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An Analysis of the Causative Factors of Trade Flows between Rwanda and its main Trading Partners

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Preface

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The objective is to increase research capacity and quality, to promote research and collaboration in research, to share gained insights into important policy issues and to acquire a balanced viewpoint of economics and financial policymaking which enables us to identify the economic problems accurately and to come up with optimal and effective guidelines for decision makers. Another important aim of the series is to facilitate communication with development cooperation agencies, external research institutes, individual researchers and policymakers in the East Africa region.

Research disseminated through this series may include views on economic policy and development, but the series will not take any institutional policy positions. Thus, any opinions expressed in this series will be those of the author(s) and not necessarily the Research Papers Series.

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Abstract

Trade play an important role in Rwanda's economy, influencing the level of its economic growth, balance of payments and employment. Rwanda has initiated several trade policy reforms aimed at promoting trade. Given the role of trade in the economy it is important to study the causative factors of trade in Rwanda and its main trading partners. This research examines the factors affecting Rwanda's trade using a gravity model. Using the World Bank Development Indicators dataset and data from the National Bank of Rwanda (NBR), it finds that Rwanda's GDP, its trading partners' GDP, population growth and real exchange rate had positive and significant effects on Rwanda's trade. The study also shows that Rwanda's population growth is not significant, while distance has a negative effect on Rwanda's trade. Having common borders, an official common language and the formation of EAC are not significant. Based on these results the study gives a number of recommendations for improving Rwanda's trade.

Keywords: Trade flows, gravity model, common borders, Rwanda.

1. Introduction

1.1 The background

Rwanda as a developing country located in central and East Africa has shown sustainable economic growth since 1995. The country has the highest density of population among sub-Saharan African countries and is landlocked with few natural resources and low levels of industrialization. About 79 per cent of the population is engaged mainly in subsistence agriculture (the World Bank, 2011). Rwanda is among those developing countries which have achieved high and sustainable economic growth during the last two decades and signed trade deals with countries so that their goods and services are exposed to the other countries and vice versa. The products that Rwanda sells to the global market are accounted for under exports and the products that it buys from the global market are accounted for under imports. Exports and imports are very important to stimulate economic growth in Rwanda and a combination of the two is a potential tool for developing Rwanda's economy. They can also play an important role in achieving the country's socioeconomic objectives including improving capital availability. In a country like Rwanda, exports and imports can also emerge as a significant vehicle for building physical capital, creating employment opportunities, developing production capacities and helping integrate the domestic economy with the global economy. Our study provides an assessment of the current export and import situation in Rwanda and examines their impact on the country's GDP.

After the genocide in 1994 the Rwandan economy was at a critical stage due to total destruction but after 20 years the country has re-established itself and is today considered as one of the top leading economies in East Africa. Some of the tools used for achieving this are promoting exports of local product such as coffee, tea and mining.

During recent years, there has been a downtrend in world economic growth due to different factors including an increase in geopolitical wars in some emerging economies that have led to an increase in energy prices and increasing long term interest rates. The Rwandan government has made significant efforts to put in place measures to promote exports (NBR, 2014). It created the Rwanda Development Board (RDB) to bring together all government agencies in charge of investments including agencies responsible for business registration, investment promotion, tourism and others. This structure helps foreign and local investors obtain certificates of incorporation, tax identification numbers and other documents in a few days. It is true that a country has to encourage investments inside and outside the country as the main key for development because investments provide a variety of benefits such as employment generation and payment of taxes to the government to boost its economy so that it can provide a variety of products and other opportunities (MINECOFIN, 2003).

The Rwandan economy grew by 6.5 per cent during the fiscal year 2015-16 compared to 7.3 per cent in the previous fiscal year. While agriculture continued at its long-term average growth rate of 5 per cent, both industry and services saw their growth slow down to 4 per cent respectively. The slowdown in industry, from 7 to 4 per cent, was particularly large and was mainly attributable to mining shrinking by 10 per cent continuing from the decline in the second half of fiscal year 2014-15 (MINECOFIN, 2017).

During fiscal year 2013-014, growth was mainly driven by services and industry sectors which grew by 7 and 6 per cent respectively. The main drivers in the industry sector were manufacturing and construction and both grew by 5 per cent. A good harvest in the A2014 season which followed a poor performance in season B2013 contributed to a 3 per cent growth in the agriculture sector. Available data indicates that GDP per capita stood at US $ 701 in 2013 compared to US $ 689 at the end of 2012 (MINECOFIN, 2014).

The economy also recorded a low performance in 2013-14 as compared to the last four fiscal years mainly due to low production in the agriculture and industry sectors. Despite the on-going implementation of the crop intensification program, weather conditions contributed to a poor harvest in 2013-14 as compared to the two previous fiscal years. The industry sector's growth rate decreased mainly due to manufacturing and construction sub-sectors, which performed badly (MINEFOFIN, 2015).

The industrial sector grew by 6 per cent during 2013-14, compared to 12 per cent in 2012-13. Mining led the sector's performance with a 15 per cent expansion, followed by construction and manufacturing with 5 per cent growth and beverages which grew at a rate of 3 per cent. The growth in mining was a result of previous large investments in the sector along with high mineral prices in the first half of the fiscal. However, sugar production declined as the industry stopped production for four months for maintenance purposes instead of the two months stoppage earlier. Electricity grew by 8 per cent due to new investments in the energy sector. During the same period, the production of cement increased by 5 per cent and modern beer by 4 per cent due to stability in electricity supply. For the manufacturing sector, the following products recorded negative growth: soaps (-6 per cent), paints (-22 per cent), textiles (-18 per cent), sugar (-18 per cent) and flour production (-9 per cent). The share of industry sector to GDP was 15 per cent (MINECOFIN, 2014).

According to MINECOFIN (2016), services remained the largest share of GDP at 47 per cent and grew by around 7 per cent. This performance was mainly driven by trade and transport which grew by 8 per cent, followed by real estate at 5 per cent. In addition to general trade and real estate, activities in administrative and support services, hotels and restaurants and information and communication remained the largest contributors to GDP.

The overall balance of payments deficit increased by 5.2 per cent to US$ 62.6 million at the end of FY 2015-16. This was due to mineral exports declining in output for six quarters in a row by the end of the fiscal year as prices continued to decline, the other segments of services sector declined due to the need for expertise for Rwandair and because secondary incomes (budgetary grants) did not grow during this period (MINECOFIN, 2017).

The decrease in mineral exports affected the volume of exports of goods in 2015 negatively; this decrease was followed by a decrease in imports of goods due to an increase in energy imports which led to a surplus in the current account.

Imports from EAC countries increased by 10 per cent in 2013-14 because of a reduction in import tariffs, reduced non-tariff barriers and more efficient border controls. However, exports to EAC declined significantly to 44 per cent. This is related to low competition in

the region. Major exports to EAC included tea and coffee (Mombasa auction), hides and skins and iron and steel (MINECOFIN, 2014).

As a landlocked country Rwanda's level of imports is higher than its level of exports because of its focus on priority expenditure assisted by grant financing from donors. Despite its trade deficit, Rwanda is driven by a stable macroeconomic framework (the World Bank, 2011). The inadequacy of infrastructure and limited knowledge of the labor force have become crucial limitations in boosting trade, investments and economic growth.

