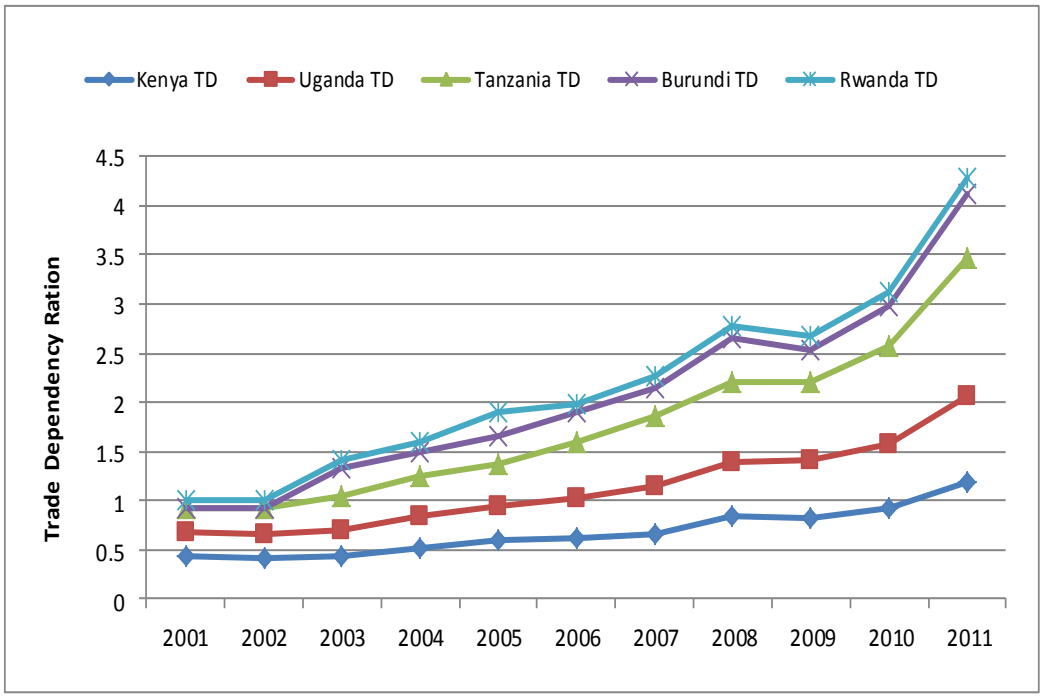
solution to maximise global efficiency under free trade and less trade distortion measures (Kikpatrick and Watanabe, 2005).

To achieve these objectives of Regional Trade Agreement (RTA), the EAC Treaty (2000) put in place policies to widen and deepen regional cooperation among the member states. A Customs Union became the entry point into the regional trade integration and it envisages a monetary union culminating into a political federation (ibid). The Customs Union resulted into a common external tariff (CET) and the removal of internal tariff and non-tariff barriers among EAC member states (Trade Mark East Africa-TMEA 2014). Further, as part of progressive regional trade integration, a common market protocol was launched in 2010. The common market was intended to ease the movement of persons, capital and right to residency.

The regional trade integration in East Africa has thus expanded the markets and raised the profile of member countries as key markets for goods from the region (TMEA, 2012). The outcome of trade liberalisation in the East African region is illustrated in Figure 3.1, which shows the trend of Trade Dependency Index[4] (TDI) among the countries between 2001 and 2011. The degree of trade openness has been increasing in all the EAC member countries. Rwanda and Burundi lead in terms of trade openness, while Kenya and Uganda have low TDI relative to other EAC trading partners. The relatively lower TDI for Kenya and Uganda is explained by a large part of their gross domestic product being created by non-tradable economic activities in their domestic markets.

[4] The calculation of Trade Dependency Index or Trade Openness Index is based on the formula in Appendix I.

Figure 3.1. Trend of Intra-EAC Trade Dependency Index (2001-2011)



Source: Authors

Despite increasing overall openness to international trade by EAC partner states, the growth of intra-EAC trade as a share of GDP has been declining. UNECA (2013) reported that between 1996 and 2000, growth of trade to GDP was 13.8 per cent. This dropped to 13.1 per cent between 2001 and 2006, and further to 12 per cent in 2007 and 2011. The declining share of intra-regional trade to GDP is partly attributed to poor trade facilitation by EAC countries. Poor trade facilitation is demonstrated by the low ranking in Logistics Performance Index (Wold Bank, 2013). A similar evaluation by the East Africa Shipping Council-EASC (2014) on the region's Logistic Performance Indicators (LPI) confirms low efficiency in goods clearance, quality and availability of logistics infrastructure, quality of logistic services, and level of preparedness for international trade.

Table 3.1 gives a summary of the score on various logistic performance components and overall ranking among EAC states. Based on the average country score on the LPI indicators, Rwanda (3.53) and Burundi (2.78) are ranked first and last respectively while Kenya (2.82) is ranked fourth, Uganda (3.07) second and Tanzania (2.89) third. Burundi scored four points in security of transit cargo and fairness in custom. Other EAC countries failed to score beyond 3.9 on different indicators. The complexity of transaction in Kenya makes it to be ranked the least in resolving trade disputes while Rwanda is ranked the best in the region. Equally, Burundi and Kenya are perceived as less transparent in customs valuation.

Table 3.1 Logistics Performance and Ranking of EAC Countries (2014)

Indicator	Individual Country Score				
	Burundi	**Kenya**	**Rwanda**	**Tanzania**	**Uganda**
Efficiency of goods clearance process	2.91	3.00	3.00	2.53	3.13
Quality of transport and ICT infrastructure	2.73	2.85	3.30	2.;73	2.90
Competence and quality of logistics services	2.86	2.54	3.00	2.93	3.20
Preparedness for international trade by shippers	2.00	3.23	3.25	3.00	3.20
Timely delivery of shipments	2.62	2.62	3.00	3.07	3.03
Security of cargo while on transit	4.01	3.15	3.90	3.00	4.23
Indicator of Complexity of Transactions					
Shipment physically inspected(5)	1.42	2.54	3.80	3.07	1.93
Handling of trade related disputes	3.00	2.00	4.00	2.90	2.83
Fairness and transparency in customs valuations	4.01	2.39	3.50	3.20	3.47
Communicating changes in trade regulations	2.00	3.77	4.10	2.87	3.30
Incidence of corruption and rent seeking	3.00	2,92	3.85	2.53	2.57
Average Country Score	**2.78**	**2.82**	**3.53**	**2.89**	**3.07**
Overall rank	**5**	**4**	**1**	**3**	**2**

Source: EASC (2014)

The inter-relationship between different trade logistic aspects and Ease of Doing Business is demonstrated by the overall ranking of countries, specifically for Kenya. Despite the efficiency in goods clearance services, other components in trade facilitation such as quality of logistics and timely delivery of goods negate the benefits of such port clearance efficiency. It is also important to note that the poor performance by the EAC coastal countries has a wider effect on international trade for both coastal and landlocked EAC countries.

The scores and rankings in Table 3.1 confirm the significance of non-tariff aspects in determining the direction of trade flow in the region. Unfortunately, trade flows are currently in favour of imports rather than exports. Obviously, this relates to other factors such as the narrow range of export products, infrastructure challenges, policy induced barriers and transit difficulties in coastal countries. Table 3.2 illustrates the total value of export and imports by EAC countries for the period 2001-2012. Despite increasing exports, it is notable that import trade has increased over time. For example, exports by Kenya increased from US dollar 1.9 million in 2001 to 6.0 million US dollars by 2012, while imports increased from 3.6 million US dollars to 16 million US dollars. Similarly, Burundi's exports increased from 37 million US dollars in 2001 to 134 million US dollars, while her imports increased from 38.6 million US dollars in 2001 to 751 million US dollars by 2012.

Table 3.2 Total Trade by EAC Member Countries in million USD (2001-2012)

	Kenya		Uganda		Tanzania		Burundi		Rwanda	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
2001	1,878.61	3,692.67	451.76	1,006.37	805.38	1,653.75	38.46	38.61	29.10	116.88
2002	2,150.18	3,273.35	467.61	1,073.75	886.77	1,598.67	30.61	1 28.37	20.00	87.63
2003	2,411.88	3,711.50	534.11	1,375.11	1,131.40	1,958.82	3.73	158.98	22.80	92.40
2004	2,704.85	4,604.51	644.29	1,726.24	1,400.42	2,420.72	9.03	145.40	25.00	130.11
2005	3,447.06	5,864.94	812.86	2,054.14	1,571.28	3,043.47	7.58	188.90	34.90	373.28
2006	3,481.19	7,232.77	962.19	2,557.31	2,000.12	3,864.10	15.59	244.60	33.00	143.40
2007	4,080.02	8,988.98	1,336.67	3,495.39	2,007.00	5,919.02	10.59	235.50	40.00	207.10
2008	5,054.16	11,291.59	1,724.30	4,525.86	3,119.30	6,907.80	10.85	359.90	46.20	394.20
2009	4,462.48	10,188.45	1,567.61	4,257.60	2,982.45	6,531.22	18.35	419.19	47.30	449.60
2010	5,172.01	11,954.68	1,618.60	4,664.34	3,976.79	8,070.36	101.23	508.83	54.20	503.60
2011	5,754.23	14,814.31	2,159.08	5,630.88	4,771.62	11,184.25	115.93	699.85	70.80	589.30
2012	6,064.49	16,097.75	2,357.50	6,042.80	5,361.41	11,715.73	1 34.70	7 51.53	5 08.77	1,645.86

Source: EAC (2013)

Trade in the region is not balanced as summarised in Table 3.3. EAC (2013) reported that only Kenya and Uganda registered surplus Balance of Trade (BOT) valued at 1.219 million US dollars and 69.4 million US dollars in 2012. It is important to note that Kenya's Balance of Trade increased from a balance of 605.4 million US dollars in 2001, while Uganda moved from a deficit of 201.4 in 2001. Uganda has generally had trade deficits over the past ten years. The other EAC member states, Tanzania, Burundi and Rwanda registered BOT deficits of US dollar 158, 131.2 and 104.3 million respectively, in 2012.

Table 3.3 Total Intra-EAC Exports and Imports and Trade Balance USD Million (2001-2012)

Country	Trade	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Kenya	Exports	622.5	667.2	710.5	810.1	974.3	735.8	952.2	1,213.4	1,167.2	1,278.7	1,544.7	1,580.4
	Imports	17.0	19.1	31.7	38.4	61.5	84.1	191.6	182.0	162.2	256.8	302.9	361.4
	Balance	605.4	648.2	678.8	771.7	912.8	651.6	760.6	1,031.4	1,005.1	1,021.8	1,241.8	1,219.0
Uganda	Exports	87.2	86.0	114.7	132.0	144.7	296.3	476.9	597.9	597.4	608.9	637.1	745.8
	Imports	288.6	415.0	414.9	416.3	551.5	499.0	560.6	618.3	597.8	620.6	723.7	676.4
	Balance	(201.4)	(329.0)	(300.2)	(284.3)	(406.8)	(202.7)	(83.7)	(20.3)	(0.4)	(11.7)	(86.6)	69.4
Tanzania	Exports	58.6	57.1	102.4	123.8	128.9	157.8	205.9	259.9	323.5	394.3	416.8	519.8
	Imports	107.8	97.9	124.2	137.8	160.5	175.5	110.1	205.0	316.9	295.5	678.6	678.6
	Balance	(49.2)	(40.8)	(21.8)	(14.0)	(31.6)	(17.7)	95.8	54.9	6.5	98.8	38.8	(158.8)
Burundi	Exports	5.6	9.2	2.8	5.4	4.0	5.5	5.3	6.6	0.4	12.6	24.4	16.0
	Imports	21.8	31.2	50.8	54.1	59.1	60.9	79.5	84.7	129.2	89.4	267.1	147.2
	Balance	(16.2)	(22)	(48)	(48.7)	(55.0)	(55.5)	(74.2)	(78.1)	(123.2)	(76.8)	(242.7)	(131.2)
Rwanda	Exports	34.3	158.7	20.0	31.0	37.0	37.0	45.4	141.8	48.1	55.2	81.2	343.5
	Imports	28.1	11.0	12.8	23.9	122.7	276.0	245.8	383.7	436.5	340.7	384.9	447.8
	Balance	6.2	147.8	7.2	7.1	(85.7)	(239.0)	(200.4)	(241.9)	(388.4)	(285.5)	(303.8)	(104.3)

Source: EAC (2013 and 2012)

Table 3.3 illustrates the mixed performance in EAC member states. Tanzania had periods of positive balance of trade (between 2007 and 2011), while Uganda only registered positive trade balance in 2012. Despite initial positive trade between 2005 and 2011, Rwanda increased her trade imbalance while Burundi registered a deficit of BOT throughout. Such trade imbalance is partly attributed to the challenges imposed by poor trade facilitation which hinders the flow of merchandize between the partner countries. In spite of increasing trade openness in the region, bilaterally, the countries have retained trade barriers which impede the flow of goods and services.

The justification for aid for trade seems apparent due to existing non-tariff barriers and the trade performance between EAC states. EAC countries are ranked among the top ten recipients of aid for trade (OECD/WTO 2011). Aid for trade commitments and disbursements to EAC countries (Table 3.4) show variations in distribution. While Tanzania and Uganda have received the highest amount of funds, Burundi is the least aid for trade recipient in the region.

Table 3.4: Aid for Trade Commitments and Disbursements to EAC (2006-2009)

	Aid commitments USD					Aid Disbursements USD			
Country	2002-05 Avg	2006	2007	2008	2009	2006	2007	2008	2009
Kenya	314.	510.3	973.0	92.2	962.1	211.7	346.2	317.0	353.2
Uganda	258.3	191.7	739.7	305.5	1 017.9	245.8	426.2	426.4	456.5
Tanzania	412.5	429.8	586.9	1325.2	881.3	401.1	433.3	475.8	590.5
Rwanda	78.3	128.1	100.9	166.1	409.2	74.0	92.5	143.6	158.0
Burundi	51.8	106.2	97.0	92.3	133.1	60.1	102.1	79.9	88.0

Source: OECD/WTO (2011)

The disaggregation of the two different categories of aid for trade (Table 3.4) illustrates that economic infrastructure receives more funding relative to policy and regulatory reforms. Even though high transportation costs are still prevalent in the region (World Bank 2012), there is limited evidence that investment in infrastructure without complementary policy reforms such as reducing the red-tape or number of road blocks is singularly significant in facilitating trade. Hoekman and Njinkeu (2007) explain that the effect of policy induced delays is not usually limited to a single country. Arguably, poor trade facilitation in one country generates negative spill-over effects (delays for example) in immediate neighbouring countries.

