Effects of Trade Balance on economic Growth in Rwanda. An empirical analysis.

(1995-2015)

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DEDICATIONS

Allow me to extend my dedications:

To Almighty God,

To My Mum,

To My aunties and uncles,

To my biological brothers and sisters,

To my Supervisor,

And finally special dedications to all my extended family and relatives, Brothers and Sisters, to whom I owe opportunities to attain and complete the MSc. level.

DECLARATION

I, Emery MUSONERWA BAHATI declare that this MSc. thesis entitled "Effects of Trade Balance on Economic Growth in Rwanda. An empirical analysis (1995-2015)" has been written by me without any external unauthorized help, that it has been neither presented to any institution for evaluation nor previously published in its entirety or in parts. Any parts, words or ideas of the thesis, however limited, which are quoted from or based on other sources have been acknowledged as such without exception.

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Date of Submission…………/…………/2017.

CERTIFICATION

This is to certify that Mr. Emery MUSONERWA BAHATI has submitted this Master's Thesis to the University of Rwanda (UR), College of Business and Economics (CBE) for examination with my approval as the University Supervisor;

Signed…………………………………………Date……………/…………/2017

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ABSTRACT

The central objective of this research thesis is to investigate the effects of Trade Balance on Economic Growth. Most of developing countries are experiencing trade deficits resulting from importing more and export less. The same scenario applies to Rwanda. Thus, this research is crucially motivated at understanding the magnitude effects of the deficits and impacts on economic growth. Econometric modelling was applied using E-views 8.1. The research used time series data from the World Bank dataset spanning from 1995-2015. Different econometric tests have been performed. The results from the unit root test have concluded that all variables are I(1), meaning that are integrated after the first difference. The long run estimation has been and has shown that LOER (Log Official Exchange Rate) and LINFL (Log Inflation) are both statistically insignificant. They have been removed from the estimation. The results found concluded that if the deficit increases by 1%, the economic growth retard or GDP decreases by 0.004707% in the long-run ceteris paribus. The Adjusted R^2 found was 99.9745%, it informed about the goodness of fit of the model. LGDP is explained by LTB, LFDI and LCONS at 99.9745%. For the cointegration, the Johansen Test was performed and revealed presence of the cointegration (long run relationship between variables). The ECM model was also performed and tests concluded fulfilment of necessary standards. VAR and Causality was included in the study. The tests ascertained the absence of any causality direction between LGDP and LTB since statistical relationship does not imply causation.

LIST OF SYMBOLS AND ABBREVIATIONS

%	Percentage
ADF	Augmented Dickey Fuller
AfDB	African Development Bank
BLUE	Best Linear Unbiased Estimator
Brexit	Exit of United Kingdom from the European Union membership
CBE	College of Business and Economics
CONS	Final Consumption
DF	Dickey Fuller
EAC	East African Community
ECM	Error Correction Model
FDI	Foreign Direct Investment
GDP	Gross Domestic Products
IMF	International Monetary Fund
INFL	Inflation
IPAR	Institute of Policy Analysis and Research
LCU	Local Currency Unit
MINECOFIN	Rwanda's Ministry of Finance and Economic Planning
MINICOM	Rwanda's Ministry of Trade and Commerce
NISR	National Institute of Statistics of Rwanda
OECD	Organization for Economic Cooperation and Development
OER	Official Exchange Rate
OLS	Ordinary Least Squares
PP	Philip Peron
TB	Trade Balance
UNCTAD	United Nations Conference on Trade and Development
UR	University of Rwanda

VAR   Vector Autoregressive

WB   World Bank Group

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CHAPTER ONE: GENERAL INTRODUCTION

1.1 Background of the study

Rwanda is a developing country, having the big share of population relying and livelihoods on subsistence agriculture. It is understood that agricultural sector contributed up to 90% employment opportunities in the economy and 70% export revenue in the country (IPAR,2009). The 1994 genocide destroyed Rwanda's fragile economic base, severely impoverished the population particularly women and eroded the country's ability to attract private and external investment.

For the last ten years, Rwanda has recorded a steady economic growth, therefore beside this growth; the country has dealt with an accelerated trade deficit. This deficit is ultimately associated to the structural weaknesses of the economy because of its reliance of the production on agriculture that is, the subsistence farming that contributes around 33% of GDP.

Global output growth was estimated at about 3 percent (at an annualized rate) for the third quarter of 2016 (IMF, 2017).