Our study analyzes the causative factors of trade between Rwanda and its main trading partners using the gravity model. Literature on the gravity model's application in Rwanda is limited even though there is growing interest in this subject among researchers and policymakers.

Geographically, our study covers Rwanda and the EAC (East African Community) territory's two main trading partners because these hold all the information regarding imports and exports of different items. This is a key factor in an analysis of the variations in trade in different years. Our study covers the period 2000-15; this was a period in which the EAC revived itself and worked among its member countries.

Our study is limited to independent variables, the dependent variable and factor and dummy variables for finding the effects of economic growth which is done by GDP, population, exchange rate and distance to Rwanda.

Trade and economic growth are two concepts that go together because international trade contributes to the growth of a country's economy in several ways. This is affected by the distance between countries which are trading with each other, the level of population growth, the variability of their currencies and the trade agreements that they sign with each other.

Like other developing countries with rapidly growing economies, Rwanda imports more than it exports leading to a trade deficit where Rwanda's participation in trade is still low. Rwanda needs to have specific solutions to resolve these issues. Our study analyzes the causative factors of trade flows between Rwanda and its main trading partners by including variables which influence trade such as growth in population, distance between the two trading partners, exchange rate and the trade agreements signed. It also looks at the effect of having common borders and languages.

Most of the empirical studies on Rwandan trade emphasize only on exports, imports, being a member of a trade union and exchange rate but do not emphasize other factors that affect trade such as distance, common borders and a common language. Our study fills this gap.

2. Literature Review

2.1 Overview of Trade theories

To understand how modern global trade has changed, it is crucial to understand how countries have traded with one another historically. Over time, economists have come up with theories to explain the mechanisms of global trade. The key historical theories are called classical theories which are done from the perspective of a country or are country-

based. In the mid-20th century, theories began to change to explain trade from a firm rather than a country perspective. These theories are referred to as modern theories and are firm-based or company-based. Both these categories, classical and modern, consist of several international theories (Robert and John, 2004).

Trade between countries is possible because they benefit from it. There may be other motivations for trade between two countries but the main motivation is gain for the participants. In most cases the benefits from international trade are like benefits from all trades. The benefits increase because specialization allows resources to be allocated to their most productive uses in each trading country (Robert and John, 2004). It is well-known that it is unwise for a town or a province to be self-sufficient and not recognize that specialization and the division of labor also exist in international trade. Political boundaries that divide geographic areas into nations do not change the nature of trade nor do they remove its benefits. The truth about this was developed by classical economists in the late 18th and 19th centuries. The advantage of Adam Smith's original statement on trade, contained in his *The Wealth of Nations* (1776), was understood in terms of absolute cost differences between countries. Smith assumed that each nation could produce one or more items at a lower real cost than its trading partners. It then follows that each country will benefit from specialization in those commodities in which it has an absolute advantage (that is, it can produce them at a lower real cost than another country), exporting them and importing other items that it produces at a higher real cost than another country. Real cost, for Smith, meant the amount of labor time required to produce an item (Robert and John, 2004).

Smith's analysis mainly relied on the labor theory of value, which considers labor as the only factor of production and holds that commodities are exchanged for one another in proportion to the number of hours needed for their production. To make it simple, the classical economists' assumption is that labor is completely immobile between countries. If labor requirements differ across countries, then in the absence of trade, the prices of goods will differ across countries. In brief, Adam Smith did not consider the way an equilibrium price might be reached between trading nations. He showed the proposition that a nation gained from trade in which it exported the commodities that it produced at a lower real cost than other countries and imported those commodities that it produced at a higher real cost than other countries.

Smith demonstrated that a possible way of gaining from specialization was not only by assigning tasks within a firm but also by trading with other countries. A country has to export products in which it is more productive than other countries because it will have an absolute advantage for goods for which it can produce more output per unit of input than others. A country should import goods where it is less productive than other countries and has an absolute disadvantage. Trade makes it possible for world output to increase even though individuals are working no harder than before the trade took place (Robert and John, 2004).

Ricardo (1987) explains that absolute cost advantages are not a necessary condition for two nations to gain from trade with each other. Instead, trade will benefit both nations provided their relative costs, that is, the ratios of their real costs in terms of labor inputs, are different for two or more commodities. In brief, trade relies on differences in comparative advantages

and one nation can profitably trade with another even though its real costs are higher (or lower) in every item. One of the ways to avoid dependency on the labor theory of value is the use of the now familiar concept of opportunity cost which is the next best alternative unit of a commodity given up in order to obtain another unit of commodity (Ricardo, 1987).

Ricardo tried to extend this finding to explain that the basis for gains from trade was the existence of comparative advantage, not absolute advantage. A country that was less productive in two goods could still gain from trade by exporting the goods in which its relative disadvantages were smaller because its relative prices of these good before trade will be lower than abroad. A country with an absolute advantage in both goods gains by specializing in the production of the goods in which its relative advantage is greater. It can gain from trade by importing the products in which its relative advantage is smaller because the foreign opportunity costs of producing them are lower (Robert and John, 2004).

Wherever pre-trade prices in two countries differ, gains from trade are possible. The larger the improvements in a nation's terms of trade the greater the gains (the ratio of its export price to its import price) relative to its autarky position.

The Hecksher-Ohlin (H-O) theory incorporates other determinants of production which were not included in the Ricardian model. Hence, labor is the only factor of production that is needed to produce goods and services and it is only differences in technology that determine international trade. According to the H-O theory a capital abundant country will export capital-intensive goods and a labor abundant country will export labor-intensive goods; complete specialization only happens when a country's factor endowments are different from the endowments of another country (Schott, 2003). Tests of the factor proportions hypothesis have shown unexpected results. Leontief found that US imports needed more capital relative to labor than US exports, even if he expected a capital-abundant country like the United States to export capital-intensive goods. More complete tests of the theory suggest that it works best in predicting trade between dissimilar countries but that some trade is not explained by differences in factor endowments (Robert and John, 2004).

Different studies have been done on factors that determine trade flows between two countries. Joachim (2007) states that more active participation in the international market by promoting exports will lead to competition and trade improvements in terms of productivity. Leamer (1984) shows that trade specialization for primary goods is highly dependent on the differences in endowments of natural resources, while the result for industrial goods is not clear. Leamer developed the idea for industrial goods at a future date in an article published in collaboration with Harry et al., (1987).

However, studies like Balassa and Bauwens (1988), find that North-South trade can be explained by differences in skill endowments (but not in capital endowments).

In the early 1990s a lot of literature on the determinants of trade patterns used differences in consumer preferences, technology or in returns to scale to explain trade patterns. According to Ricardo changes in technology were utilized unexpectedly which enhanced the prediction of trade in factor services (Davis and Weinstein, 2001; Trefler, 1995). Changes in consumer choices could relate to home bias consumption (Trefler 1995). Further, increasing returns to

scale in different sectors is also beneficial in clarifying some factors of trade flows (Antweiler and Trefler, 2002).

In addition to factor endowments, these studies applied new factors to describe why a country was a net exporter of one factor and to describe specialization in production (Harrigan, 1997).