Table 3.5: Aid for Trade to Economic Infrastructure and Trade Policy in EAC (2003-2011)

Country	Aid type from DAC donors (US$)	2003	2004	2005	2006	2007	2008	2009	2010	2011
Kenya	Economic infrastructure	66230960	101213259	88401022	103358163	227078423	199129474	245182012	237910699	379069648
	Trade policy and regulations	345471	111065	523763	3255029	1600525	505737	1354197	1256207	1718552
Uganda	Economic infrastructure	57592602	122103105	80364286	102985579	302551981	294468563	263590945	317063289	308075604
	Trade policy and regulations	230515	48864	1553240	1190672	14702446	2460758	4235075	7682068	10883070
Tanzania	Economic infrastructure	197097750	225110369	178686258	169040219	225232928	287657776	327346009	500051079	460782326
	Trade policy and regulations	296400	30685020	3614867	2441817	16299406	7244193	1016290	8631829	5743814
Rwanda	Economic infrastructure	23595029	29540961	56707512	32292187	52349366	96348232	103246742	87414914	153607612
	Trade policy and regulations	9798	11050	182	74485	62648	84043	12582907	3061144	27146009
Burundi	Economic infrastructure	3746524	6636827	8136149	19365021	29569122	54707965	54390281	85976871	81702117
	Trade policy and regulations	-	-	-	54699	36955093	292205	6495925	7064361	9692826

Source: OECD/WTO (2011)

It should be recognised that the different aid categories existed prior to the AfT initiative (Hunne et al., 2013). It is only after 2005 that the donors pledged to increase the funds, thus necessitating closer examination.

3.4 Literature Review

This section explores the theory of aid flows, empirical literature on aid for trade facilitation and the conceptual relationship between aid and trade flows. The earlier theoretical foundation held that aid has macroeconomic effects by altering the terms-of-trade between the recipient and donor countries, thereby influencing the direction of trade. However aid for trade is used to augment domestic capital stock in the production of local public goods such as roads and also in inducing policy reforms thereby facilitating trade flows. The underlying assumption is that aid for trade should lead to the maximisation of some domestic welfare.

3.4.1 Theoretical Literature

The understating of Official Development Assistance (ODA) is usually based on a number of economic theories and models that find some positive relation between aid disbursement and the growth of recipient countries (Sindzingre, 2012). The Harrod-Domar model, for example, assumes that developing countries have limited capital but can grow faster if aid complements their private capital. However, the theories and the channels to deliver aid raise important debate on the causal relationship between aid and growth. A number of theoretical perspectives have sought to explain the link between aid and trade flows. The link extends into macrocosmic, political theories and game theory models, international financial transfers and new trade theories.

Nunnenkamp *et al.* (2013) however contend that the theoretical literature that associates aid for trade and trade flow provide a weak direct link. This is explained by the numerous channels that are used to deliver aid for trade which makes attribution difficult. For example, aid could result into macroeconomic effects through increased economic performance. This occurs when such aid is tied to trade, and results into improvement of the bilateral relations between the donor and aid recipient countries (Suwa-Eisenmann and Verdier, 2007). As Lyod *et al.* (2000, 2010) observed that there could be a two-way link between trade flow and economic growth.

The macroeconomic channel explaining aid and trade flows posits that aid augments domestic savings, thus more investments and economic growth (Lloyds *et al*. 2010). This is consistent with the argument that aid expands the capacity of the domestic economy to produce and absorb imported goods and services from the donors thus increasing trade flows between donors, and aid recipient countries (McGillivray *et al*., 2010). Another way involves aid bringing trade policy reforms such as trade liberalisation and minimal currency controls (Morrissey, 1995). The result of these reforms is to improve the market access conditions by eliminating policy induced barriers.

Samuelson (1953) explained that income transfers among countries could also have terms-of-trade effects, determined by the consumption propensities in the aid receiving countries. Samuelsson's (1953) arguments are similar to the views of Keynes (1929) and Li and Mayer (1990). They agree that aid could either improve or deteriorate the terms of trade in a recipient country. However, the requirement for

counterpart funding by donors might impose an additional tax burden on citizens and private investment thereby negating aid macroeconomic effects.

The political theory of aid for trade is perceived from international trade negotiations and the subsequent collapse of the WTO Doha round of multilateral trade negotiations. Aid for trade was introduced in the negotiations as an instrument to achieve progress and consensus. It also converged the interest of both the WTO, donors and developing countries (Hallaeret 2012). Stiglitz and Charlton (2006) suggest that aid for trade in this respect was an incentive for developing countries' political commitment in the trade negotiation process. The countries involved in the negotiations are assumed to be representative of different interest groups. Along similar thoughts, Boone (1994) modelled government behaviour as being influenced by politics. Governments thus use ODA or distortionary taxes to provide public goods or conduct public transfers to maximise the welfare of certain group interests. Securing aid is used to minimise internal distortions and change consumption and investment choices of certain interest groups. Adam and O'Conell (1999) expounded that when aid is given unconditionally, it limits the distortions, but it is used to finance transfers, more so when the preferences of the governments are not representative. They aver that conditional aid reduces such distortions in policy choices and private investment in a country.

The explanations for aid in game theory framework use the principal-agency problem. The implication is that supplying aid where the principal gives conditions to the agent is contingent on certain action by aid recipient countries, such as better coordinating mechanisms, policy reforms, or improved reporting styles. The game theory model by

Lahiri *et al.* (2002) used a dynamic game with two stages to demonstrate that aid furthers donor interests, in this case, to promote their exports to the aid recipient countries. He observes that trade reforms in these countries usually happen after the donors have made the first move by deciding the amount of funds allocated for aid. The assumption in the model is that donors have less altruistic motives for reforms to improve the collective welfare of all players (donors and recipients) in the aid game, but are rather out to expand their exports to aid recipient countries e (Lahiri and Raimondos-Moller 1997). Furthermore, aid could be given as tied aid contingent, obliging aid recipient countries to purchase goods from the donor countries (Llyod *et al*. 2010)..

The welfare theory of aid explains that countries who seek aid want to maximise certain welfare objectives. However, achieving welfare outcomes should occur without the possibility of an immiserizing effect on the economy of recipient countries (Jones 1970,). Such immiserizing effect is explained by the 'Dutch Disease' phenomenon where aid flow causes appreciation in real exchange rate, making goods from the recipient country to be globally uncompetitive, while encouraging imports. However, in the long run, adverse effects caused by the "Dutch Disease" are countered by the improvements of supply side constraints, like investments in public infrastructure creating some positive multiplier effects on exports by aid recipient countries (Adam and Bavan, 2006). Schweinbeger (1990, 2002) argued that financing public investments using domestic tariffs and trade levies results into distortions and under-supply of public goods, while changes in trade policies are done to extract revenue. Subsequently, the aid transfer paradox is avoided when aid is used to finance the production of certain public goods previously financed through tariff revenues on

imported commodities and domestic taxation. By increasing the supply of public goods through shifting the financing instruments away from welfare distorting tariffs and taxes, it is possible to improve the overall welfare of a county (Suwa-Eisenmann and Verdier, 2007). For example, increasing the consumption of infrastructure is seen as complementary to imports and exports. AfT therefore promotes trade by accumulation of domestic capital stock necessary to finance public goods provision. The funding areas in AfT include addressing trade limiting policies, enhancing domestic productive capacity, and supporting adjustment to external shocks by countries among other areas.

3.4.2 Empirical Literature

Aid for trade now forms part of Official Development Assistance for many countries especially resource poor countries. Since the countries lack good infrastructure, have restrictive policies and regulations and out-dated technology, they have failed to integrate into the global trading system. Yet existing literature is scant on the relative strength of AfT on recipient and donor exports (Nunnenkamp and Huhne 2013) more so between recipient countries. There is a nagging ambiguity on which of the aid transmission channels indeed is working among aid recipient countries.

In some countries with better institutions, capacity, regulations, policies, efficient customs procedures and documentations, AfT is complementary to capital accumulation. On the contrary, for countries with poor institutional structures, AfT is not easily transferable into better economic performance and trade outcomes. Addressing the empirical gap, Ferro *et al,* (2011) classified countries into different income levels. The authors then evaluated the impact of AfT using the input-output

tables in five service sectors for 48 countries. The conclusion is that aid channelled to transportation and energy sectors was significant in increasing exports, but less robust to the business sector. Indeed, the results from developing countries underscore one of the biggest challenges to trade; poor infrastructure is a great barrier for both domestic and international trade in these countries.

Portugal-Perez and Wilson (2013) examined the effect of AfT on 101 developed and developing countries within an extended gravity model using trade barriers information from World Doing Business reports and Transparency International reports. They used different trade facilitation indicators like infrastructure, technology and border efficiency that affect trade in mining, manufacturing and services sectors. For estimation purposes, a two-stage Heckman selection model was used. The results indicated that infrastructure variable had a larger impact within the mining industry in comparison to textiles and manufacturing sectors. Aid is given to ICT, the effect the fuels sector although this was negative and significantly related to ores and metals industries.

Busse *et al*, (2011) defined AfT by aggregating aid meant for trade policy and regulations for both developing countries including 33 LDCs and non-LDCs top 20 aid recipients. They subsequently estimated the effect of AfT on the cost of trading using fixed-effects panel data. While the results showed that AfT was significant in lowering the costs of trading, the effect depended on the aid category. When channelled into more specific areas like trade policy and regulations, AfT was effective than general aid for trade. While the extent of AfT in reducing transaction

time was less robust, aid directed towards policy and regulations was significant, but of marginal effect in reducing the period of transactions.

Helble *et al,* (2009) used a gravity model with panel fixed-effects for 172 developed and developing countries on OECD-Credit Reporting System (CRS) data. The authors used trade policy, trade development, and infrastructure as the main variables. The overall result was that increasing AfT facilitation by 1 per cent could generate an increase in global trade by US dollar 415 million.

Ivanic *et al,* (2006) classified countries into income and geographical zones. The sample included developed countries; East Asia and Pacific; Europe and Central Asia, Latin America and Caribean; Middle East and North Africa; and Sub-Saharan Africa. The authors used a Computable General Equilibrium (CGE) model by first estimating the effects of trade promotion on world transaction costs. AfT was determined to be welfare enhancing.

Wilson *et al,* (2004) used the following four variables: harbour infrastructure, customs, regulations, and technology facilities to investigate how beneficial AfT facilitation was. Using data in the manufacturing industry for 75 countries for the period 2000 to 2001 in a gravity model, the study demonstrated that when aid was directed to the four variables, exports and imports increased. The results showed that improvements in countries rated below-average to half of global average increased export and imports by US dollar 107 billion and US dollar 33 billion respectively. Importers from developing countries benefited the most from better customs administration and port efficiency.

APEC (2004) using CGE carried out studies to find out if trade facilitation was important enough to promote intra- Asian and Pacific Economic Community (APEC) transactions. Examining customs procedures in the region, the study determined that if customs procedures were improved by 10 per cent, import trade increased by 0.5 per cent within APEC. Kim *et al,* (2004) had similar findings that improving customs clearance by fifty per cent generated 1.7-3.4 per cent imports for the industrialised APEC economies, 2.0-4.5 per cent in newly industrialised, and 7.7-13.5 per cent in industrialising APEC countries.

These results are consistent with those of Wilson *et al.* (2003) who examined the impact of addressing port efficiencies. They determined that improved port performance generated about 9.7 percent gain (US dollar 117 billion) to the economies, while improving customs procedures resulted to 1.8 per cent (US dollar 22 billion) gain.

3.4.3 Overview of Literature

The discussions on the role of AfT in promoting trade have a common narrative. If well targeted, aid for trade facilitation reduces transaction costs and stimulates trade flows. However, existing numerous non-tariff factors which impede trade makes such prioritisation difficult. Furthermore, better trade facilitation may have varied results depending on the commodity in question. Thus, countries are at a loss on the right mix of investments for aid funds or sectors to promote.

Several authors agree that aid for trade facilitation is necessary in promoting trade (Vijil and Wagner, 2010; Ferro et al. 2011; Helble et al. 2009; Wilson *et al.* 2004, and

APEC, 2004) among others. They determine that reduction in transaction costs increases trade, especially for infrastructure improvement, custom environment, policy and regulatory reforms. The consensus in these studies confirm the thesis connecting aid directed towards trade to better trade and to some extent better welfare. Whereas AfT facilitation is perceived by some as trade enhancing, much of the previous work involves examining the trade relations between the donors and AfT recipient countries. The direction of trade is singular either from donors to recipients or recipients to donors. Without disregarding the importance of trade between countries or income groupings with the donors, understanding the regional perspective of AfT is more relevant in promoting deeper regional integration along the lines of South-South Trade. There is limited evidence that any work has been undertaken in examining whether aid for trade promotes South-South (aid recipient countries) trade. This study therefore strives to fill this gap in empirical literature by explicitly accounting for the effect of AfT funds to Kenya on inter-regional export trade.

3.5 Conceptual Framework of Aid for Trade

MacGillivray *et el.* (2010) explored two arguments on the linkages between aid and trade flows as being bidirectional. It is argued that aid causes trade or trade causes aid. The bi-directional relation is based on numerous, though less verified, positions on the commercial returns of aid, by promoting donor country interests and the growth inducing effect of aid, thus the ability to purchase donor export (ibid). We examine in detail the latter position as advanced by the developed countries and WTO that AfT generates trade flows in recipient countries with the rest of the world. The underlying

reason is that if aid for trade works between the donors and recipient countries, then aid should boost intra-African trade.

The argument is that infrastructure development generates productivity spill-overs which stimulate exports in recipient countries. This is captured by aid meant to improve transport systems, telecommunications and energy supply. Further, aid meant to improve trade policies and regulations is also identified as critical in increasing trade in recipient countries (Hunne et al., 2013).

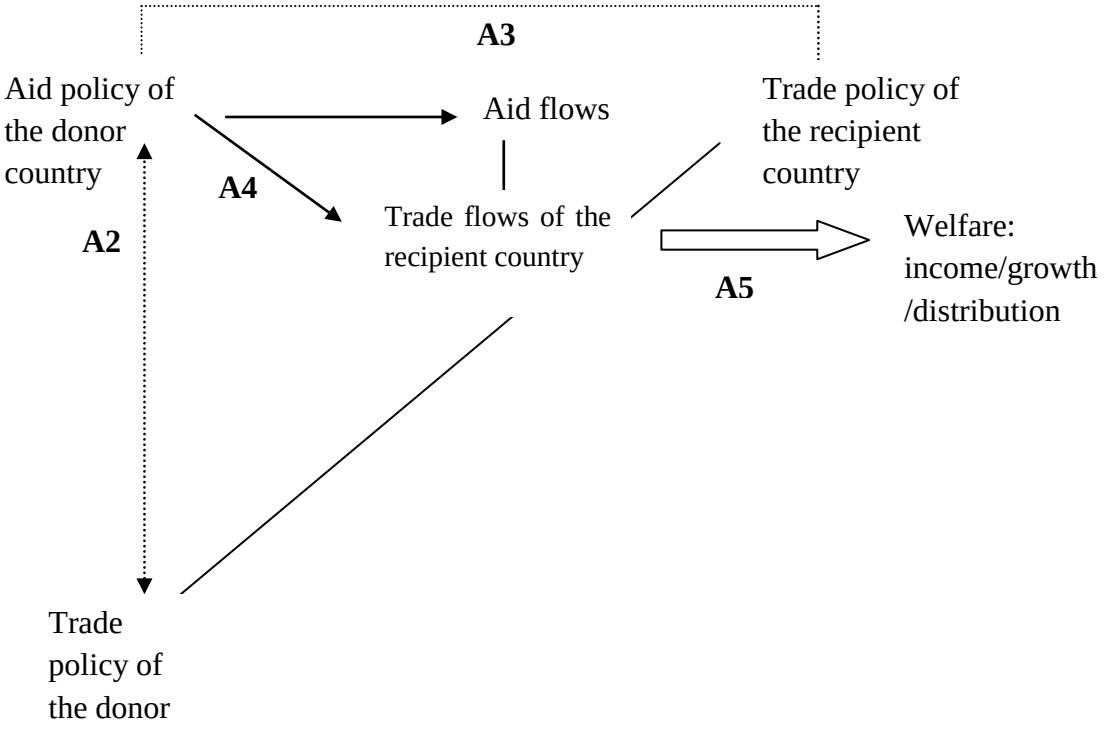
The framework of aid-trade flows as demonstrated in Suwa-Eisenmann and Verdier (2007) shows that aid influences trade flows by changing either the macroeconomic fundamentals or trade policy instruments of a country. Thus, the movement between aid meant for trade happens through its effects on policy reforms, infrastructure investments, trade adjustments and building productive capacity. Aid induces increased consumption of public infrastructure and policy reforms in this context. Barro (1990) noted that investment in public infrastructure usually produces long-term growth effects in an economy. Aid for trade is regarded as either a complementary or a substitute to national trade variable of aid recipient countries. Even though countries engage in international trade for different reasons, one purpose is to maximise national social welfare, contingent on domestic environment like existing income levels, resource distribution and how trade is diversified in the country. By receiving aid, the country expects to maximise certain welfare outcomes.

In the context of AfT facilitation, aid promotes trade through different channels. The complex interrelationship is demonstrated in Figure 3.2, which underlies the argument

how aid affects policy instruments in arrow (A3) and influences the economic performance of a country giving certain welfare outcomes. Figure 3.2 illustrates the connection into welfare function showing that donor aid policy is either supplementary or complementary to trade policy reforms and overall welfare objectives. Suwa-Eisenmann and Verdier (2007) identified two channels perceived as the link through which aid optimises the welfare outcomes in a country.

The conceptual model is when aid promotes trade directly through the macroeconomic effects of aid (shown in Figure 3.2 and A1). The macroeconomic route occurs when aid serves as a complement to domestic savings. This induces more investment and economic growth than when aid is not included (White, 1992). Thus, aid increases the domestic capacity in aid recipient countries to export or import. The result is more pronounced when aid funds are tied to specific structural reforms which unlock the idle capacities of a country resulting into increased domestic production and trade. Further, trade can increase due to improved bilateral relations between donors and recipient countries. The framework assumes the absence of the 'Dutch disease' since AfT is a form of tied aid, which allows allocation inefficiencies, especially when overpriced capital goods are purchased from donor countries (Jepma,1991).

Figure 3.2: Aid and Trade Interactions



Source: Suwa-Eisenmann and Verdier (2007)

The framework demonstrates that aid causes an increase in trade flows through policy (see arrow A2 and arrow A4). This is conditional on the changes in trade policy reforms of aid recipient countries. Some of the trade policy profiles include tariff rates, quantitative restrictions, customs procedures, trade standards and regulations, depending on what countries perceive to facilitate trade. For example, reduction in trade limiting procedures in both aid recipient and donor countries would promote bilateral trade flows between them. Finally, the convergence of AfT and trade flow results into the initial welfare objective (arrow A5) of the countries.

3.6 Empirical Model Specification and Definition of Variables

Recent empirical studies on international trade exploit the gravity model for estimation purposes because of the robustness and ability to explain trade flows (Novy, 2011). The model is adaptable hence allows for augmenting with key variables to answer the research questions. Some of the control variables included in gravity models are: economic size, population, trade intensity, infrastructure, language, REC, colonial ties, borders, trade cost variables and distance. Hoekman and Nicita (2008), and Anderson and van Wincoop (2003), for example, examined the effect of border barriers by including differences in trade costs and regulatory policies as control variables.

This essay extends the work of Hoekman and Nicita (2008) and Anderson and van Wincoop (2003) by explicitly examining how AfT policy barriers and infrastructure relates to trade flows. The foundational structure of the gravity model derived from the Dornbursh Fisher Samuelsson (DFS) theoretical framework highlighted in Appendix II is as:

$$X_{ij} = \frac{Y_i Y_j}{Y_w}\left[T_{ij} \Big/ P_i P_j\right]^{1-\sigma} \qquad 1.$$

Where:

Y_i Y_j and Y_w define the economic size of countries i, j and the world, in that order; Tij is the trade costs variable and other transaction barriers; Pi and Pj give equilibrium prices; and σ is the constant elasticity of substitution (CES) between all goods in the utility function as derived from the DFS model, and T_{ij} gives the obstacle due to geography.

This essay uses trade policies/regulations and density of infrastructure in Kenya as the trade facilitation barriers, identified in the gravity model as Pi and Pj as shown in Equation 1. The baseline model for estimation in a gravity model is usually given by a functional specification expressed as;

$$X_{ij} = \beta_o Y_i^{\beta_1} Y_j^{\beta_2} N_i^{\beta_3} N_j^{\beta_4} D_{ij}^{\beta_5} A_{ij}^{\beta_6} \quad \text{.....2}$$

Where the variable;

Xij- gives the trade in volume or value between the two countries i and j;

Y-is the income levels given by GDPs or GDP per capita of the two trading countries;

N-is the population size of the trading countries;

D-defines either geographical or commercial distance between them; and

A is a set of dummies of other factors that influence trade included in the traditional gravity model.

The specific objective to determine whether AfT is significantly important in facilitating trade flow in Kenya is achieved. This is by augmenting equation (2) with the variables that capture AfT facilitation through policy and regulatory measures and infrastructure density. Subsequently, AfT is defined by two categories using an infrastructure variable, and policy and regulations variable are included for estimation purpose.

Accordingly, we estimate three linear regression models including separating the variables of interest; the first estimation is performed with all the AfT variables. In the second estimation, only aid for policy and regulations variable is included while aid for economic infrastructure is introduced in the third estimation. The estimation is

done in natural logarithms for continuous variables to allow for interpretation of the coefficients as elasticities. The estimation equation is as shown in equation 3.

$$LXA_{mit} = \alpha_o + \alpha_1 + \beta_1 LGDP_{mt} + \beta_2 LGDP_{it} + \beta_3 LPCGDP_{mt} + \beta_4 LPOP_{it} + \beta_5 LPOP_{mt} + \beta_6 LINE_{it} + \beta_7 LINF_{it} + \beta_8 LINF_{mt} + \beta_9 LAfT_{it} + \beta_{10} LPol\,\mathrm{Re}\,g + \beta_{11} LD_{im} + \beta_{12} \sum_h D_{mih} + \mu_{mit} \quad \ldots 3$$

Where:

i and m = exporting and importing countries in EAC;

Trade Flow (Export) = XA_{mit}^{k} is the variable for trade flows from country (i) to country (m) in the broad product category (k) in period (t).

Gross Domestic Product (Y) = the gross domestic product (GDP) of countries *i* and m respectively. GDP is taken to be positively related to exports.

Gross Domestic Product per Capita (PCGDP) = the GDP per capita of countries *i* and *m* respectively. GDP per capita is negatively related to exports due to greater self sufficiency.

Infrastructure (INF_{imt}) = the variable defines the infrastructure density existing in the exporting, and importing country at time *t*. It hypothesises that infrastructure has a positive effect on intra-EAC trade.

Aid for Trade (AfT_{it})= is the variable that defines AfT facilitation which is categorised into three: Aid for Economic Infrastructure, Policy and Regulations. The effect of AfT for economic infrastructure is expected to be positive.

Policy and Regulation (PoReg)= the variable of policy and regulatory environment in the exporting country. It is expected that better policies and regulations have positive effects on exports.

Bilateral Distance (Dim)= gives the resistance between countries i and j. This follows the traditional gravity model where it represents the commercial distance between capitals as a measure of the trade resistance between countries. Distance between trading centres is expected to negatively affect trade flows.

Dummy Variables= $\sum \beta_h D_{mih}$ is used to express the different dummy variables expected to influence trading within a gravity model. The study uses as dummies, the main languages (French or English) spoken in the region, membership to the EAC Customs Union and sharing of borders (the dummy takes value of 1 if the condition is true or 0 otherwise) as dummies. The membership to a common RTA, sharing of borders and speaking common language is hypothesised to positively affect trade flows. $\mu_{imt} = \upsilon_{imt} + \varepsilon_{im}$ and υ_{imt} is unobserved random or fixed bilateral effect, while ε_{im} is the remaining effect.

3.6.1 Definition and Measurement of Variables

Trade Flow is measured by the logged value of aggregate exports in US dollars from country *i(Kenya)* to country *m* within Eastern Southern Africa (ESA).

Policy and Regulations-are measured by the quality of regulatory environment in percentile rank from the Wold Bank's Worldwide Governance Indicators (WGI). The variables capture the institutional environment (policy reforms or lack of it) which increases or slows the movement of goods along the transport corridors and borders.

Aid for Trade is measured by the logged amount of funds the Development Assistance Committee (DAC) disbursed in current million US dollars. The use of disbursed funds rather than funds committed is to address any possible upward bias caused by differences between what donors commit and what eventually they disburse to countries.

Population is the logged number of persons in the country measured in millions as a proxy for economic size (GDP) of the country.

Gross Domestic Per Capita is measured in logged current US dollar prices in constant 2005 US dollar. The variable is used control for the state of economic development, thus purchasing power of citizens.

Infrastructure variable is measured in logs using access to internet services per 1,000 people and fixed telephone subscriptions in Kenya and in the trading partners, as a proxy measure for state of infrastructure development. This is informed by the

previous works such as Fink *et al.* (2002) who used the bilateral cost of telecommunication to estimate the effect on trade flows. Nordas and Peirmartini (2004) argued that it is not just the cost of internet, but also access to internet services that are important determinants of trade flows. Good communication requires the existence of such services in both trading countries. Furthermore, the role of ICT investment for developing countries is to reduce the information gap, improve productivity and deliver market related institutions (Donaubauer *et al*. 2014). This variable was used to measure possible infrastructure deficiencies that introduce additional barriers to trade (Lemi 2014).

3.7 Data, Sources and Analysis

We used annual secondary data for the period 2003 to 2012 for the empirical analysis in section 3.7. This data is sourced from COMESA trade data portal, which has the value of total imports and exports at an aggregated level. The period of study is informed by data availability, and fits with the period after the formation of the Common Market in EAC. It is also within the pre and post "Enhanced" AfT as an instrument for Official Development Assistance (ODA) thus captures the changes in AfT flow to EAC countries aggregated from all DAC members.

World Bank data sources capture various World Development Indicators like the internet access per 100 persons, gross domestic product per capita, gross domestic product and population. The data on internet access, GDP per capita and population for East Africa countries and other ESA countries was sourced from the World Bank's database while fixed telephone subscriptions was obtained from the World Telecommunication Organisation. Additionally, the policy and regulatory indicators

are usually published by the World Bank in their Worldwide Governance Index (WGI) data. WGI measurement on governance comprises stability and absence of violence/terrorism, voice and accountability; government effectiveness, regulatory quality, rule of law, and control of corruption. These indicators are constructed using 31 different data sources, capturing governance perceptions as reported by survey respondents, non-governmental organisations, commercial business information providers, and public sector organisations worldwide (Kauffman *et al*., 2010). We used the regulatory quality quintile measure of WGI data.

From the CRS, we used the two categories of AfT disbursed for trade policy and regulation reforms, and AfT for economic infrastructure. CRS classifies aid according to the WTO definition of Aid for Trade as reported by DAC members, hence it is more realistic to specific policy areas. The economic infrastructure aid includes funds used for improving energy generation and supply, transport and storage, and communication. The data is obtained from the World Bank as reported by the OECD Creditor Reporting System (CRS) aid database. For no other reason, this allows for quality control that is present from the World Bank's data collection system. It should be highlighted that these categories have been in existence except that after the 2005 AfT initiative, donors agreed to increase funds. Data on distance (in kilometres) between the economic capitals of the trading partners was obtained from CEPII website at (www.cepii.fr). Using these data sources, we have created a single database for each country.

3.8 Data Analysis

Most panel econometric estimation of bilateral trade that has used random Effects Model (REM), require that $\mu_{imt} \sim (0, \sigma_{\mu}{}^{2}), \upsilon_{imt} \sim (0, \sigma_{\upsilon}^{2})$. Further, the explanatory variable XA_{imt} must be independent of μ_{imt} and υ_{imt} for all the cross sections and time periods, even though fixed effect model (FEM) is consistent when endogeneity is absent. The random effect model (REM) is only consistent if orthorgonality conditions are met thus it is advantageous to use REM instead FEM. However, when the conditions fail to hold FEM, despite wiping all time invariant factors, is a good estimator. The decision on whether to use REM or FEM can be drawn from Hausman test (1978). However estimating the model with time invariant factors is not feasible since they are all wiped out and the degrees of freedom reduced since the error term may be correlated with only a few variables. As a solution to these possible drawbacks, Hausman and Taylor (1981) suggested an alternative that exploits panel properties without the need to bring in variables outside the model as instrumental variables. We estimate the REM, REF and Hausman Taylor Method (HMT). The appropriateness of HTM was based on Hausman and Taylor Test for identifying over-restrictions. According to Egger (2002), the consistent REM, FEM and HTM are associated with short-term parameter estimates which fit into this panel study.

We estimated panel dataset of Kenya's export values to Eastern and Southern Africa countries. We use in natural log form the real export values in current US dollars; real GDP per capita; population; fixed telephone subscriptions; internet per 1,000 persons; regulatory quality and bilateral distance. In the tradition of gravity model estimations, the dummy variables included are sharing common borders, membership to the EAC

Customs Union and a common language. Table 3.6 presents the descriptive statistics. The estimation results are in the next section.