Cumulative income determines the level of demand in the importing country and the level of supply in the exporting country. Whereas Anderson and Van's (2003) analysis found that it was cumulative income that determined demand and supply Bergstrand (1985, 1989) developed a microeconomic foundation of the gravity model. He states that a gravity model is a reduced form equation of a general equilibrium of demand and supply systems.

To understand the factors of comparative advantage it is necessary to include many countries over a long period of time in the analysis to see if these factors change over a period of time. Given the lack of reliable input-output data that is needed to calculate the net factor content of trade, one way to proceed is by studying the factors of net trade on items (that is, relying on the items version of the Heckscher-Ohlin-Vanek theorem). Lederman and Xu (2001) included these 'new' factors in item version for a panel of 57 countries over 25 years for ten product group clusters presented by Leamer (1984). Lederman and Xu used an estimate of profit to test the influence of factor endowments on net exports which is the best way to control for the absence of linear than the way used in preceding studies on items (Leamer, 1987). According to Baier and Bergstrand (2001) the main factors that explain growth in world trade are income growth, tariffs and transport cost reductions.

2.1 Economic Growth and Trade

Many researchers and economic policymakers have studied the relationship between economic growth and trade. Many economic models have been established by many researchers. However, their studies focus on the foreign sector by emphasizing the relationship between exports, imports and GDP growth. More than two centuries ago, mercantilists said that surpluses of trade were considered as the only profit for a country doing international trade. Trade flows between countries depend on a number of factors. Bilateral trade flows between two countries are assumed to be proportional to their GDP. GDP is taken into account due to the fact that higher income economies tend to be more interested in product differentiation and specialization and therefore they trade more (Edmonds and Fujimura, 2006).

Alfred (1963) also studied the positive relationship between economic growth and trade and showed a positive relationship between international trade and variations in the economy by studying this relationship between seven countries.

The idea behind these analyses have been classified into two streams where the first focuses on the role of trade in economic growth and the second deals with the causality relationship between trade and economic growth to analyze if economic growth is affected by international trade or vice versa (Rodriguez and Rodrick, 2001).

Neddy et al., (2013, citing Ulaşan, 2012 and Andersen and Babula, 2008) state that as a major factor of openness international trade has made an increasingly significant contribution to economic growth. Schneider (2004) found that imports increased competition and brought different categories of goods to domestic markets, which increased consumer welfare and improved domestic firms as they exported to enlarge their markets. International trade also increases specialization for domestic producers as they are exposed to foreign markets where they meet a number of foreign firms and where the demand is large which increases their production capacities. International trade helps domestic producers to access innovative capital inputs such as machine equipment to increase productivity. They can also avail of new chances of growth for developing countries.

It is thus difficult to talk of economic growth and development without understanding trade. Some models such as endogenous growth models (Schneider, 2004) have tried to connect different pathways of international trade with economic growth.

According to Marin (1992) countries exporting a big part of their output develop faster than countries which do not export a great part of their GDP. Growth in exports has a stimulating influence across the economy in the form of technological spillovers and other externalities.

According to Bhagwati (1988), increased trade produces more incomes and more incomes facilitate more trade. The neoclassical trade theory emphasizes the causal relationship between factors of production and the level of production which lead to exports thus resulting in a 'virtuous circle.' This type of feedback has also been noted by Grossman and Helpman (1991). In their study on Austria, Kunst and Marin (1989) give evidence of growth-driven exports.

Analyzing the relationship between exports and economic growth in Portugal, Oxley (1993) found no support that an increase in exports had an impact on economic growth. Export growth is often considered a main determinant of the production and employment growth of an economy. This so-called hypothesis of export-led growth (ELG) is substantiated by Balassa (1978) and Bhagwati (1988). First, by the foreign trade multiplier, export growth leads to an expansion of production and employment. Second, the foreign exchange made available by export growth allows import of capital goods which, in turn, increases the production potential of an economy. Third, the volume of and the competition in export markets leads to economies of scale and an acceleration in technical progress in production. Export expansion and openness to foreign markets is viewed as a key determinant of economic growth because of the positive externalities that it provides. After recognizing the importance of trade in a country's economic growth was found that countries began reducing trade barriers and controls over other economic activities for facilitating trade to increase the economy's rate of growth. Robert and John (2004) also note that any change in supply conditions interacts with demand conditions at home and abroad to determine the final effects on output, quantities of exports and imports and the terms of trade. It has also been suggested that growth in output leads to growth in exports (Jung and Peyton, 1985).

We use the gravity equation in our research. In its simplest form, the gravity equation states that bilateral trade between two countries is directly proportional to the product of the countries' GDP. Thus, larger countries tend to trade more with each other and countries that

are more similar in their relative sizes also trade more (Feenstra, 2000). This model has earlier been used for analyzing the causative factors of trade flows between Rwanda and its main trading partners. As noted by Giovanni (1998), in a gravity model the volume of trade between two countries rises with the level of their GDP and decreases with their geographical distance. Countries with larger economies tend to trade more in absolute terms, while distance represents a factor for transportation costs and it negatively affects bilateral trade.

The gravity equation states that bilateral trade between two countries is directly proportional to the product of the countries' GDPs. Thus, larger countries tend to trade more with each other and countries that are more similar in their relative sizes also trade more. This equation performs well empirically, as has been known since Tinbergen's (1962) work.

2.2 Geography, Distance and Trade

Being landlocked limits a country's trade and it becomes dependent on the transit states (Arvis et al., cited in World Trade Report, 2003) and thus the location, size and quality of transportation infrastructure to support trade are not fully under its control. Neither are the policies or regulations that apply to the transportation and logistics sectors. These have to be discussed with the transit states and the outcomes are not necessarily what the landlocked country would have chosen. Transit countries may also have political and economic incentives to impose costs on landlocked countries (Gallup et al., cited in World Trade Report, 2003)

In addition, to the determinants of trade, its impediments and frictions (trade barriers, transaction and transport costs) should be also taken into consideration. As Leamer (1984) has shown these impediments are reflected in a deviation of domestic prices from international prices. Davis and Weinstein (2001) improve the Heckscher-Ohlin-Vanek model by adding a measure of trade costs through a gravity equation.

According to Samuelson (1954), most of the trade models that consider transportation costs assume that these costs are proportional to the price of the traded good (transportation costs are the 'iceberg costs'). Transportation costs determine a wedge between origin and destination prices but they do not produce changes in the relative prices of goods. Consequently, higher transportation costs reduce the volume of trade but do not automatically change the composition of trade.

The cost of transportation is in turn affected by a wide range of essential determinants. These include countries' geographical features, the quantity and quality of the physical infrastructure that supports transportation services, the procedures and formalities used for controlling the movement of goods from one country to another, the extent of competition in the transportation sector, the pace of technological innovations in the sector and the cost of fuel (Behar and Venables, cited in the World Trade Report, 2003). The characteristics of the products being shipped also influence transportation costs.

A number of studies use the gravity model to point out the effects of geographical distance on trade like Blomqvist (2004) on Singapore and Montanari (2005) on Balkans. They state

that population, distance between trading partners and culture effect trade flows between countries. The negative relation between geographical distance and bilateral trade has been studied in most economics (Leamer and Levinsohn, 1995) but exact information which is in distance coefficients is unclear. Filippini and Molini (2003) noted that the impact of distance on trade was more than the impact of geography. They added that in the history of countries which are trading partners, culture, language and social relations too had an impact on the trade between them. This findings state that distance included in the variables explained the determinants of trade flows between countries and by Leamer (2007) in his review of Krugman's study that trade decreases severely with distance.