Table 3.6: Descriptive Statistics (Kenya)

Variable	Obs	Mean	Std. Dev.	Min	Max
Exports from Kenya	190	14.392	2.374	6.845	18.897
AfT for policy and regulations	190	.161	1.088	-1.863	2.169
AfT for economic infrastructure	190	5.179	.587	4.375	6.315
Regulatory quality in Kenya	190	3.849	.050	3.7294	3.917
GDP per capita in Kenya	190	2.108	.0781	1.977	2.227
GDP per capita in importer	190	1.609	1.437	-2.058	4.789
Population in Kenya	190	17.460	.0773	17.339	17.581
Population in importer	190	15.882	1.816	11.321	18.334
Fixed telephone in Kenya	190	12.814	.333	12.435	13.406
Fixed telephone in importer	190	11.702	1.683	8.161	16.288
Internet per 1,000 people in Kenya	190	5.213	3.677	1.164	12.033
Internet per 1,000 people in importer	180	3.424	3.866	0	14.836

The mean value of trade flows from Kenya to the ESA region is varied from the standard deviation. Whereas aid for policy and regulations seems not to change much, aid for economic infrastructure is widely dispersed. Similarly, regulatory quality and fixed telephone line both in Kenya and importer countries are varied. Although the GDP per capita of the importing countries are widely dispersed, Kenya's GDP per capita seems not to have been varying over the years.

A pre-estimation test for possible multicollinearity was conducted among the variables, indicating that the VIF was 10.93 and is thus within the range allowable for low variable correlation.

In terms of the estimation technique, the panel nature of the data which is balanced requires that panel estimation techniques are used. Therefore, either random or fixed effects are estimated. Hausman specification test however rejected the fixed effects estimation in favour of random effects method.

Table 3.7.1 presents the full estimation results based on the panel estimation. There are four columns in Table 3.7.1: column one shows all the control variables used in the estimation; column two shows the estimation results when total AfT (policy and infrastructure) is included in the regression; column three shows when aid for policy and regulations is used and the fourth column shows when aid for economic infrastructure is included in the estimation.

The specifications of gravity model contain possible causality between income and trade. Some argue that increasing income causes high trade; this is contrary to the position that trade causes income growth (ibid). Other possible sources of endogeneity include domestic government policy reforms that drive both income and trade. Therefore estimating the model without accounting for possible endogeneity would result into biased estimates. This study accounts for possible reverse causality in the model by estimating Hausman-Taylor model, that allows for the inclusion of time invariant dummy variables that have also been used in the study. The results of the Hausman-Tylor estimation are shown in Table 3.7.

3.8.1 Analysis of the Effect of Aid for Trade in Kenya

Few studies (Leyaro and Karingi 2009; 2010; Lemi 2014) have explicitly examined the effect of AfT and trade outcomes in SSA countries. This study adds to this literature by estimating using two categories of AfT (aid for policy and economic infrastructure) and its relationship with regional exports by Kenya. The results of the pooled panel estimations are presented in Table 3.7.1.

The results indicate that the two catergories of AfT when jointly disbursed exerts significant and positive effects on export trade in Kenya. By increasing aid for economic infrastructure by 1 per cent, export trade increases by 1.47 per cent, infrastructure beyond improving trade has productivity boosting effect, while increasing aid for policy and regulations increases regional exports by 0.1 per cent. The magnitude for policy effect is smaller, since such funds directed at policy reforms are generally low and attendant divergence between trade reforms and policy implementation. The findings get credence from Lemi (2014) who estimated the role of all the AfT categories and trade between donors and recipient countries in SSA. Though the coefficient for aid for policy and regulations had the expected sign, the variable turns to be non-significant when singularly included without aid for infrastructure in the estimation. This indicates possible complementarities between aid for economic infrastructure and aid for policy and regulations. The regulatory quality variable as a measure for policy and regulation reforms was significant and had the expected positive signs in all the estimations. Enhancing the quality of regulation in the country by 1 per cent boosts exports by 6.8.8 when all the categories of aid are given, and by 1.94 per cent when only aid for policy and regulations are used, while boost trade by 7.2 per cent when there is aid for economic infrastructure.

Table 3.7.1: Random Effects Panel Estimation Results (Kenya)

Variables	(1) All aid for trade	(2) Aid for policy and regulation	(3) Aid for economic infrastructure
Aid for policy regulations	0.1044**	0.0865	
	(0.0509)	(0.0535)	
Aid for economic infrastructure	1.4773***		1.4473***
	(0.2062)		(0.2138)
Regulatory Quality in Kenya	6.8294***	1.9411**	7.2015***
	(1.1645)	(0.9038)	(1.1531)
GDP per capita of Kenya	-1.9157	-0.9006	-1.1207
	(1.7007)	(1.7872)	(1.4166)
GDP per capita of Importer	0.5220**	0.5249**	0.5269**
	(0.2064)	(0.2094)	(0.2118)
Population of Kenya	5.5635**	13.1048***	5.6130**
	(2.5682)	(2.0814)	(2.5638)
Population of importer country	0.9269***	0.9314***	0.9305***
	(0.1416)	(0.1477)	(0.1437)
Tel per 1,000 persons Kenya	0.9085***	-0.6224**	-0.9505***
	(0.2859)	(0.3131)	(0.3006)
Tel per 1,000 persons importer country	0.0178	0.0070	0.0113
	(0.1381)	(0.1346)	(0.1354)
Internet per 1,000 persons Kenya	0.2872***	-0.2232***	-0.2459***
	(0.0596)	(0.0645)	(0.0501)
Internet per 1,000 persons importer country	0.0574	0.0566	0.0557
	(0.0377)	(0.0369)	(0.0374)
Sharing of borders	-0.0503	-0.0306	-0.0494
	(0.6426)	(0.6339)	(0.6388)
Geographical distance	-2.7774***	-2.7448***	-2.7562***
	(0.8038)	(0.8043)	(0.8089)
Common language	-1.1463	-1.1504	-1.1425
	(0.7219)	(0.7266)	(0.7207)
Membership to EAC	-0.0735	-0.0441	-0.0495
	(0.2356)	(0.2407)	(0.2283)
Constant	94.3275**	205.8608***	-97.9532**
	(40.3978)	(34.6490)	(40.2873)
Observations	180	180	180
Number of countries	19	19	19
Overall R-sq	0.702	0.696	0.701
F-test	0.789	0.779	0.788

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results relating to infrastructure indicators (fixed telephone subscriptions and internet) were mixed. When used in the data set with the two aid categories, the coefficient for infrastructure was positive, where increasing the stock of infrastructure (telephone and internet per 1000 persons in Kenya) by 1 per cent would increase trade by 0.9 per cent and 0.29 per cent respectively. However the variables turned negative when only one category of aid (either policy and regulatory aid or economic infrastructure) funds was disbursed and included in the estimation. Export is reduced by 0.62 per cent when only policy and regulatory funds is used and negatively affected by 0.95 per cent when only infrastructure money is given. The contradiction mirrors the findings of Lemi (2014), who determined that road network and mobile telephone as indicators for infrastructure turned negative in some of the estimations. The possible explanation can be traced back to the fact that receiving only one kind of aid either for policy or infrastructure does not generate the requisite threshold for regional exports. Thus, Kenya's exporters find it easier to export to other regions, probably traditional export destinations that have well established communication infrastructure rather than export within the region, which is characterised by inferior infrastructure.

The variables used to control for economic size (population), in terms of production and market size had the expected positive signs and were found to significantly affect trade in all the data specifications. This could mean that Kenya's trade depends much on her production size and trading partners with a 1 per cent growth in Kenya's economy increasing trade by 5.56 per cent when infrastructure funds are used, while increasing the partner economy's trade by 0.93 per cent. Economic size of Kenya is consistently significant in all the estimations increasing trade by 13.1 percent with

only aid for policy and 5.61 per cent when infrastructure aid is given. The intuition is that there is a "home market" effect as the basis of more trade by Kenya which is similar to the findings of Mahona and Mjema (2014) who determined how the population of Tanzania and Kenya affect their bilateral trade. Equally, the GDP per capita variable which was used as a measure of the purchasing power and productivity for both the exporting (Kenya) and importing countries (COMESA countries) was found to be positive and significant in relation to Kenya's exports. However, Kenya's GDP per capita was found to negatively relate with her exports. One per cent increase in GDP per capita in importing country increased trade by 0.52 per cent while GDP per capita for Kenya reduced trade by 1.92 per cent. The implication of the finding is that Kenya's export trade is driven more by her GDP rather than per capita and productivity.

The geographical distance coefficient was used as a measure for the resistance (such as time to export) between the trading pairs. It had the expected sign (negative) and exerted a significant effect on trade flows in all the estimated models. The implication is that Kenya is trading more with countries in closer proximity rather than distant ones in the COMESA region. The finding that increasing distance by one per cent reduces trade by about 3 per cent, is similar to the findings of Mahona and Mjema (2014).

Due to possible endogeneity between trade flows and GDP per capita, AfT and regulatory reforms in the presence of time invariant factors in the model (Lemi, 2014), estimation results from the Hausman-Taylor model are shown in Table 3.7.2.

Table 3.7.2: Hausman-Taylor Estimation Results (Kenya)

Variables	(1) All aid for trade	(2) Aid for policy and regulation	(3) Aid for economic infrastructure
Aid for policy regulations	0.1030	-0.0070	
	(0.0920)	(0.0834)	
Aid for economic infrastructure	1.4749***		0.9067**
	(0.4472)		(0.4364)
Tel per 1,000 persons Kenya	-0.9134***	-0.3808*	
	(0.2676)	(0.2251)	
Tel per 1,000 persons importer	0.0492	0.0130	
	(0.1900)	(0.1944)	
Internet per 1,000 persons Kenya	-0.2872***		-0.0680
	(0.0937)		(0.0732)
Internet per 1,000 persons importer	0.0501		0.0515
	(0.0394)		(0.0393)
GDP per capita of importer	0.6297*	0.7683**	0.5133
	(0.3509)	(0.3687)	(0.3384)
Population of country Importer	0.9170*	0.3949	0.9073**
	(0.4790)	(0.8984)	(0.3921)
Membership to EAC	-0.0460	0.0939	0.0127
	(0.3740)	(0.3745)	(0.3851)
Population of country in Kenya	5.6356	6.2279***	0.8042
	(4.3929)	(1.8262)	(4.2891)
Regulatory quality Kenya	6.7672***	3.7949***	5.2932**
	(2.2240)	(1.3544)	(2.2151)
GDP per capita of Kenya	-1.9483	0.1959	-1.2546
	(1.3841)	(1.2190)	(1.2265)
Sharing of borders	-0.0595	1.2363	-0.0004
	(2.2183)	(4.5134)	(1.7842)
Geographical distance	-2.9002*	-2.6070	-2.6805**
	(1.5072)	(2.9925)	(1.1935)
Common language	-1.2672	-1.3629	-1.1230
	(1.5717)	(3.2138)	(1.2729)
Constant	-94.6018	-92.4554**	-16.7253
	(69.9167)	(38.8552)	(67.0863)
Observations	180	190	180
Number of countries	19	19	19

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The estimation determined that aid for economic infrastructure was consistently significant in determining exports in all the estimations, even when disbursed without including policy variable. Increasing aid for economic infrastructure by 1 per cent increases exports by 1.47 per cent. Surprisingly, when aid for policy is introduced it turned negative but insignificant effect on trade. Increasing aid for policy would reduce exports by 0.007 per cent. The explanation could be that introducing stringent conformity standards as part of policy reforms for example, may impose a compliance burden on traders thus without complementary improvement in infrastructure, negate trade.

The variable on regulatory quality was positive on trade flows in all the estimations whereby improving regulatory quality by 1 per cent positively promotes trade by 6.77 per cent when all aid is given; by 3.79 per cent when only aid for policy and regulations is given; and by 5.29 per cent when aid for economic infrastructure is disbursed. Fixed telephone and internet access variables in Kenya turned out to negatively affect Kenya's exports, but not in a significant manner except when all the categories of aid is disbursed. Internet per 1000 persons reduces trade by 0.287 per cent. This highlights the fact that when possible endogeneity in the model is accounted for, Kenya's exports shift away from the region, such that the country begins to trade with alternative markets, possibly, the aid donors. GDP per capita of the importer had the expected signs and was significant when all the two categories of aid are disbursed. Thus, importer per capita increase by 1 percent exports increases trade by 0.63 per cent but was 0.77 per cent when only aid for policy and regulation is given. The significance of the constant term when only aid for policy and regulations

was used in the estimation highlights the important role of infrastructure money in trade.

3.9 Summary, Conclusion and Policy Implication

In conclusion, the thesis identified the supply-side factors (trade facilitation) that influence export trade from Kenya into the Eastern Africa region. The study findings support the argument that AfT is trade enhancing - not just between donors and recipient countries - but also among AfT recipient countries. This provides a policy rationale for increasing regional trade through AfT.

In line with previous research on aid for trade, the study determined the effect of Aid for Trade facilitation, specifically aid that is disbursed for policy and regulation reforms and aid for economic infrastructure investment. To add value to previous literature, the study examined export trade among aid recipient countries. This orientation is different from previous work which focused on trade between the donors and aid recipient countries.

The study conducted three estimations. The first estimation included all the funds disbursed for trade policy reforms and economic infrastructure, while accounting for other control variables used in gravity models. The second estimation included the only the aid for policy and regulations while the third estimation used only aid for economic infrastructure. Aid can be given to the poorest country (with low GDP per capita) or a country with inherently poor regulatory framework, therefore low international trade. The study used a Hausman-Taylor estimation method to address the possible endogeneity between aid and regulations, and aid with GDP per capita.

The results from the study indicate that aid for economic infrastructure is a key determinant of export trade in Kenya. Increasing funds to improve road network, energy supply, port facilities, transport and communication would increase exports by Kenya. Equally, better policy and regulatory environment was found to make it easy for Kenya to trade in the region. In addition, the findings show that increased internet and fixed telephone connectivity could be driving Kenya's exports away from the region to other destinations.

The intuition is that with better communication, exporters from Kenya find it easy to link with other traders outside the Common Market for Eastern and Southern Africa region. This appears therefore to divert trade from the region. The finding is important since improving communication access allows the country to diversify her trade by retaining other export destinations while using aid to expand into the Eastern Africa region. Additionally, the existence of other trade arrangements other than EAC Customs Union in the region seems to have reduced the possible effect of the EAC common external tariff (CET) as a major determinant of trade flows. Consequently, the policy insight from the results is that to expand regional trade, it is imperative that there be a combination of widening and deepening regional integration while enhancing global connectivity though faster information and communication systems.

The policy recommendations accrued from the study therefore call for: support of the development of new infrastructure; maintenance of the existing infrastructure such as the port, access roads and border facilities through Public Private Partnership (PPP); and policy reforms to reduce bureaucratic procedures around trade documentations, customs procedures, weigh bridge inspections and standard conformity assessments.

Further harmonizing regional standards and joint investments on trade facilitation projects is required besides constant monitoring, identification and elimination of non-tariff barriers along the trade corridors, while encouraging Good Manufacturing Practices (GMP) by traders to meet the set standards.