In addition, Krugman (1991) considers the distance between two countries to be an important determinant of geographical partners in trade. He found that trading partners located far apart from each other incur high costs in their bilateral trade which reduces trade between them. Papazoglou et al., (2006) also indicate that the longer the distance between two trading partners the lower will be the trade between them. Jacquemin and Sapir (1988) and Neven and Röller (1991) add that the volume of international trade is negatively related to the cost of transport, where an increase in transport costs reduces trade.

After a study of the effects of distance on trade, Blum and Goldfarb (2006) concluded that distance effected trade even in a free trade area. Clark et al., (2004) and Rose et al., (2000) add that if a country is far away from its trading partner, this will negatively affect bilateral trade between the two. Tinbergen (1962) studied the relationship between bilateral trade and distance using the gravity model. His results show that distance negatively affected trade between countries.

Berthelon and Freund (2008) note that it is the variations in the coefficients of the distance across industries that increases the global distance coefficient.

2.3 Population Growth and Trade

International studies on differences in population have found that this difference may be one of the factors in determining the differences in comparative advantage and trade. Some theoretical studies show that a country with a population growth rate is capital-abundant and a country with a high rate of population growth is labor-abundant over time (World Trade Report, 2003). This is similar to Lederman and Xu's (2001) findings that population growth is one of the determinants of growth in trade.

Bendjilali (2000) adds that the populations of trading partners can be included in the gravity model for expanding it and seeing the effect of population on bilateral trade flows between countries in trade. A larger population can also be interpreted as a bigger market for imports. The effect on total trade depends on which effect overcomes the other. On the other hand, higher GDP per capita means enhanced demand for differentiated products which has a tendency to increase import levels.

Economic growth may be negatively or positively affected by population growth. According to Todaro (1994), larger populations provide the required aggregate demand (the 'size' effect) to generate favorable economies of scale in production, lower production costs and provide

sufficient labor supply to achieve higher output levels. Moreover, positive effects of population growth also stem from human capital's contribution. However, population growth can have a negative impact on economic growth if the dependency of the young population lowers investments. It is possible to extend the basic gravity model by including the populations of exporting and importing countries to see the effect of population on bilateral trade flows between two countries.

Matyas (1997) found that population had a tendency to increase trade and the level of specialization by producing gains from specialization. On the other hand, Bergstrand (1989) found that there was a positive effect of GDP per capita's coefficients, which means a negative relationship between population and trade flows, suggesting that imports and exports are capital intensive in production. A higher population growth rate may have a positive impact on trade flows in the short-run since it may increase the labor force, the level of specialization and more products for export. However, in the long run a higher population has a tendency to decrease income per capita, making every individual poorer and therefore it may cause production and exports to decrease. In addition, imports reduce when a country is at the low income per capital level.

2.4 Exchange Rate and Trade

According to many theories, another variable that is supposed to affect the level of international trade is the exchange rate. Many researchers have studied the effects of exchange rate volatility on international trade following two approaches. According to the first approach, exchange rate uncertainty or volatility does not affect trade while according to the second approach it affects trade. Hooper and Kohlhagen (1978) analyze the impact of exchange rate uncertainty on the volume of the US-German trade and Gotur (1985) studied the volume of trade among US, Germany, France, Japan and the UK. Both the studies reveal that the exchange rate did not have any economic meaning. A similar result was found by where it noted that a big part of the research done on the relationship between a change in exchange rate and the volume of trade supported the previous argument even if this did not mean that the relationship did not exist. This view was supported recently by Bacchetta and Eric (2000) who found that exchange rate uncertainty did not affect trade significantly.

Ethier (1973) notes that any doubts about the future exchange rate has a negative impact on the volume of trade. Cushman's (1983) study of 14 bilateral trade flows between high industrialized countries found a significant negative effect of exchange rate on trade. Akhtar and Hilton (1984) also found a negative relationship between trade and exchange rate.

Studies are conducted to find out whether trading partners being across each other was affected by a change in exchange rate otherwise, as well as analysis of the effects of change in real exchange rates on the level of trade and concluded that an increase in exchange rates reduced the volume of trade. De Grauwe and De Bellefroid (1986) in their study on trade in the European Economic Community's countries for 1960-1969 and 1973-1984 found a negative relationship between exchange rate and bilateral trade. Further, Lanea and Milesi-Ferretti (2002) analyzed the effects of variability of exchange rates on trade and concluded

that there was a positive impact of real exchange rate on trade if there was a decrease in the real exchange rate.

2.5 Trade Agreements and Trade Policies

Trade creation and trade diversion and the effect of a custom union was first brought into limelight by Viner (1950) who pointed out that regional trade agreements could be beneficial or harmful to the participating countries depending on whether the trade arrangements led to trade creation and trade diversion. Trade diversion refers to a shift in trade from a less expensive (or a more efficient foreign producer) to less efficient producers within the trading bloc while trade creation is shifting in trade from more expensive to less expensive producers in the trade arrangement.

Regional integration can be made more interesting by the members if they enable a more competitive and complementary trade environment. The key areas that they can focus on to create an enabling environment are the large cost discrepancies in the goods that they produce; the initially high tariffs between partner states and low tariffs for the outside world; and the highly elastic demand and supply curves. If addressed well, producers and consumers can be effectively targeted based on their responses to targeted surveys. An increase in the number of regional participants can increase the benefits of such agreements, that is, the more the trading partners the larger the scope for traded goods after integration.

When one looks at these factors and how they are working in the East African Community (EAC), one cannot help but conclude that the net effect is not substantial or at the very least it is unknown. EAC economies cannot be categorized as competitive or complimentary as they stand alone and do not take any initiative to enhance trade within the bloc. Even though the number of member countries increased from three to five in 2007, the effect of this increase is not visible. Additionally, trade creation and trade diversion effects of regional integration have not yielded much. On the other hand, it is clear that there exist dynamic effects including a competitive market, reduced monopoly, economies of scale, specialization, higher levels of investment and higher incomes from factor mobility. However, our study focuses on analyzing the static effects of EAC.

Our study relies on two major theoretical backgrounds: one, of the Ricardian model of comparative advantage and the second of Viner's (1950) model of trade creation and diversion effects. Finally, it also relies on Grossman and Helpman's (1995) focus on the 'politics' of free trade agreements (FTA). In their theoretical political-economy analysis, two governments establish a FTA when there is the existence of substantial economic welfare gains for each country's average voter; this is similar to our model.

Classical international trade literature has long advocated trade liberalization and open borders, claiming that open borders help everyone if proper compensation schemes are implemented (Krugman, 1987).

Classical economists provided essential thoughts on the benefits of trade, although the economics of regional integration was still a future idea for them. Modern economic analyses emphasize complex problems of international trade and also on the maximization of trade

benefits through regional integration resulting from regional trade agreements. However, literature on this subject has produced mixed results as far as benefits for member states are concerned. Winners and losers appear to be in equal strength. Regardless of the poor performance of some regional integration schemes in Africa, efforts have been made to resuscitate EAC to promote trade between member countries. To facilitate this, the area formed a custom union in 2005 as an entry point to the regional trade agreement (RTA).

The impact of trade agreements on each country in the agreement as noted by researchers such as Vinaye (2009) is that the formation of RTAs has resulted in an increase in intra-regional trade volumes within the RTAs in general. The existence of the North American Free Trade Agreement (NAFTA), for instance, led to an increase in the intra-regional trade volume from less than 35 per cent in the late 1980s, to almost 50 per cent in 1999. Over the same period, trade among MERCOSUR members doubled from 10 to 20 per cent. However, the picture is mixed in Africa. The extent of regional integration among the Common Market for Eastern and Southern Africa (COMESA) members has been relatively static over the past two decades. In contrast, the share of intra-regional trade has increased substantially for the Economic Community of West African States (ECOWAS) since the early 1980s and for the Southern African Development Community (SADC) since the late 1980s. Robert (2004) notes that a trade agreement between countries for the mutual, reciprocal reduction of tariffs will be beneficial for both the countries.

Cernat (2003) did a preliminary analysis of the Framework Agreement on Trade Preferential System (FATPS) between the OIC member countries and his findings show that FATPS had an effect on overall trade expansion and increasing potential intra-regional trade among its members. Regional integration is considered a major policy tool that countries can use to ensure industrialization and economic growth for attaining better social welfare for their citizens. This belief has accelerated RTAs in the world trading system in recent years. According to the World Trade Organization (WTO), there were more than 350 RTAs in force, several fully operational while others were under on-going negotiations and it had received 200 notifications from RTAs.

Since the 1990s, a number of countries in Africa have worked hard to open up their economies to external competition through trade liberalization. Many RTAs have been signed to achieve this. According to WTO, the African continent had 30 RTAs. Trade agreements are projected to nurture trade and investment relations between member countries by removing tariffs and other barriers to intra-regional trade flows. The success of these arrangements in fostering inter-regional trade has been diverse with the Southern African Development Community (SADC), the Economic Community of West African States (ECOWAS) and the Common Market for Eastern and Southern Africa (COMESA) cross-border initiative and UEMOA being more successful.

Economic integration under RTAs opens trade by changing the prices of goods from member states as tariffs are phased out. This makes goods and services cheaper as compared to imports from the rest of the world leading to a change in demand patterns resulting in adjustments in trade flows and output flows. RTAs' welfare impact depends on its effect on trade, that is, whether it will create trade or divert trade between the member states (Viner 1950). Consequently, membership to a RTA has both positive and negative effects for the

economy, hence it is the net impact that determines the overall effect. However, there are indecisive welfare effects of RTAs to both the member states and the world at large (Jayasinghe and Sarker, 2007). Bhagwati (1988) shows that there are two sets of views on RTAs. Additionally, there are regional or locational factors that can skew the effects. Time and further studies will make this clearer.

Finally, opening the borders and reducing trade barriers changes most of the small countries into internationally large markets where they may become decision makers for their prices. Consumers are able to buy not only domestically, but they can expand their interest and exploit the opportunities to travel abroad and buy from foreign firms. Domestic producers can sell not only to domestic consumers but may also gain from competitors in foreign markets. But as domestic producers move from the domestic market to foreign markets they may lose their existing clients because of this market expansion (Yochanan, 2004).

3. Methodology

3.1 Study Design

We used balanced panel data of 96 observations to determine the causal factors of trade flows between Rwanda and its main trading partners. A balanced panel has the same number of time-series and observations for each cross-sectional unit. We used the panel data framework because panel data methods increase the power of the test. The use of a panel data framework is also important because it helps address two problems: controlling cross-sectional dependence across the members of the panel because a shock affecting one country may also affect another through the high degree of globalization and international trade and financial integration.

Hsiao (1986) highlighted the importance of panel datasets when he argued that panel data provided much larger datasets with more variability and less collinearity among the variables compared to typical cross-section or time series data alone. In addition, he showed other important aspects of panel data including the fact that it is more informative and useful for controlling individual heterogeneity. Controlling for individual heterogeneity is necessary because it leads to biased estimates.

The gravity model suggest that the level of GDP influences trade positively but trade is influenced negatively by the distance between trading partners.

This is displayed as:

$$(1) \qquad T\iota j = C \times \frac{GDP\iota \times GDPj}{D\iota j}$$

where, C is a constant term, $T\iota j$ is the volume of trade flows between the importing country ι and the exporting country j, where $GDP\iota$ and $GDPj$ are the levels of the trading partners' economic size and $D\iota j$ is the distance between them (Krugman and Obstfeld, 2006). According to the gravity model, large economies spend more on imports and exports. Therefore, higher GDP means more trade for a country. After the introduction of this basic gravity model, we extended it to catch the effects of distance, market size, level of exchange

rate, having a common language and a common border or signing a trade agreement between trading partners. We use being a member of EAC or not in our study. The proposed model explains the causal factors of trade flows between Rwanda and its main trading partners as:

(2) $\mathrm{Ln}TRADE_{RP}t = \alpha + \beta_1 \ln DIST_{RP} + \beta_2 \ln GDP_{Rt} + \beta_3 \ln GDP_{Pt} + \beta_4 \ln POP_{Rt} + \beta_5 \ln POP_{Pt} + \beta_6 \ln EXR_{RPt} + \beta_7 \ln GDP_{Pt} \#\# \ln DIST_{RP} + \beta_8 T + \beta_9 EAC + \beta_{10} CB + \beta_{11} CL + \varepsilon_{RPt}$.

(3) $\mathrm{Ln}TRADE_{RPt} = \alpha + \beta_1 \ln D_{RP} + \beta_2 \ln GDP_{Rt} + \beta_3 \ln GDP_{Pt} + \beta_4 \ln POP_{Rt} + \beta_5 \ln POP_{Pt} + \beta_6 \ln EXR_{RPt} + \beta_7 \ln GDP_{Pt} \#\# \ln DIST_{RP} + \beta_8 T + \beta_9 \ln GDP_R{}^2{}_t + \beta_{10} \ln GDP_P{}^2{}_t + \beta_{11} \ln POP_R{}^2{}_t + \beta_{12} \ln POP_P{}^2{}_t + \beta_{13} T^2 + \beta_{14} EAC + \beta_{15} CB + \beta_{16} CL + \varepsilon_{RPt}$.

3. 2 Data

Our data source is the National Bank of Rwanda (BNR), the World Bank Development Indicators' database and the Rwandan Ministry of Finance and Economic Planning (MINECOFIN). The data used covers the period 2000-15, the dataset consists of 96 observations between five EAC countries and two countries which are Rwanda's main trading partners (Rwanda, Burundi, Tanzania, Kenya, Uganda, China and Belgium). Data for estimating the causative factors of trade flows between Rwanda and its main trading partners comprise of:

Dependent Variables

The dependent variable that we use is trade in USD (LTRADE) defined as the sum of exports and imports between Rwanda and its main trading partners.