CHAPTER FOUR

EFFECT OF TRADE COSTS ON EXPORT DIVERSIFICATION IN KENYA

4.0 Background and Problem Statement

The poor economic growth in many developing countries is partly linked to the high export concentration within them. The dependence on a narrow range of primary commodities for export earnings is perceived to expose the countries to negative external shocks and Gross Domestic Product (GDP) volatility (Caselli *et al*., 2014). Therefore to reduce volatility and grow, developing countries should shift from trading in less sophisticated primary commodities into high productivity manufactured goods (Collier and Venables 2007). Naude and Rossouw (2008) argued on the basis of Prebisch (1950) and Singer (1950) hypothesis that increased product diversification is necessary for growth in developing countries. Lemi (2014) equally avers that trade diversification is a prerequisite for sustained gains from international trade.

Developing countries stand to reap productivity gains and positive spill-overs by producing technology intensive products, thus expanding the scope for economic performance and growth. There is a relationship between the disappointing economic performance in many developing countries and low product differentiations (Imbs and Wacziarg, 2003). Trade diversification hence is an important channel for these countries to improve their economic performance. As an illustration, beginning 2005, world merchandize transactions outpaced GDP growth, increasing by 3.7 per cent per annum compared to 2.5 per cent in GDP growth per year (Aldan and Chula, 2013).

The long-run improvement in economic growth arises from different channels including productivity gains as explained by Melitz (2003), scale economies (Krugman, 1979), and reduced volatility of export earnings (Caselli *et al*., 2014; Cadot *et al.,* 2011; Dennis and Shepherd, 2011). The path towards a diversified export basket involves either exporting to new markets (termed as the intensive margin of trade) or exporting new products in the extensive margin (Hummels and Klenow, 2005). Chandra, Boccardo and Osorio (2008) using the Herfindahl Index, found that over the past 30 years, 60 per cent of developing countries in the middle and low income categories diversified their exports.

Much of the growth in trade has been driven by expanding the existing bilateral trade among developing countries, hence the intensive margin of trade. Brenton and Newfarmer (2009) quantified trade in the intensive margin in developing countries and determined that it constituted 84.4 per cent compared to 19.6 per cent in the extensive margin of trade. A similar result by Amurgo-Pacheco and Pierola (2007) found that the intensive margin dominates growth in export trade for developing countries.

Despite possible gains from trade diversification, resource rich developing countries still depend on a narrow range of commodities to earn their foreign exchange (Derosa, 1992; Brenton and Newfarmer (2009). The reliance on a thin layer of goods increases the vulnerability of these countries to price uncertainty of international commodity markets (Levchenko and Di Giovanni (2009). However, there are arguments that only short-run effect happens when developing countries trade relationships are defined on the extensive margin.

There is therefore rekindled interest on ways to improve the economic performance - which is a source of low per capita incomes in developing countries- by exploiting the three-way connection between export diversification, growth and income per capita (Cottet and Madariaga2012; Lee and Kim 2012; Ferdous 2011; Dennis and Shepherd 2011, and Persson, 2008). This approach is informed by acknowledging that income levels and the extent of economic diversification usually evolve in the same direction over the long-run (Cottet and Madariaga 2012).

What is hindering more export diversification in Sub-Saharan Africa (SSA)? The debate and evidence so far is that the quality of export products is important if SSA is to attain increased growth and provide a buffer against external economic shocks (Karingi *et al*. 2012; Songwe and Winkler, 2012). A range of other plausible factors that prevent increased value addition of export products from developing countries exist. Besides the abundance of natural resources, poor policies and market failures, high trade costs are cited as one of the reasons why these countries have failed to diversify their trade (Denis and Shepherd 2011; Lee and Kim 2012; Persson 2008; Cramer 1999). These authors consent that reducing trade costs and better trade facilitation increases trade diversification.

Crozet and Koenig (2010) explain that when trade costs are reduced, first, firms that are already exporting increase the volume of export goods. Second, new firms seek to enter into the export markets. The entry of new firms or products into the export basket depends on the heterogeneity of firm productivities (Crozet and Koenig, 2010) which is closely related to trade costs in a country.

The areas identified as trade limiting include trade facilitation measures like poor infrastructure, burdensome customs procedures, the state of productive capacity and nature of institutions. Improving trade facilitation elicits different outcomes to the extensive and intensive margin of trade diversification (Lee and Kim 2012). Thus understating how trade costs are important in determining whether a country is exporting more of the old goods in intensive margin or expanding the range of her export products in the extensive margin is important to inform national and regional trade and growth policies (OECD/UNOSSA, 2011).

4.1 Objectives of the Study

The objective of this chapter is to measure the extent of trade diversification in Kenya. The specific objectives are:

i. Determine the extent of extensive margin trade diversification for manufacturing goods in Kenya.

ii. Examine the relationship between export diversification to EAC trading partners and the bilateral tariff equivalent trade costs.

iii. Draw policy implications on the effect of trade costs on trade diversification in Kenya.

4.2 Justification for the Study

Bilateral trade costs among countries influence not just how much volume is exported, but the kind of commodities traded. The empirical debate on whether a country should specialise or not in producing certain goods is still on-going. Supported by the neo-classical trade theory of Ricardo, some argue that on the strength of comparative advantage, countries are better off specialising (Songwe and Winkler 2012). This argument is counter to the Heckscher-Ohlin theory which posits

that countries should trade in goods that use the abundant local factors intensively. A different strand of literature in line with the new trade theory suggests that countries accrue economies of scale when they are exporting more because of increased specialisation, knowledge and technology transfers (Krugman, 1980). Tsivadze (2011) argue that the composition of exports is important relative to how much a country exports. Brenton and Newfarmer (2009) aver that there is an empirical gap to offer explanations on the need for increased trade among developing regions in the extensive margin and combined with growth in exports into new markets.

This essay seeks therefore to determine the extent of export diversification in a theoretically consistent manner using manufactured exports, and subsequently examine the relationship in bilateral tariff equivalent trade costs and the manufactured export basket from Kenya into other East African states. The choice on export trade to the EAC is informed in part by the increasing role of regional integration as a driver of trade expansion by Kenya. The growth in exports can either occur through existing firms increasing volumes of sales (called the intensive margin); new firms moving into export markets or selling new products. Countries must address both supply and demand constraints that reduce international trade. The exposition of this essay should provide useful information for both domestic and regional trade policies.

4.3 Export Diversification Theory and Measurement

International trade theory as discussed by the classical school was meant to dispose of surplus production output and accumulate the benefits from industrial specialisation. Adam Smith absolute advantage hypothesis highlights how labour specialisation leads

to more output and trade. Subsequent explanations on international trade used comparative advantage as the basis for international trade. The seminal work of Ricardo comparative advantage theory argued that differences in labour productivity result into comparative advantage for countries, hence trade. The sustaining argument seen in the Ricardian theory is that only labour matters in production. When augmented with technology, productive labour offers some comparative advantage to one country and not the other in producing particular goods. Therefore the production efficiency caused by international specialisation forms the basis of production and trade between any two countries.

Other trade theories similar to the Ricardian framework include Amingtonian model which postulates that each country produces only one variety in a given category of goods. The model assumes that there are no variations in the quality of goods across countries. Therefore only labour productivity drives the intensive margin by defining the commodities being produced and exchanged. The outcome is that bigger economies produce intensively and export at lower prices resulting into the intensive growth of trade.

Heckscher-Ohlin (H-O) theory assumes that there are no technological differences between countries. The arguments in H-O are based on factor abundance and factor usage in production. When a country enjoys comparative advantage, it is expected to export goods made locally using factors that are abundant in the home market. The model assumes that there are no labour movements, preferences are homothetic and there is free movement of goods. Subsequently, gains to trade accrue to the country and the sector with abundant factors while the resource scarce sector loses out. The

extension to H-O in Heckscher-Ohlin-Vanek model explained the role of factor content and endowments in describing the trade patterns under two countries, two industries and two factor models.

Brainard and Cooper (1968) argue that the neo-classical trade theories and their assumptions under uncertainty offer limited basis for trade. This is consistent with the account in specialisation when countries enjoy comparative advantage in producing a commodity. However the choices of export commodities are guided by the risk preferences caused by underlying uncertainty in world markets. Therefore the more risk averse a country is, the more likely the country tends to specialise and diversify its trade basket.

Donbursh, Fisher and Samuelson (DFS) theory (DFS 1977) includes multiple countries, a continuum of goods and transportation costs in international trade, similar to Samuelson's (1948) framework. The main argument here is that only some fractions of the tradable goods reach their final destination because transport costs melt away bits of the exported goods. The distinguishing feature in the DFS theory (1977) is how tariffs and transport costs make certain goods non-tradable across countries.

The neo-classical trade theories' inability to explain all international trade and appearance of new products lead to the New-New trade theories. Accordingly, countries that have similar demand structure or income levels tend to trade more between themselves. Thus by incorporating economies of scale and increasing returns to scale, Krugman (1980) demonstrates how external economies resulting from

enlarging markets and trade in similar but differentiated products form the basis for international trade. According to Krugman's variety theory, affection by consumers induces both scale and selection effect, which incentivises countries to specialise in trade. In this model, bigger countries tend to be more diversified in their export structure. Indeed, Funke and Ruhwedel (2001) found a positive correlation between nineteen export and import goods and the per capita incomes of Organisation for Economic Corporation and Development (OECD) countries. In addition lower differentiation is associated with lower income levels and the consequent low welfare benefits from trade (Parteka, 2013).

Regolo (2013) presents a theoretical study on export diversification using the model explained in Romalis (2004), whose basis was the differences in factor endowment between the North and South. The argument is that trade patterns follow intra-industry trade of differentiated goods. The theoretical work in Regolo (2013) introduces heterogeneous trade barriers between countries with no factor price equalisation. The addition in the work is how bilateral reductions in costs and possessing similar endowments promote export diversification. Where there are heterogeneous firms with fixed costs, Melitz (2003) argues that only the most productive firms enter the export market. Equally, Helpman *et al.* (2008) points out that reduced entry and trade costs result into export diversification, giving an account of the extensive margin in trade growth.

The foregoing discussions underscore how the size of a country is important in determining the extent of trade. The prediction in literature is that large economies tend to export more compared to smaller ones. However, there is mixed consensus on

how the large countries end up exporting more products (Karingi *et al.*, 2012). Those pursing the intensive trade route base their arguments on the Armington (1969) model in which goods get differentiated according to the country of origin under constant substitution elasticity between domestic output aggregates (Feenstra *et al.*, 2012).

Hummels and Klenow (2005) take a middle ground that neither use Krugman's (1980) nor Armington's (1969) hypothesis to explain the trade structure in developing countries. Hummels and Klenow (2005) argue that consumer preferences for varieties increase as economies grow, and that this is an incentive for export expansion in the extensive margin. Therefore, large economies end up exporting higher volumes of each good along the intensive margin, export more variety of goods in the extensive margin and offer better quality products (Hummels and Klenow, 2005).

Subsequently, recent studies have focused on the variations emanating from changes in trade diversification as countries grow (Parteka 2013). Therefore the theoretical anchor in this essay is based on the Melitz (2003) model. The study by Melitz (2003) uses productivity gains by heterogeneous firms which emanate from market improvements abroad, such that highly productive firms enter the export market while less productive ones are crowded out. The channel of productivity gains for producers and more export varieties happens by deliberate welfare boosting government policies like improving trade facilitation measures (Feenstra and Ma, forthcoming).

This study examines changes in the variety of manufactured export products from Kenya to EAC, and the effect of bilateral trade costs among the countries. This is informed by pursuit for deeper regional trade integration and investments to reduce trade costs.

4.4 Measurement of Trade Diversification

There are different methods to measure export diversification including examining the share of primary and manufactured exports in the total exports in a country, explained through vertical diversification (Regolo 2013). Other methods consider horizontal diversification at a disaggregated level of export shares using Standard International Classification of goods within an industry (Naude and Rossouw, 2008). The improvements to these methods have resulted into composite indices which examine the concentration of exports by country. Herfindahl Hirschman Index (HHI) has been used, for example, in Karingi *et el.*, (2012) to determine the level of exports concentration for countries in SSA. The authors use a normalised index calculated as:

$$HHI = \frac{\sqrt{\sum_{i=1}^{N}\left(\frac{x_i}{\sum_{i=1}^{n} x_i}\right)^2} - \sqrt{\frac{1}{N}}}{1-\sqrt{\frac{1}{N}}}$$

Where x_i is the export of good i and N is the number of products considered. The intuition behind the formula is how countries depend on a concentrated basket of goods for their export earnings. The value of the HHI lies between zero and one with a value close to one indicating more concentration, thus less diversified export trade, while values near zero mean high trade diversification. Other studies such as Parteka and Tamberi (2011) use the relative Theil Index to determine how sectors are

diversified. Theil Index is calculated by assuming *n* industries established in *m* countries, taking Xij as the value of j exports in country i, the proportion of exports from the sector *j*=1……m and country *i*=1….m. The Theil index is given as

$$S_{ij} = X_{ij} \Big/ \sum_j X_{ij} .$$

The lowest value of the index being zero and an upper limit of one. The meaning is that high values mean less diversified exports in a country, while lower figures indicate a more diversified trade.

Another way to construct the diversification index used in Al-Marhubi (2000) is by constructing the absolute deviation of a country's export share in world total exports. The index is given as: $S_{jt} = \frac{\sum_i |H_{ijt}| - |H_{ii}|}{2}$

The limits of the measurement are between zero and one with similar interpretation where a value of one defines less export diversification. The h_{ijt} gives the share of industry *i* in total exports in country *j* and h_{it} is the share of industry *i* in world exports in period *t*. Dennis and Shepherd (2011) construct a relative measure of variety as built by Feenestra (1994) expressed as :

$$A = \frac{\sum_{i \in j^H} P_i^w q_i^w}{\sum_{i \in j^w} P_i^w q_i^w}$$

Where *i* and *j* is the range of varieties of products exported from the world (w) and domestic market (*H*). The home country's value of exports across the varieties is given by the numerator while the denominator gives the total value of all world

exports in all the product ranges. The variations in *A* only occur when the product varieties change.

Despite the appeal of indexes, Dennis and Sherpherd (2011) advocated for additional methods perceived to be more robust. The methodology in Hummels and Klenow (2005) and Feenestra (1994) bears important theoretical underpinnings and is thus useful for this study. The derivations are demonstrated in latter sections of this essay.

4.5 Kenya's Export Structure

Kenya's international trade structure can be traced to the post-independence period. The general consensus was that the country's export performance had been poor as demonstrated by slow growth in exports (Mwega and Muga 1999). Whereas the average economic growth before and after independence (1954-1994) was about 4.7 per cent, the volume of export growth was much lower increasing at 1.7 per cent (ibid). Over the decade from 1995 to 2005, the ratio of exports to GDP dropped from 71 per cent to 58 per cent (Amajdi and Yeats 2005). More recently in 2011, exports growth is recorded at around 1 per cent while imports increased by 5.7 per cent (GoK, 2014; KIPPRA, 2013). GoK (2014), reported that the quantum index for all exports declined by 8.0 per cent between 2012 and 2013.