Independent Variables

We use the independent variables Rwanda's real GDP represented by ($\ln GDP_{Rt}$), real GDP of Rwanda's main trading partners represented by ($\ln GDP_{pt}$), real exchange rate represented by ($\ln EXR_{RPt}$), Rwanda's population growth represented by ($\ln POP_{Rt}$) and that of Rwanda's trading partners represented by ($\ln POP_{Pt}$), the factor variable is represented by ($\ln GDP_{Pt} \#\# \ln DIST_{RP}$) and the trend variable by (T). If the coefficient of trend variable turns out be significant, then it will mean that trade does change with respect to time and dummy variables represented by (EAC, CB, CL). The EAC dummy variable has been coded 1 for a EAC country member and 0 for an EAC non-member. The common border (CB) dummy variable is coded 1 for a country that has a common border with Rwanda and 0 indicates the opposite. The common language (CL) dummy variable is coded 1 for a country that speaks a common language with Rwanda and 0 indicates the opposite. During the analysis we used the squared variables ($\beta_9 \ln GDP_R{}^2{}_t$), ($\ln GDP_P{}^2{}_t$), ($\ln POP_R{}^2{}_t$), ($\ln POP_P{}^2{}_t$), ($T^2$) to see if the effect of these variables on trade will be the same for the continuous growth of these variables in the short and long term.

4. Empirical Results

We used the test of functional form to see how the data is scattered from the mean. This test is based on the residual sum of squares. Based on the residual sum of squares in the model

and the p-value for the F-test of overall significance for both models we conclude that both models provide a better fit than the intercept-only model as the probability for both models is significant. According to our results of this test, Model 2 was the accepted and preferred model specification with reasonable explanatory power in explaining trade flows between Rwanda and its main trading partners (see Table 1). The F-value also confirms that the second model is a better fit than the first model as the F-value of Model 1 is greater than the F-value of Model 2, where Model 1 was the restricted and Model 2 was a more generalized specification model; hence we use Model 2 in our research.

Insert Table 1 about here

We then applied the Hausman test to check whether the fixed effects model was more efficient than the random effects model. This would be true if the null hypothesis of no correlation between the individual effects and the regressors was rejected (Park, 2015). According to our results, the Hausman test statistic shows that the null hypothesis was accepted, suggesting that the random effects regression was more efficient than the fixed effects regression. According to the test results, we do not reject the null hypothesis in favor of the random effects model.

Insert Table 2 about here

Table 2 provides summary statistics of the main variables used in our study, where the average trade between Rwanda and its main trading partners was US$ 933 million where a standard deviation of US$ 101 million each year meant a dispersion of 0.1 times the mean each year. Rwanda's average real GDP was US$ 4,470 billion with a standard deviation of US$ 2,230 billion each year where the average of real GDP of Rwanda's trading partners was US$ 908 million with a standard deviation of US$ 2.29 trillion. The average exchange rate was 131.541 in relation to the US is with a standard deviation of 265.302. The average population for Rwanda was 10,400,000 million with a standard deviation of 1,329,050 million which means a dispersion of 0.1 times the mean each year. The mean population of Rwanda's trade partners' was 248 million with a standard deviation of 285 million. The distance between Rwanda and its main trading partners had a mean and standard deviation of 2,893.590 km and 3,372.087 km respectively.

The minimum trade that Rwanda had with its main trade partners' was US$ 452,677 million while the highest was US$ 456 million. The minimum real GDP that Rwanda had was US$ 1,670,000,000 and the maximum was US$ 8,100,000,000. For its main trading partners the minimum and the maximum real GDP was US$ 785 million and US$ 11 trillion respectively.

The minimum and maximum exchange rate was 0.241 and 907.503; for Rwanda's population it was a minimum of 8,398,413 and a maximum of 12,700,000. The minimum population was 6,767,073 while the maximum was 1,370,000,000 for Rwanda's main trading partners. The nearest country was 159.390 km and the farthest was 8,730.450 km.

Insert Table 3 about here

The correlation coefficients among the nine variables are given in Table 3. Variables such as GDPR and GDPP had positive effects on trade as expected but most of the variables such

as PPOR, EAC, CB and CL did not have the expected trade sign. The trend variable had a high correlation between PPOR, POPP, GDPR and GDPP variables which may lead to a spurious regression and that is why we removed this variable in our further analysis. The remaining pairs were low correlated with each other and did not show any signs of serious multicollinearity (see Table 4).

Insert Table 4 about here

The variables which influenced Rwanda's trade were its economic size (GDP_R) and its trading partners' economic size (GDP_P), population size (POP_P), distance (D_{RP}) and exchange rate (EXR_{RP}). The other variables had no impact on Rwanda's trade because of insignificant coefficients.

The effect of Rwanda and its trading partners' GDP was positive and statistically significant at the 5 and 1 per cent levels respectively. This is in line with theoretical expectations. The population of trading partners, distance and exchange rate variables were statistically significant at 1 per cent. This result suggests that Rwanda's GDP was a key determinant of its capacity to export. A higher GDP means a higher production capacity which in turn translates into an economy's ability to export more (supply side). This is consistent with theory and most of the findings of previous researchers such as Edmonds and Fujimura (2006). These studies argue that GDP is taken into account because higher income economies tend to be more interested in product differentiation and specialization and thus they trade more.

Rwanda's GDP growth and also the GDP growth of its trading partners will help increase the total trade value. The estimated coefficients of these variables are statistically significant and show a positive influence which is in line with expectations. An increase of 1 per cent in Rwanda and its trading partners' GDP will enhance the trade value by 35.5 per cent and 5.5 per cent respectively but this positive effect will turn negative for an intensive increase in Rwanda's GDP as Rwanda's economic growth will negatively affect the volume of trade (as shown by the coefficients of $GDPR^2$ and $GDPP^{2)}$ where an increase of 1 per cent will decrease trade by 0.77 per cent and 0.06 per cent approximately. This may be explained by the fact that most of the domestic goods produced will be domestically consumed ceteris paribus. While Rwanda's trading partners' market size will be statistically significant with positive effects. If the population of a trading partner country increases by 1 per cent, Rwanda's trade value will step up by roughly 15.5 per cent but this effect will be the opposite when the trading partner's population continues to grow at this high level as this continuous growth will reduce Rwanda's trade by 0.4 per cent. Therefore, hypothesis 1 – a positive effect of the economy and market size on Rwanda's trade -- is strongly supported for Rwanda and its trading partners' economic size and market size but it is not supported for Rwanda's market size as this variable is not statistically significant which means that this coefficient does not have economic meaning in our study.

Geographical distance is statistically significant and impairs trade between Rwanda and its partners, where a 1 per cent increase in distance leads to a 0.4 per cent decrease in trade, on average. Therefore, hypothesis 2 – negative effect of geographical distance on Rwanda's trade – is strongly supported.

An increase in exchange rate means that Rwanda's currency is devalued as a result of which imports will be more expensive and exports will become cheaper; Rwanda was more of an import-based country during 2000-15. Hence, the exchange rate variable is expected to have a positive effect on trade between Rwanda and its partners.

A change of 1 per cent in the exchange rate will increase Rwanda's trade by 0.7 per cent. The exchange rate policy in Rwanda during the period under study had an influence on increasing the competitiveness of exports as a change in the exchange rates of Rwanda's currency significantly supported commercial activities.

Therefore, hypothesis 3 is strongly supported. In addition, variables having a common border and being a member of EAC are not statistically significant, which means that these variables did not have economic meaning during the period of the study.

The EAC variable was not significant, which means that many things still need to be done like increasing industries so that Rwanda is able to increase its exports to regional countries. This is consistent with some of the findings of previous researchers such as Duncan (2016). His findings on EAC members' regionalism showed that regionalism had no significant effect on agricultural exports of Burundi, Rwanda and Uganda, while Kenya and Tanzania reported a significant effect of regionalism on their agricultural exports as these two countries enhanced this regionalization more than the other three countries.

The EAC variable cannot affect Rwanda's trade value and a possible explanation for this is the signing of partnership trade agreements which was strengthened during 2000-15, though this was not efficient. If Rwanda has more trading partners, then its resources should be distributed and it would be hard to focus on investments that promote important economic and political relationships. Another reason for the insignificance of this variable is that during the study period, Rwanda was still investing in infrastructure development when it needed materials that were available in other EAC countries.

This also confirms what MINICOM (2010) said when it indicated that only FTAs are not enough to help trade and economic growth in developing countries. Accumulation of resources including labor, human capital, physical capital, land and natural resources; improvements in technologies for converting those resources into goods and services; investments in efficient public infrastructure; and innovation of new goods and services are extremely important complementary economic development factors that need to be coherently developed to make trade an effective engine for economic development and poverty reduction. The fundamentals for long-term growth are human resources, physical infrastructure, macroeconomic measures and the rule of law.

Insert Table 5 about here

The effect of each trading partner on Rwanda's trade flows (Table 5) shows that most of the variables were not statistically significant except for China where some variables such as GDP_R, POP_P, EX_{RP}, T were statistically significant. An explanation for this is that even if these countries are Rwanda's main trading partners, a single country alone cannot help the growth of trade flows to Rwanda.

This also means that Rwanda needs to have more trading partners to achieve a high level of trade growth.

Some of the results for the variables which are statistically significant are not in line with theory, like considering if Rwanda is trading only with China an increase in GDP_R by 1 per cent will reduce trade by 142 per cent, but this effect will become negative as GDP continues to increase where an increase in GDP_R by 1 per cent will increase trade by 3.5 per cent which is in line with theory.

The effect of EX_{RP} is also not in line with theory, as the devaluation of Rwanda's currency should encourage exports but in our case an increase of 1 per cent in the exchange rate reduced trade by 6.08 per cent.

China's population growth positively affected Rwanda's trade, where according to our findings an increase of 1 per cent in China's population positively affected Rwanda's trade by 30.56 per cent.

Insert Table 6 about here

Table 6 gives the influence of the variables used and the results are similar to the ones got before. Total elasticity shows that the effect of Rwanda's GDP on both Rwanda and its trading partners was positive and statistically significant at the 5 per cent level, where a growth in Rwanda's GDP will boost trade value. An increase of 1 per cent in Rwanda's GDP will enhance trade value by approximately 31.9 per cent and an increase of 1 per cent in Rwanda's trading partners' GDP will enhance trade value by approximately 5 per cent but this positive effect may turn negative if there is an intensive increase in Rwanda's GDP as in this case the coefficients of $GDPR^2$ are not statistically significant while Rwanda's trading partners' market size is statistically significant with positive effects. If the population of a partner country increases by 1 per cent, Rwanda's trade value will step up by roughly 13.4 per cent but this effect will be the opposite when the trading partner's population continues to grow at a high level and this will reduce trade by 0.3 per cent.

Geographical distance is statistically significant and effects trade between Rwanda and its partners, where an increase of 1 per cent in the distance reduces the trade value by 4.1 per cent on average (see Table 7).

The other variables did not have any economic meaning.

Insert Table 7 about here

The effects of trading partners' on Rwanda's trade varied over time. In 2003, 2005, 2006, 2007, 2010 and 2013 they had an economic meaning for the trade flows as their coefficients are statistically significant. In 2003 there was a reduction in trade between Rwanda and its trading partners of 0.3 per cent; this was 0.26 per cent in 2010; and 0.18 per cent in 2011 and 2013.

During the study period trade flows between Rwanda and its trading partners had an increment of 0.59 per cent in 2005, 0.51 per cent in 2006 and 0.3 per cent in 2007.

5. Summary and Conclusion

The main purpose of this study was determining the causative factors which affected trade flows between Rwanda and its main trading partners and reviewing the potential for trade growth between Rwanda and these countries. It estimated the gravity model with data from six countries for 2000-15. The estimated results showed that trade flows between Rwanda and its main trading partners were mainly affected by Rwanda and its trading partners' economic size, population growth in Rwanda's trading partners, real exchange rate and geographical distance. Growth in Rwanda's economic size had a positive impact on trade flows with its trading partners. Besides, an increase in Rwanda's trading partners' economic and population positively affected the total trade value; but a continuous increase in these variables negatively affected Rwanda's trade growth. The negative effect of a continuous increase in population growth can be explained as a larger younger generation does not trade as much as the adults. Geographical distance negatively affected trade flows between Rwanda and its main trading partners. Being a member of EAC, having common borders and having a common language did not have economic meaning for Rwanda's trade flows as they were not statistically significant.

Our study has some limitations. It is limited in the data that it uses as some aspects observed in the rest of the world have not been included in the research. Hence, studies with large-scale data in space and time should be conducted as this will give universal results with fewer errors.

However, our research does provide an interesting result and may help policymakers get a clearer view of how to improve Rwanda's trade trends to ensure that its trade potential is met. Policymakers can learn from our results and assess what is lacking in the trade agreements that Rwanda has signed. Our results will also help in implementing other internal trade policies which should be monitored and evaluated on a timely basis during their implementation. Rwanda's current weak trade performance is largely attributable to its weak supply side capacity. It is therefore clear that the government needs to undertake more work on strengthening productive capacity as according to our results Rwandan economic growth has positive effects on its trade.

An insignificant number of Rwandans are involved in trade and this does not impact its trade. This should be a lesson for policymakers to support the Made in Rwanda campaign in terms of quality improvements so that it attracts buyers and sellers and hence leads to trade development.

The negative impact of distance between Rwanda and its main trading partners should also be taken into consideration when working out trade and infrastructure policies to reduce transport costs.

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Table 1. Result of Test of Function form for Model 1 (N=96)

	(Model 1) Coefficients	Standard Error	(Model 2) Coefficients	Standard Error
_cons	1489.425*	588.441	1690.361	2206.527
LGDPR	2.162***	0.509	50.031	37.004
LGDPP	5.009***	0.623	0.000	0.000
LDIST	5.194***	1.149	0.000	0.000
C.LGDPP#C.L DIST	-0.384***	0.069	-2.081**	0.621
LEXC	0.511*	0.248	0.685*	0.279
LPOPP	-0.113	0.221	-13.855	15.367
LPOPR	-101.021**	37.108	-179.661	220.567
T	2.477*	1.009	1.873	1.829
EAC	-0.298	0.437	-0.675	0.569
CB	0.058	0.589	0.314	0.677
CL	0.000	0.000	0.000	0.000
LGDPP2			0.142	0.109
LGDPR2			-0.799	0.886
LPOPP2			0.378	0.420
LPOPR2			3.078	6.516
T2			0.005	0.009
LDIST2			1.956**	0.660
F-value	84.53		58.27	
R^2 Adj	0.908		0.906	

Note: Significant at lesser than * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ levels of significance.