The explanations for the underperformance in export trade are varied, but policy choices by the country (like tariffs charges, quantitative restrictions and export promotions strategies) over the years played an important role in defining the trade performance. Immediately after independence in 1964, the country started implementing import substitution policies as a means towards industrialisation. This

involved increasing tariffs rates on import goods ranging between 2 per cent and 90 per cent in early 80s (Mwega and Muga, 1999). In addition, quantitative restrictions were imposed on essential and non-essential import products, even though the latter category was subjected to higher quantitative limitations (ibid).

Available evidence suggests that initially the pre and post-independence policies resulted into gains in the manufacturing sector, driven, in part by foreign investments. The manufacturing sector grew at an average rate of 8.7 per cent between 1954 and 1963, which was higher than the rate of economic growth (Kinuthia, 2013). Unfortunately, over time, the policy choices failed to realise other desired macroeconomic outcomes, for example, expanding the manufacturing export trade, addressing unemployment, and deteriorating trade imbalance in the country. Thus, by 1970; confronted with external shocks occasioned by the oil crises, global recession and balance of payment problems, the failings of past policy choices became obvious. The erosion of early gains resulted into neglect of certain industries, leading to the dependence on a narrow range of export commodities (Kinuthia and Dietz forthcoming).

Furthermore, the desire for new trade policy direction had been set, and this occurred with the introduction of Structural Adjustment Programmes in the early 1980s. SAP's were meant to reduce government involvement and distortions in economic activities and improve the competitiveness of the country. Through liberalising different sectors of the economy, the policy intention was to attract more foreign direct investments and create greater diversification in the country's export basket.

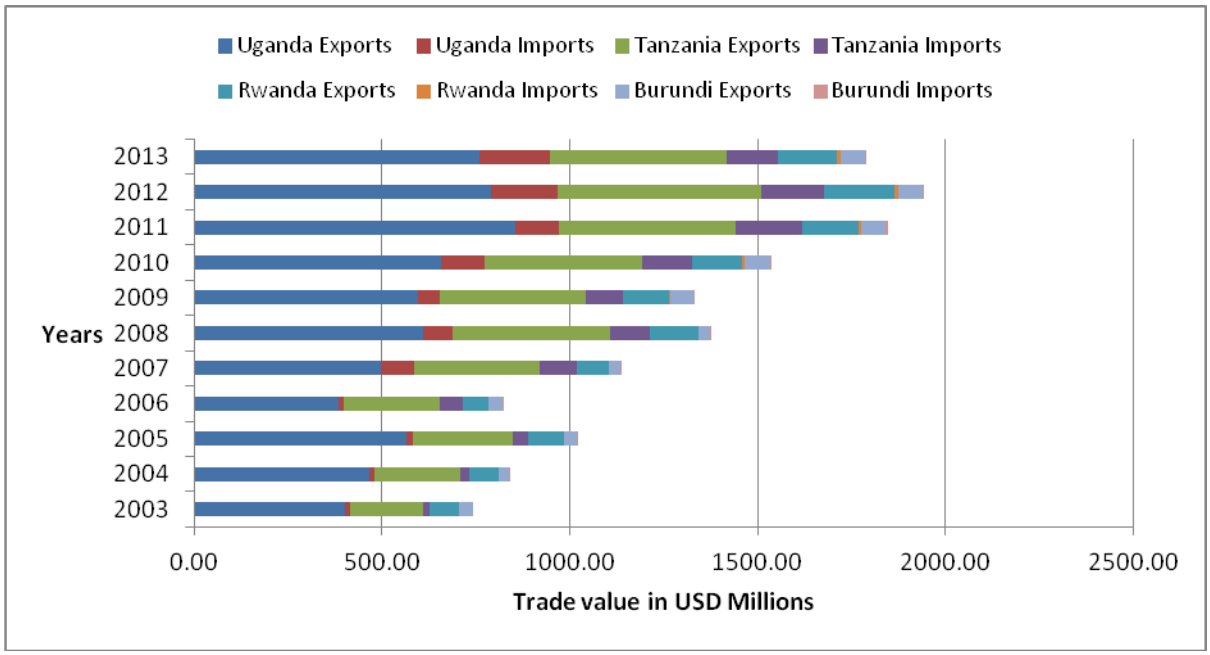
Whereas trade liberalisation under SAPs is partly credited with increased overall export performance in the mid 90s (Glenday and Ndii 2003), the period also coincided with movement away from the previous inward looking trade policies and import substitution of the early 1970s and 80s to an outward regional orientation (Abala, 2009). The current trade expansion strategies through regionalism thus appear to be in line with the structural adjustment policies adopted in the early 1980s. However, despite the policy changes like regional integration by acceding to various RTAs including EAC and COMESA, the contribution of manufactured exports has stagnated at 10 per cent of the country's GDP over the last two decades (Abala 2009).

Consequently, Africa and East Africa in particular have become important export destinations for Kenya's products. The African market accounted for 46.1 per cent of the total exports in 2013, with Uganda and Tanzania as the major export destinations in the continent (GoK 2014). Kenya's expansion into the regional markets took place at the expense of hitherto traditional trading partners like the European Union (EU) who accounted for 24.6 per cent of the exports in 2013, representing a 3.6 per cent decline from 2012. The value of exports to the EU declined by 7.3 per cent to stand at USD 373, while exports to USA remained unchanged at USD 338 in the year 2013. Asia was the only region whose exports expanded from USD 105 million in 2012 to USD 108 million (ibid).

Within the EAC region, the value of exports to Uganda and Tanzania was USD 1000 and USD 875 million respectively in 2013 (GoK, 2013). However exports to EAC partners contracted by 7.2 per cent from USD 134,946 million to USD 125 million between 2012 and 2013 while imports declined by 6.6 per cent (ibid). Figure 4.1

illustrates the changes in the structure of export trade of each EAC trade partner with Kenya between 2003 and 2013.

Figure 4.1 Share of Kenya's EAC Trade Value (2003-213)



Source: Authors

Regardless of the improvements in regional trade flows in the last decade (between 2000 to 2010), primary commodity exports (e.g. coffee, tea and horticulture) still constituted 49 per cent of export earnings (GoK, 2014). This is cited as one of the drawbacks to Kenya's export led growth strategy. Abala (2009) pointed out that there have been few attempts coupled with limited success to diversify the export commodities and markets beyond the traditional primary products and trading partners.

As a share of world exports, Kenya's manufacturing sector was marginal at 0.02 per cent (KIPPRA, 2013). This compares unfavourably with other countries, for example South Africa, with 0.3 per cent and Singapore with 2.4 per cent (ibid). The domestic

export structure by Broad Economic Classification (BEC) confirms the assertion by Abala (2009), on the limited policy success to diversify export content. Food and beverages are dominant in the export basket (42%), illustrating low upstream processing as shown in Table 4.1.

Table 4.1 Shares of Domestic Exports by BEC in Percentage (2009-2013)

Export Category	**2009**	**2010**	**2011**	**2012**	**2013**
Food and beverages	42.26	44.12	40.36	41.17	42.81
Industrial supplies(non-food)	26.99	28.07	30.26	29.61	27.69
Fuel and lubricants	1.41	1.93	2.07	0.84	0.35
Machinery and other capital Equipment	2.10	2.34	2.31	2.86	2.14
Transport equipment	1.80	1.71	1.56	1.64	1.78
Consumer goods not elsewhere specified	25.43	21.80	23.42	23.74	24.92
Goods not elsewhere specified	0.01	0.02	0.02	0.15	0.31

Source: GoK (2014)

Table 4.1 highlights that compared to foods items, industrial supplies average contribution to export earnings over the last five years was 28.52 per cent. However more illuminating is the low average share of machinery (2.35%), transport equipment (1.7%) and fuel and lubricants (1.32%). Largely, the manufacturing sector is composed of agro-processing, thus vulnerability to changes in weather patterns (KIPPRA 2013).

Despite domestic incentives designed to promote manufacturing export trade like the Export Processing Zones (EPZs) and Manufacturing Under Bond (MUB) scheme,

there is no discernible structural improvement in the manufacturing sector. Between 2011 and 2012, the sector's contribution to GDP contracted marginally from 9.6 per cent to 9.2 per cent (KIPPRA 2013). This added to diminishing bilateral market share (in Uganda) highlighting failures in the past and current trade policies in the country.

Abala (2009), and Glenday and Ndii (2003) acknowledge that several reasons explain such poor trade diversification. The reasons include: low value addition and declining manufacturing productivity, poor domestic business environment, inadequate local infrastructure, inefficient transport services and high business risk. These diminish the opportunities for export led growth in the country, contrary to the policy aspiration of Vision 2030 (GoK, 2007).

4.6 Empirical Literature Review

Past empirical work on trade diversification mainly examined the determinants and causality between growth and income. For example, Cabral and Veiga (2010) analysed the cause of export diversification in SSA, and Cardo *et al*. (2011) explored the relationship between export diversification, income and growth. Ragolo (2013) examined the role of country endowments and how diversified the trade is; and Arip *et al*. (2010) examined export diversification and growth in Malaysia.

Another body of empirical work, though not closely related to trade facilitation delves into the reasons for intensive and extensive margin in trade. Feenstra (1994) and later Hummels and Klenow (2005) disaggregated trade data and theoretically derived the measures for two categories of export growth. They contend that extensive margin dominates trade flows, contributing to 60 per cent of trade growth for larger countries.

Besedes and Prusa (2008) examined export growth in both developed and developing countries on the extensive and intensive margins. The results show that intensive margin would be recommended for developing countries. Amurgo-Pacheco and Pierola (2007) looked at the extensive and intensive margin in the patterns of trade from developing countries, while Neto and Romeu (2011) questioned whether export diversification could cushion countries from the global financial crises. Baliamoune-Lutz (2011) examined whether export destinations matter in growth of trade.

The related works on extensive margin include Bergin and Glick (2005), who examined firm entry decision when costs and tariffs are present. They concluded that when more firms enter the market, more varieties are produced hence growth in trade. Dennis and Shepherd (2011) determined that trade costs negatively affect trade diversification in the extensive margin. Using export and import data from developing countries to the EU for the year 2005, the authors found that export costs, transport costs and market entry costs had a negative effect on developing countries' content of trade. Other control variables included tariffs and distance. Despite the use of extensive margin to define diversification, it is an anti-thesis in the study since trade facilitation indictors used in the study are those that are quantifiable. This is despite the stringent quality requirements in the EU markets (e.g. Sanitary and Phyto Sanitary measures) on imports from developing countries. Thus, though empirically robust, the results may have underestimated the effect of trade costs (trade facilitation) on export outcome.

Comparing the extensive and intensive margin of trade, Persson (2008) revealed that there is a higher response of extensive margin of trade due to better trade facilitation. He used inefficiency of border procedure as the proxy for trade facilitation. The data include all developing countries exporting into the EU in 2005. The results show that inefficiencies affect the extensive margin more than the intensive margin. Reducing delay at the border even for one day significantly affects extensive margins for both the exporting and importing country. The inclusion of factors at the border as control variables in the study might result into an underestimation. This is because only tradable goods are captured by the disaggregated trade data.

However technological improvement shortens trading distance by reducing transport costs which changes the trade incentive between the tradable and non-tradable sectors. These changes in trade structure are not addressed in this study but Feenstra and Ma (forthcoming) used data spanning 1991 to 2003 in a traditional gravity model to determine the effect of port efficiency on exports in the extensive margin. The countries are grouped into Organisation for Economic Corporation and Development (OECD) and non-OECD. Other control variables used are trade restrictiveness and regional trade agreements. They find membership to OECD, reduction of port efficiencies and bilateral tariffs to promote extensive margin of trade diversification. Port efficiency is a significant determinant of extensive margin compared to the intensive trade growth.

In spite of disaggregating export data and extending into the period of Harmonised System of classification, there is a possibility of over-inclusion of varieties, since

newly classified goods, which were originally traded might be included as new trade yet there is no upstream movement in product composition.

Kehoe and Ruhl (2009) used a new methodology and assigned weights on the importance of a commodity to a country instead of imposing a cut off value on whether a product is traded or not. The authors found that policy changes like trade liberalisation (China's accession to the WTO, formation of the North Atlantic Free Trade Area (NAFTA) and the USA-Canada Free Trade Agreement have positive effects on extensive margin in growth of trade for the member countries. However, the authors focused on policy trade barriers ignoring the totality of trade barriers, including the role of infrastructure on the growth of trade.

Lee and Kim (2012) used a gravity model to assess the effect of trade facilitation on exports in the extensive and intensive margin, from developing and developed countries, into the EU 26 countries. They use Logistic Performance Index as a measure of trade facilitation and then disaggregate the commodities into primary and manufacturing sectors. The results show that better trade facilitation enhances intensive margin growth of primary goods for lower middle income developing countries, and is effective in the extensive margin for manufactured exports for upper middle income countries.

4.7 Literature Overview

There is a dearth of empirical studies that link trade costs or trade facilitation to trade diversification. Though they address related aspects of trade diversification, the few empirical studies sought to link export diversification, economic growth and income. The works that relate to the objective of this essay (Dennis and Shepherd, 2011;

Kehoe and Ruhl 2009; Lee and Kim 2007; Person 2008) examine trade facilitation using either direct cost indicators or trade facilitation indexes. The consensus from these studies is that better trade facilitation or reducing trade costs enhances export diversification. However, none of these studies focused on bilateral trade relation among individual developing countries or particular Regional Economic Communities (RECs) in SSA. In addition, by using indirect measures for trade facilitation and direct costs, the studies overlook other factors affecting diversification that are unobserved and less-quantifiable. Whereas recent literature on trade facilitation focuses on its effects on trade flows, an important aspect is what is exported. The empirical studies pursing this area use trade facilitation indicators and seek the causality with trade diversification. There is thus a glaring gap in empirical literature on similar work on SSA. This study seeks to fill this empirical gap by using trade costs measure constructed from bilateral trade data to address extensive margin trade diversification in Kenya within the EAC RTA. So far, no known research has blended such a measure of trade costs and trade diversification.

4.8 Theoretical Framework

The theoretical underpinnings used for the construction of trade diversification draws inspiration from Feenestra (1994), as expounded by Feenestra and Ma (2013). The authors derive extensive trade diversification by assuming multiple countries and goods. The countries are given by $h = 1.....H$ and commodities aggregated to a single sector, allowing for extension into many sectors. At time period t the bundle of goods produced by *h* is given by: $I_t^h = \{1,2,3.....\}$.

Since country h produces many goods, the quantity set for each good is denoted by: $q_t^h > 0$. Thus, aggregate output in the country is defined by $Q_t^h = f\left(q_t^h, I_t^h\right)$ which is given by non-symmetric CES production function expressed as:

$$Q_t^h = Q\left(q_t^h, I_t^h\right) = \left[\sum_{i \in I_t^h} a_{it}\left(q_{it}^h\right)^{\left(\sigma-1/\sigma\right)}\right]^{\sigma/(\sigma-1)} \text{.....1}$$

The elasticity of outputs is $\sigma < 0$

The output function (1) is constrained by the transformation frontiers

$$F = \left[f\left(q_t^h, I_t^h\right), V_t^h\right] = 0 \text{.....2}$$

The value $V_t^h > 0$ gives how much country h is endowed at period t. Under the assumption of perfect competition the value of output is defined by $P_t^h Q_t^h$ where $P_t^h > 0$ gives the price index (price vector of all the different outputs) in country h at time t, thus the CES functional form as:

$$P_t^h \equiv c\left(p_t^h, I_t^h\right) = \left[\sum_{i \in I_t^h} b_{it}\left(p_{it}^h\right)^{1-\sigma}\right]^{1/(1-\sigma)} \text{ and } b_{it} = a_{it} > 0, h = 1,.....H$$

The ratio of price indices of outputs in two countries a and b gives the Sarto-Vartia product in the goods common among the countries, such that $I_t \equiv \left(I_t^a \cap I_t^b\right) \neq \otimes$, multiplied by the revenue share of the goods:

$$\frac{P_t^a}{P_t^b} = \prod_{i \varepsilon I}\left(\frac{P_{it}^a}{P_{it}^b}\right)^{\omega_i(I_t)}\left(\frac{\lambda_t^a(I_t)}{\lambda_t^b(I_t)}\right)^{1/(\sigma-1)} a \text{ and } b = 1.....H \text{ .....3}$$

Using the revenue shares in the two countries, the weights $\left(\omega_t\right)$ are constructed as:

$$\omega_i(I_t) \equiv \left(\frac{S_{it}^a(I_t) - S_{it}^b(I_t)}{\ln S_{it}^a(I_t) - \ln S_{it}^b(I_t)}\right) \Big/ \sum_{i \varepsilon I_t}\left(\frac{S_{it}^a(I_t) - S_{it}^b(I_t)}{\ln S_{it}^a(I_t) - \ln S_{it}^b(I_t)}\right) \text{.....4}$$

$$S_{it}^{h}(I_t) \equiv p_{it}^{h} q_{it}^{h} / \sum_{i \varepsilon I} p_{it}^{h} q_{it}^{h} \ \forall h = a, b \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 5$$

Thus

$$\lambda_t^h(I_t) = \frac{\sum_{i \varepsilon I} P_{it}^{h} q_{it}^{h}}{\sum_{i \varepsilon I_t^h} p_{it}^{h} q_{it}^{h}} = 1 - \frac{\sum_{i \varepsilon I_t^h, i \in I} p_{it}^{h} q_{it}^{h}}{\sum_{i \varepsilon I_t^h} p_{it}^{h} q_{it}^{h}} \ \forall h = a, b \ldots\ldots\ldots\ldots\ldots 6$$

$\lambda_t^t(I_t)$ is always less than one since some goods are not likely to be in the set I_t^h relative to the benchmark set I_t. Thus the inverse of $\lambda_{it}^{a} \big/ \lambda_{it}^{b}$ is used to infer country $a's$ export diversity compared to $b's$. By introducing worldwide comparative country (ω), the measure for export diversity in the extensive margin is given as:

$$\lambda_t^w\left(I_t^h\right) = \frac{\sum_{i \varepsilon I_{tt}^h} p_i^w q_i^w}{\sum_{i \varepsilon I^w} p_i^w q_i^w} \ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 7$$

Equation (7) gives the bilateral extensive margin of trade from country h to j which gives the average of the world's average to j from the sectors exported by h to j compared to the average of world exports to j for all the defined product groups.

4.9 Empirical Model Specification

Lee and Kim (2012) construct the measure of extensive margin based on the value of exports in particular products over the country's bilateral exports in that market. We adopted a similar empirical method to construct the exports extensive diversification measurement (ExM) given as:

$$ExM_{jm} = \frac{\sum_{i \varepsilon I_{jm}} v_{kji}}{\sum_{i \varepsilon I} v_{kji}} \ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 8$$

where ν gives the value of country $k's$ exports to m for certain categories of goods given by I_{jm} compared to $k's$ aggregate exports to m in all the other goods.

Equation (8) which defines the measurement for export diversification in Kenya, is used as the dependent variable, while tariff equivalent trade costs variable is introduced as a key exploratory variable within a gravity model. The additional control variables included in the estimation are membership to the East Africa Community RTA, GDP per capita, population, distance, and sharing of borders, (see Lee and Kim, 2012; Feenestra and Ma, 2013).

Thus the estimation equation is expressed as follows:

$$\ln(ExM_{kmt}) = \alpha_1 \ln(TEC_{jmt}) + \alpha_2 \ln(GDP_{kt}) + \alpha_3 \ln(GDP_{mt}) + \alpha_3 \ln(POP_{kt}) + \alpha_4 \ln(POP_{mt})$$
$$\alpha_5 \ln(Dist) + \alpha_6 RTA_{km} + \alpha_7 Border_{km} + \varepsilon_{kmt} \quad \text{.....9}$$

where the variables ExM_{jmt} = the extensive margin for manufactured products from Kenya (k) to the rest of EAC partner countries (j);

TEC_{jmt} = the bilateral tariff equivalent trade costs between Kenya and the EAC trade partners. This variable is constructed following Novy (2011) and Turkson (2012) as demonstrated in the First Essay in Chapter two of this study.

$GDPP_k$ and $GDPP_m$ = Gross Domestic Product per capita for Kenya and other EAC member states. The GDP per capita of Kenya is expected to positively relate to trade diversification, while GDP per capita of the other EAC partners should negatively affect the extensive margin of trade;

POP_k and POP_m = the population of Kenya and other EAC member states in million persons;

DIST= the commercial distance between Kenya and EAC trade partners;

RTA_{km} = the common membership to the EAC Customs Union;

$BORDER_{km}$ = whether Kenya shares a border with the trading partner in EAC; and

ε_{kmt} = the error term- normally distributed mean and standard error of σ^2.

4.9.1 Definition and Measurement of Variables

Extensive trade diversification is the main variable for the essay as measured by equation 8 above. The definition by Amurgo-Pacheco and Pierola (2007) captures it as the export of new products to old markets, old products to new markets, and new products to new markets. This study attempted to define how Kenya has moved up-stream in exporting new products to the existing EAC markets. This is done using HS classification at 8 digit level for products in the manufacturing sector. This is the dependent variable in the study.

Tariff equivalent trade cost measurements variable is the bilateral equivalent of tariff rates. This is constructed based on the methodology by Novy (2011) and Turkson (2012) who use trade flow data, arguing that such measure is a good computation of most factors that affect trade and also shift commodities between tradable and non-tradable sectors within a country. As a measure of trade cost, it is hypothesised to negatively influence extensive trade diversification.

Gross domestic product per capita and *population* gives the total value of all domestic output for per person in each EAC member state. GDP per capita measures the endowments in US dollars for each EAC member country; while population confers scale economies by offering large markets and the love of variety by consumers. The expectation is that they relate positively with extensive trade diversification.

Distance measurement is based on CEPII calculation of bilateral distance for 225 countries worldwide. This study used the weighted distance between the largest city in a country calculated by weighting with the share of the city's on a country's overall population. Distance is hypothesised to negatively affect extensive export diversification.

EAC RTA and Sharing borders have been empirically proven to enhance trade. The EAC Customs Union gives certain preferences to member states, and CET for particular products from Kenya following the asymmetrical integration. The variables are measured using a dummy for RTA and sharing of borders. The association is expected to be positive with extensive diversification, while countries not sharing borders with Kenya are hypothesised to negatively relate to the extensive trade diversification.

4.10 Data, Sources and Analysis

The bilateral manufacturing exports and aggregate export data was sourced from the Kenya Revenue Authority database. This data is reported at Harmonised System (HS) classification at eight-digit level for the value in Kenya shillings of the country's

export trade with EAC between 2002 and 2013. The total tariff lines per year were around 9,786 in all the four EAC countries.

To achieve the objective of the essay, the HS tariff headings from chapter HS 50 up to HS 96 which include the disaggregated levels of manufactured products were selected per country and per year for the period under study. The period from 2002 and 2013 fits well within the formation of the EAC Customs Union, thus captures the pre and post adoption of the CET. This is important because tariff variations in the Common External Tariff changed the cost structure for traders. Only Kenya's intra-EAC export trade data is used in this study.

The use of direct costs and indirect trade measures like LPI has been previously questioned on grounds of disregarding certain unobservable and non-quantifiable barriers that influence trade flows. This study used the approach demonstrated in the first essay to infer the bilateral tariff equivalent trade costs since the factors shifting the composition of export goods are included in the measure.

The use of GDP per capita in US million dollars and population in millions persons is justified on the basis that trade is driven partly by the endowments within a country. The data used was sourced from the EAC Facts and Figures (2013). The population were mid-year figures based on population census and projection using annual growth rates, fertility rates, mortality rates and migration (EAC, 2013).

Measurement of distance was from the CEPII database of 225 countries worldwide, of which the EAC countries are included. The inclusion of GDP per capita, population and distance is in line with the gravity tradition and includes data on the five EAC countries. The population figures and GDP per capita were sourced from the various editions of the EAC Facts and Figures on their website.

4.11 Data Analysis

Table 4.1 presents the results on how diversified the extensive margin[5] in Kenya's manufactured exports to the EAC partners is and how it has evolved. The general level is that Kenya's regional trade is not well diversified with the highest computed bilateral level and more extensive diversification being 0.64 (Burundi), while for the rest of other EAC partners it is below 0.4.

At the beginning of 2002, relative to other EAC trading partners, Kenya's trade with Tanzania was marginally diversified at 0.08 compared to 0.03 (Rwanda), 0.02 (Uganda) and 0.02 (Burundi). By 2013, Rwanda and Tanzania markets were more diversified at 0.4 and 0.37 respectively. Uganda was at 0.31 and Burundi (0.34), highlighting the small range of goods exported to these markets.

[5] Extensive margin trade diversification is constructed based on equation 8.

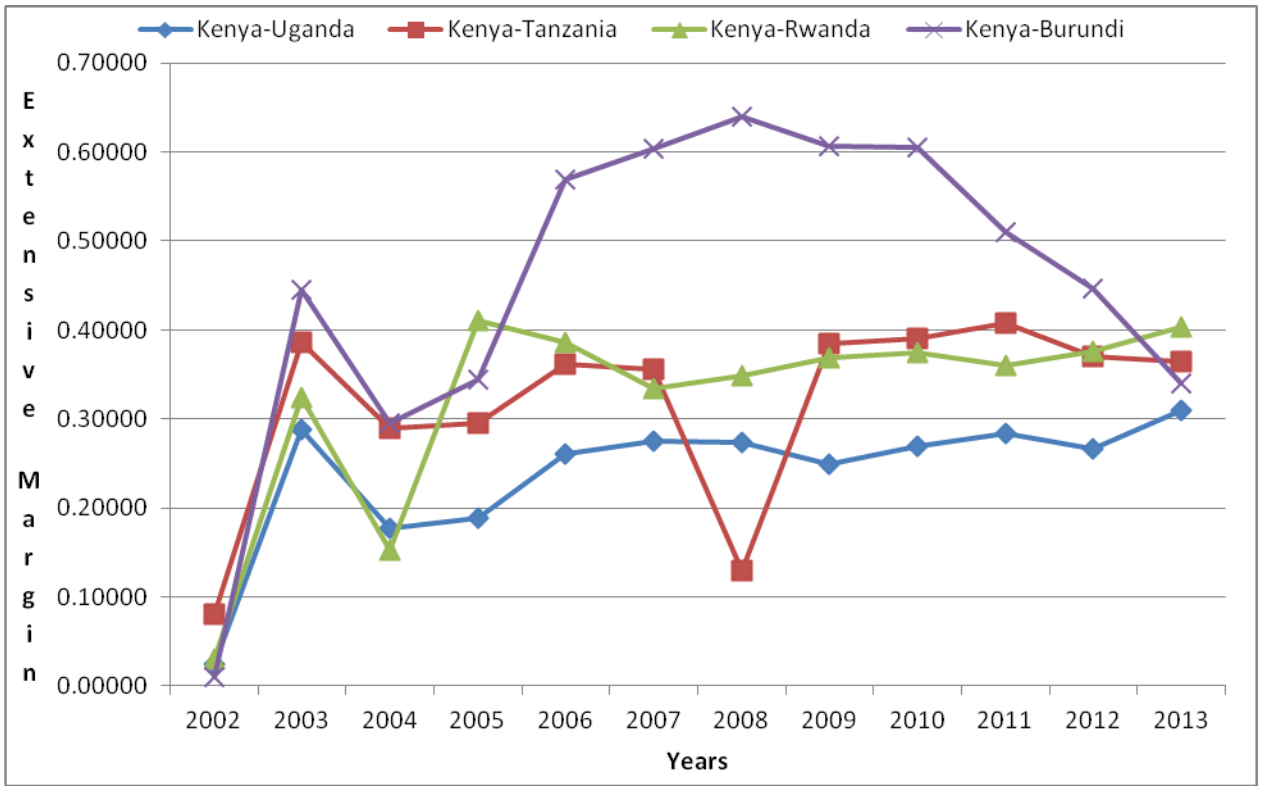
Table 4.2 Calculated Bilateral Extensive Margin for Kenya's Intra-EAC Trade (2002-2013)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Kenya-Uganda	0.02408	0.288363	0.177143	0.188053	0.260944	0.274829	0.274253	0.24872	0.269544	0.283164	0.266438	0.310124
Kenya-Tanzania	0.08000	0.385397	0.289728	0.295954	0.36115	0.355292	0.129298	0.385347	0.389987	0.407087	0.370286	0.365076
Kenya-Rwanda	0.03000	0.323432	0.152787	0.410606	0.386396	0.333585	0.3485	0.36859	0.374927	0.359941	0.376513	0.404037
Kenya-Burundi	0.01000	0.444734	0.295588	0.344568	0.568608	0.604296	0.639996	0.60668	0.604628	0.510657	0.447362	0.340361

Source: Authors

The bilateral measurement of extensive margin of trade is illustrated in Figure 4.2, where the evolution of extensive margin growth of trade shows the pattern of Kenya's export range of products with Rwanda and Uganda's increasing since 2004. It is noteworthy that at the beginning of 2004, the export varieties to Burundi were increasing relative to other EAC partners. However there was a gradual decline in the range of goods exported to Burundi from 2008. The possible explanation, as demonstrated in the first essay, is the increase of bilateral trade costs between Burundi and Kenya. Further, there is a small decrease in the varieties of manufactured goods exported to Tanzania from 2009, following the steep fall of exports between 2007 and 2008.

Figure 4.2. Trend of Kenya's Extensive Margin Trade Diversification in EAC (2002- 2013)



Source: Authors

4.12 Descriptive Statistics

In summary there were 44 observations on tariff equivalent trade costs ranging between 0.45 to 1.3, and a mean of 0.78. The extensive margin of trade had 44 observations between 0.01 and 0.64 with a mean of 0.33.