Table 2. Summary Statistics of Variables (NT= 96)

Variable	Mean	Std. Dev.	Min	Max	VC
TRADE	93,300,000	10,100,000	452,677	456,000,000	0.108
GDPR	4,470,000,000	2,380,000,000	1,670,000,000	8,100,000,000	0.532
GDPP	9,080,000,000,000	2,290,000,000,000	785,000,000	11,000,000,000,000	0.252
EXC	131.541	265.302	0.241	907.503	2.017
POPR	10,400,000	1,329,050	8,398,413	12,700,000	0.128
POPP	242,000,000	485,000,000	6,767,073	1,370,000,000	2.004
DIST	2,893.590	3,372.087	159.390	8,730.450	1.165

Table 3. Correlation Matrix of variables (N= 96)

	LTRADE	GDPR	GDPP	POPP	POPR	DIST	EXC	T	CB	CL	EAC
LTRADE	1										
GDPR	0.6587	1									
GDPP	0.3242	0.2533	1								
POPP	0.1691	0.0168	0.8077	1							
POPR	0.6493	0.9876	0.2520	0.0171	1						
DIST	0.2409	0.0000	0.6574	0.7699	0.0000	1					
EXC	0.1701	0.0948	0.0153	-0.0982	0.0997	0.5364	1				
T	0.6565	0.9820	0.2491	0.0172	0.9982	-0.0000	0.1020	1			
CB	-0.4081	-0.1139	-0.3601	-0.4058	-0.1129	-0.6577	-0.4571	-0.1088	1		
CL	-0.1810	-0.0919	-0.4916	-0.5507	-0.0833	-0.8624	-0.6191	-0.0766	0.7284	1	
EAC	-0.1810	-0.0919	-0.4916	-0.5507	-0.0833	-0.8624	-0.6191	-0.0766	0.7284	1.0000	1

Table 4. Robust Estimated Results

	LTRADE	Robust Standard Error
LGDPP	5.522***	1.231
LGDPP2	-0.065**	0.022
LGDPR2	-0.775*	0.360
LGDPR	35.474*	15.698
LEXC	0.742**	0.278
LPOPP	15.556***	4.255
LPOPP2	-0.424***	0.111
LPOPR	-289.077	175.868
LPOPR2	8.680	5.437
LDIST	-4.644***	0.739
EAC	-0.744	0.509
CB	0.682	0.641
CL	0.000	0
_cons	1810.968	1319.546
N	96	
R^2	0.913	

Note: Significant at lesser than * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ levels of significance.

Table 5. Trading Partners' Estimated Results per Country

	(BELGIUM) LTRADE	(BURUNDI) LTRADE	(CHINA) LTRADE	(KENYA) LTRADE	(TANZANIE) LTRADE	(UGANDA) LTRADE
LGDPP	-65.231	25.783	57.185	41.057	210.129	-17.196
	(158.040)	(178.890)	(56.984)	(352.657)	(486.476)	(132.955)
LGDPP2	1.182	-0.602	-0.902	-0.926	-4.330	0.332
	(2.932)	(4.252)	(0.991)	(7.342)	(10.141)	(2.825)
LGDPR2	-2.095	-7.459	3.253*	-3.810	-0.252	-3.730
	(2.048)	(4.939)	(1.130)	(5.706)	(6.573)	(4.324)
LGDPR	92.914	332.081	-142.734*	175.816	10.393	168.621
	(89.230)	(215.394)	(49.670)	(249.026)	(295.001)	(193.285)
LEXC	3.092	-1.014	-6.086*	2.080	-0.620	-0.486
	(4.031)	(9.164)	(1.819)	(4.709)	(7.781)	(1.613)
LPOPP	182.945	-216.658	160.594	502.648	77.293	-205.597
	(393.462)	(727.061)	(158.415)	(771.886)	(715.972)	(357.688)
LPOPP2	-2.708	2.928	30.566*	15.451	6.158	-2.371
	(12.165)	(23.454)	(10.689)	(20.468)	(31.409)	(34.617)
LPOPR	-742.526	472.580	15.758	291.107	-365.054	-363.336
	(411.677)	(911.237)	(148.977)	(858.701)	(788.385)	(465.217)
LPOPR2	19.716	-6.967	7.992	-14.881	9.756	12.721
	(11.494)	(23.571)	(4.112)	(26.103)	(26.543)	(12.015)
LDIST	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)
LDIST2	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)
T	2.321	-4.098	-17.094*	-23.597	-7.345	8.184
	(3.097)	(7.729)	(5.456)	(17.674)	(15.915)	(27.129)
T2	-0.007	0.068	0.085*	0.052	-0.023	0.002
	(0.015)	(0.060)	(0.024)	(0.071)	(0.155)	(0.039)
EAC	0.000	-1.548	0.000	3.449	0.000	0.000
	(.)	(0.847)	(.)	(1.670)	(.)	(.)
CB	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)

CL	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)
_cons	4445.487	-7025.436	-18343.520*	-16561.459	-2478.778	5060.964
	(5388.724)	(12153.246)	(6229.631)	(16828.047)	(13464.468)	(6017.433)
N	16	16	16	16	16	16
R^2	0.927	0.984	0.998	0.972	0.959	0.993

Note: Standard errors in parenthesis.

Significant at lesser than * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ levels of significance.

Table 6. Trading Partners' Estimated results per year

	LTRADE	Standard Error
LGDPP	3.138	2.724
LGDPP2	-0.020	0.051
LGDPR2	0.541	0.280
LGDPR	-21.653	12.219
LEXC	0.727*	0.296
LPOPP	36.141	23.252
LPOPP2	-0.985	0.633
LPOPR	0.000	0.000
LPOPR2	-0.381***	0.080
LDIST	-14.230	10.977
LDIST2	0.717	0.823
EAC	-0.096	0.820
CB	0.260	0.820
CL	0.000	0.000
2000.year	0.000	0.000
2001.year	0.187	0.159
2002.year	-0.173	0.183
2003.year	-0.373*	0.167
2004.year	0.060	0.142
2005.year	0.592***	0.109
2006.year	0.518***	0.105
2007.year	0.301**	0.110
2008.year	0.144	0.113
2009.year	-0.003	0.107
2010.year	-0.255**	0.083
2011.year	-0.188*	0.076
2012.year	0.000	0.000
2013.year	-0.179**	0.062
2014.year	0.000	0.000
2015.year	0.000	0.000
_cons	0.000	0.000
N	96	
R^2		

Note: Significant at lesser than * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ levels of significance.

Table 7. Total Elasticities results

	LTRADE	Standard Error
LGDPP	5.081***	1.288
LGDPP2	-0.057*	0.023
LGDPR2	-0.688	0.376
LGDPR	31.903	16.416
LEXC	0.544	0.291
LPOPP	13.452**	4.449
LPOPP2	-0.371**	0.117
LPOPR	-292.232	183.912
LPOPR2	8.746	5.686
LDIST	-4.154***	0.773
EAC	-0.266	0.532
CB	0.033	0.670
CL	0.000	0.000
_cons	1904.233	1379.904
N	96	

Note: Significant at lesser than * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ levels of significance.