Table 4.3 Estimation Summary StatisticsVariable

	Obs	Mean	Std. Dev.	Min	Max
Bilateral Distance	44	734.38	119.29	583.76	877.51
Tariff Equivalent Trade cost	44	.78	.23	.47	1.3
GDP per capita of Kenya	44	454.82	40.59	406.29	533.39
GDP per capita of EAC importers	44	243.99	94.00	74.71	423.06
Pop of country Kenya	44	36.16	3.722	30.4	42.4
Pop of country EAC importers	44	21.48	13.73	7	44.9
Extensive Margin trade	44	.33	.15	.01	.64

Source: Authors

The GDP per capita for the exporting country i (Kenya) was found to range between 406 and 533.4 with a standard diversion of 39.3. This indicates the low variability of the GDP per capita in Kenya. However, per capita GDP of importing countries j (EAC partners) was more varied with a diversion of 94.9 and a mean of 239 ranging from 74.7 to 423. This shows that the income levels of Kenya's EAC trading partners were not similar. Exporting country population, for instance is between 30.4 million persons to 42.4 million, compared with 6.7 million to 44.9 million in other EAC partners. The longest commercial distance between the countries was 877.5 kilometres with the shortest being 583.76 kilometres.

The correlation matrix in Table 4.4 indicates low correlation between the natural log transformed variables, except distance and tariff equivalent trade costs that are negatively related. The reduction in distance due to better transport technology or improved road infrastructure increase trade facilitation, thus the opposite movement with tariff equivalent trade costs. As such, better trade facilitation content in trade equivalent measure leads to reduction in the bilateral distance. The other variables, seemingly correlated, have no theoretical relations or causality, thus the perceived relationship is spurious. The Variance Inflation Factor (VIF) for the tolerance level are key variables like GDP per capita of both the exporter (12.15) and importer countries (1.3), tariff equivalent trade cost (11.22), population of Kenya (7.43) and the EAC (4.86) fall within the allowable VIF range of 10 to 20.

4.13 Correlation Matrix

To check whether there is correlation between the variables, Table 4.4 shows the correlation matrix.

Table 4.4: Correlation Matrix of the Estimation Variables

	Log of bilateral distance	Log of trade Cost	Log of GDP per capita of i	Log of GDP per capita of j	Log of pop country j	Log of pop country i	Log of extensive margin
Log of bilateral distance	1.0000						
Log of trade cost	-0.7943	1.0000					
Log of GDP per capita of i	0.0005	0.0201	1.0000				
Log of GDP per capita of j	-0.6408	0.5002	0.1647	1.0000			
Log of pop country j	-0.8984	0.7035	0.0466	0.6181	1.0000		
Log of pop country i	-0.0005	0.3930	0.3762	0.2860	0.1338	1.0000	
Log of extensive margin	0.1921	-0.0377	0.4114	-0.0242	-0.0570	0.5346	1.0000

Source: Authors

4.14 Estimation Results

Both random and fixed effects were estimated. However, random effects were determined to be more efficient based on the Hausman specification test (Prob>chi2 was 0.9997) which rejected the fixed effects model. The estimation results for the random effects with robust standard errors are presented in Table 4.5. The results show that tariff equivalent trade costs were significant determinants of the varieties of manufactured goods exported. This was consistent with existing empirical work. The tariff equivalent trade costs were squared to capture the increasing or decreasing effect of costs on extensive margin. Results show that a non-linear relationship exists between extensive margin and trade facilitation indicator (Lee and Kim, 2012). When trade costs increase by 1 per cent, the export of manufactured goods reduces by 3.56 per cent. These results are consistent with other studies which found that trade costs have negative effects on trade diversification. Similarly, Dennis and Shepherd (2011) found that there was a negative relationship between export costs in developing countries and the level of trade diversification at 0.3 per cent. Feenstra and Ma (forthcoming) found that reducing tariffs by 1 per cent increased the extensive margin of exports by 1.23 per cent.

The bilateral distance was also found to be a major determinant of the range of goods exported. By increasing the distance between countries by 1 per cent, the variety of goods exported decreased by 6.49 per cent. This is confirmed by Feenstra and Ma (forthcoming). The figurative reductions in distance involve improving transport technology and the conditions of infrastructure along the routes. The elasticity indicates the constraints trade encounter across the region. Attempts to estimate the

model without distance turned the constant term significant indicating that distance is a major determinant on trade growth.

The GDP per capita of trading partners was also found to be a significant determinant of the diversity of Kenya's exports to the region. Increasing GDP per capita by 1 per cent reduced the variety of product range by 0.92 per cent. GDP per capita is used to measure the endowments of a country. High per capita means better endowments thus production of more export varieties of goods by the importing countries which is limiting the extent of the market for manufactured exports from Kenya.

Table 4.5: Random Effects Estimation Results of Extensive Export Diversification in Kenya

Variables	Dependent Variable; Extensive Export Diversification
Log Tariff equivalent trade cost	-3.5615***
	(0.5696)
Geographical distance	-6.4986***
	(2.0903)
Log GDP per capita of Kenya	1.8741
	(1.5176)
Log GDP per capita importers	-0.9239***
	(0.2306)
Log Population of importers	1.5759***
	(0.5301)
Log Population of Kenya	6.8791***
	(1.5417)
Membership to EAC	-0.0995
	(0.3602)
Sharing of borders	-3.1376**
	(1.2578)
Constant	7.9240
	(24.4151)
R-squared(within)	0.44
R-squared(between)	0.99
R- squared(overall)	0.45
Observations	44
Number of countries	4

*** p<0.01, ** p<0.05, * p<0.1

The population of Kenya and other EAC partners positively affects the range of goods exported. Increasing the population of the exporter by 1 per cent would increase the range of products exported by 6.87 per cent and 1.57 per cent in the importing market. The findings are in line with Krugman's (1979) hypothesis on the love of varieties by consumers driving trade between countries. Not sharing borders reduces the varieties exported by 3.1 per cent. This is consistent with Persson (2008) who found that

reducing delays at the border by 1 per cent increases the variety by 0.61 per cent. The variables of interest validate what related studies (Lee and Kim 2012; Feenstra and Ma, forthcoming) determined that reducing trade costs or improving trade facilitation promotes trade in the extensive margin. The R-square show that the factors explain 44 per cent in the varieties of manufactured goods exported by Kenya. The level of R-squared could be explained by the exclusion of many other factors which are taken to have been included in the trade cost measurement.

4.15 Summary, Conclusion and Policy Implications

This essay sought to examine how Kenya's trade diversification and tariff equivalent trade costs are related in the context of EAC trade. The essay used manufactured goods exports to each of the EAC partner country. The first part of this study constructed and determined the changes of extensive margin for manufactured products exports. This was achieved using a theoretically consistent method to construct the extensive trade diversification variable. The study related how bilateral trade costs affect the content of manufactured goods exports to EAC partner countries. This was achieved through an estimation process, using extensive margin of trade as the dependent variable and tariff equivalent trade costs as the key explanatory variable. Accordingly, this essay contributes to literature in this area by using the calculated tariff equivalent trade costs rather than composite trade cost indices to represent trade costs. The new approach is more comprehensive since it accounts for several factors that constitute bilateral trade costs overtime, thereby reflecting the real effect of trade costs and the content of bilateral trade.

The findings suggest that Kenya's export trade is not well diversified in the extensive margin. This provides evidence of a possible avenue to expand trade and economic growth for the country. The results on how the extensive margin has evolved suggest that the country is exporting a declining variety of manufactured goods to Burundi with a marginal drop in the range of products to Tanzania. For Rwanda and Uganda, the import varieties of manufactured products improved marginally.

The regression results relating the cost of trade with extensive diversification determined that bilateral trade costs between Kenya and her EAC trading partners is a major drawback on the exports content from the country into the region. Additionally, not sharing borders with her trading partners increases the trade cost thus limiting the varieties of manufactured exports. This finding is similar to the effect of trading distance which negatively affects diversification. Consequently, for Kenya to diversify the content of her export products, the country must reduce bilateral trade costs with her partners.

The policy recommendations therefore include: improving Kenya's endowment by increasing GDP per capita to enhance purchasing power; expanding trade into new regional markets to expand the range of products exported hence diversification in the extensive margin; reducing trading distance and addressing factors that add-up trade costs through investment in better road infrastructure, and improving customs and border clearance procedures like introduction of one-stop border posts. The country should also set up a monitoring and elimination mechanism to reduce non-tariff factors which have been proven to increase the cost of international trade.

CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

5.1 Summary

This thesis examined how trade costs, and aid for trade affect international trade in the East Africa region. This was motivated by the realisation that despite the reduction in trade costs globally and specifically tariffs in EAC following the formation of the EAC Customs Union, trade barriers continue to escalate trade costs impeding international trade. Indeed non-tariff factors that are not easily quantifiable persist in the region. Therefore the specific introduction of aid for trade as an instrument to deliver aid was intended to reduce such trade barriers. Yet as noted by Hallaert (2012) donors have over the years reduced trade barriers indirectly by financing different projects whose goals are not necessarily trade facilitation. The subsequent introduction of a new aid instrument and the distribution of ODA that favour greater investment in economic infrastructure relative to other trade inhibiting factors has generated debate, on which category or combination of aid for trade would be useful in reducing trade barriers. Thus there are lingering questions whether aid for trade as trade promoting facility has been effective with both arguments for and against aid for trade facility.

This thesis therefore sought to understand within three objectives how to measure trade costs, and whether aid for trade is working and how trade costs affect the extent of export diversification. Caselli *et al.,* (2014) for example highlighted that countries get exposed to external shocks and growth volatility when they depend on a narrow range of primary commodities for export earnings. It is within this trade costing, and

estimation framework that the thesis filled both a methodological gap in measuring trade costs by using bilateral trade flows between the EAC countries and an empirical gap by introducing two categories of aid for trade in the second essay.

The first essay established how to use trade flows to measure trade costs using EAC bilateral trade data sourced from the EAC Secretariat reports from 2001 to 2013. The intention was to construct a theoretically consistent measurement of trade costs which accounts for both intra-domestic and inter-regional trade. The use of trade data is taken to include observable and unobservable cost factors. Since as Novy (2011) noted trade flow data overcome the difficulty in aggregating all the possible factors constituting trade costs and influence regional trade. The intuition of the methodology is that reductions in trade barriers shift resources between the tradable and non-tradable sectors, which alter trade flows. Thus using bilateral trade flow data between EAC partner countries, within a theoretically consistent gravity model is taken to be robust. The gravity-based measurement hence provides a good approximation of bilateral trade costs between the countries. Furthermore, the empirical verification of the cost measurement shows that it is explained well by the traditional gravity variables such as distance, sharing of borders and membership to Regional Trade Arrangements (RTAs). The cost measurement indicates that bilateral trade costs between EAC partner countries' have been declining.

The second essay investigated the relationship between aid for trade and Kenya's exports. The essay introduced aid data on economic infrastructure, and policy and regulation from the period of 2002 to 2013 as reported by the Organization for Economic Corporation and Development (OECD) Credit Reporting System. The

augmenting of gravity model with aid for trade data builds to previous though limited literature that explicitly introduced aid flows. The results show that Aid for Trade invested in improving economic infrastructure and the policy environment are significant in expanding exports. Indeed economic infrastructure is consistently significant to trade, even when given without aid for policy and regulatory reforms.

Finally the third essay measured the extent of trade diversification in the extensive margin and empirically determined how trade costs affect export diversification. Lemi (2014) demonstrated that trade diversification is a prerequisite for sustained gains from international trade. The objective expanded literature by first determining the extent of export diversification using theoretically consistent measurement (Dennis and Sherpherd 2011) and subsequently determined how trade costs affect Kenya's exports. The thesis used HS tariff headings from chapter HS 50 up to HS 96 which included disaggregated levels of manufactured products selected per importing country and per year from 2002 and 2013. The period is within the formation of the EAC Customs Union, thus captured the pre and post adoption of the Common External Tariff. Trade costs were found to negatively affect the extent of export diversification of manufactured goods from Kenya to the region.

5.2 Conclusions

This thesis analysed how to measure trade costs, role of aid for trade in promoting trade and how export diversification is affected by trade costs. The results from the first objective showed that bilateral trade among EAC states have been increasing, due to the general decline of trade costs between the trading partners. Kenya appears to enjoy better export trade performance, due to the decline of her trade costs with all

her trading partners**.** Uganda is the leading destination of exports from Kenya, while Burundi registers the least trade among the regional partners. Indeed bilateral tariff equivalent trade costs of Burundi with the rest of EAC partners showed an upward trend, which undermine her bilateral trade.

International trade is driven by the prevailing costs. The factors identified in the second objective as driving costs include inadequate infrastructure and poor regulatory environment. Aid for Trade was meant to address the factors resulting into high international trade costs. The results from the study indicate that reducing infrastructure bottlenecks is a key determinant of export trade. Therefore increasing funds to improve road network, energy supply, port facilities, transport and communication would increase exports by Kenya. Equally, better policy and regulatory environment is important for trade by Kenya in the region. The results found that there is complementarily between aid for policy reforms and infrastructure. When both types of aid are disbursed jointly, aid for policy retains significance in promoting trade. Finally, the trade costs hinder the range of products Kenya exports. In conclusion, the results reported in this thesis should assist policy makers to understand the patterns and determinants of trade costs, what type of aid for trade is necessary in prompting exports, and what factors limits trade diversification.

5.3 Policy Implications

The main findings of the study are of policy relevance in addressing barriers that increase trade costs and how to use aid for trade to reduce costs thus diversify products exported by Kenya. The first policy recommendation is to invest funds to improve economic infrastructure, which include roads, electricity and storage

facilities. The second policy recommendation is to put in place policy and regulatory reforms in part to increase the ease of trade across borders. Some of the policy and regulatory reforms should include reducing the number of export and import documents, harmonising different standards between the trading partners, reducing the time to register new business, connection to electricity and improving border co-ordination between the different trade public agencies. Third policy is to pursue deeper regional integration by implementing in full the common market protocol, and pursuing joint cross-border projects to improve coordination between EAC countries and expanding trade into new regional markets to expand the range of exported products. The final policy recommendation is ensure that economic growth is equitable thus rising GDP per capita to improve the purchasing power, and set up a monitoring and elimination mechanism to reduce non-tariff factors.

5.3 Areas of further research

Further studies on international trade should be directed to investigate the role of aid for trade in promoting exports within different sectors. For example beyond general trade the studies should examine how aid for policy is useful to promote exports in the horticultural and fisheries sector. In addition, Kenya lags behind in terms of economic transformation with manufacturing and agricultural sectors contribution to the GDP remaining the same over the past two decades from the mid-1980's to-date. Thus new research should examine whether aid for trade can be useful in this regard. Due to policy interest to promote South-South trade, further research should examine the factors that determine Kenya's regional trade orientation away from the traditional trading partners like United Kingdom.

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