Growth in real GDP was estimated at 3.6%, higher than the 3.1% for the global economy and 1.5% for the euro area. Africa remained the world's second fastest growing economy after East Asia. In 2015, sub-Saharan Africa (excluding South Africa) grew faster than the continental average, at 4.2%, with East Africa leading the way at 6.3%. Growth in Central, North and West Africa was above 3%, while Southern Africa grew by an average of 2.2%. (AfDB, 2016).

For the post-genocide period, Rwanda has achieved growing economy at an average GDP growth of 8% against a set target of 11.5% GDP growth from 2012 – 2017.

Global trade slowed down dramatically to around 1.5 per cent in 2015 and 2016, compared to 7 per cent before the crisis. (UNCTAD, 2016). The same report highlighted that developing economies was supposed to grow on average less than 4 percent in 2016, but with considerable variation across countries and regions.

Rwanda imports more than it exports in real terms, leading to a trade deficit. Hence, the study aims ultimately at analysing the causes and the effects on Economic growth.

1.2. Statement of problem

Rwanda is a landlocked country. Imports in values and quantities exceed exports, leading to a trade deficit. From the initial Mankiw's equation of calculating GDP using the framework of expenditure approach, Trade Balance is component. Thus, trade balance affect GDP in one or another. Trade deficit would therefore hamper growth.

In 2015/16, estimates calculated in 2011 prices shows that GDP was 6.5 percent higher in real terms compared to the previous fiscal year (NISR, 2016). Overall, Rwanda's economy was growing at a healthy rate, 7.5 percent in 2010, two percent higher than the East African Community (EAC) and even more than Sub Saharan Africa. (WB,2011). The result achieved for the decade spanning from 2011 to 2015 informs that real GDP growth was averaged at about 8% per annum.

In the fourth quarter of 2016, Rwanda's total trade recorded a decrease of 7.40 per cent over the fourth quarter of 2015. Exports totaled US$ 109.50 million, imports totaled US$ 400.31 million and re-exports were valued at US$ 60.30 million. (NISR,2016).
Total domestic exports increased by 12.86 per cent during the period of the fourth quarter 2016 over the same quarter of 2015 and also decreased by 2.69 per cent compared to the third quarter of 2016. the deficit on traded goods decreased considerably by 32.57 per cent, from the same period in 2015. In as far as trade components are concerned, total imports of goods constitute 70.22 per cent of total trade in goods (US$ 400.31 million), while domestic exports constituted 19.21 per cent and re-exports constituted 10.58 per cent (NISR,2016).

Dependence on commodities exports (tea and coffee) has resulted in an export decrease over the years resulting from international and regional price fluctuations. Notably, the service sector still recorded a growth at a faster rate. Services exports were also limited to few sectors, especially tourism. (MINICOM, 2010).

Rwanda records an economic growth along with a trade deficit. As per Mankiw's identity of national income computation, trade balance is a component of GDP. Thus, the study aims at analyzing the magnitude effects of trade balance on Economic growth in Rwanda.

1.3. Significance of the study

To date, there are only very few studies that consider of the effects of trade balance on economic growth. This has been an additional motive to pursue this study. Again, this research helps the researcher to get additional knowledge about the effect of trade balance on economic growth in Rwanda. The recommendations drawn from this research will be useful for government authorities in order to take measures and policies that improve trade balance and accelerate economic growth.

1.4. Research objectives

1.4.1. General objective

The general objective of this research is to analyze the effect of trade balance on economic growth.

1.4.2. Specific objectives

The study makes its emphasis on the following specific objectives:

- To determine the relationship between economic growth trade balance,
- To determine to which extent variables influence economic growth,
- To give suggest the way forward on the raised issues.

1.5. Research hypotheses

H_0: Trade balance has no effect on economic growth in Rwanda.
H_1: Trade balance has a significant and negative impact on economic growth in Rwanda.

❖ **On correlation:**

By assuming 5% level of significance, we hypothesize the following:
H_0: $\beta=0$: Trade balance has no effect on economic growth in Rwanda.
H_1: $\beta \neq 0$: Trade balance has a significant and negative impact on economic growth in Rwanda.

1.6. Scope of the study

This study focuses on Rwanda and covers the period of 21 years spanning from 1995 to 2015. It assesses the effect of trade balance on economic growth in Rwanda.

1.7. Subdivision of the work

The study is subdivided into five (5) chapters. Chapter 1) Introduction, 2) Literature review, 3) methodology, 4) Findings, discussion and interpretation of results, and chapter 5) Conclusion and recommendations.

CHAPTER TWO: LITERATURE REVIEW

The chapter basically presents the review of literature related to the study, additionally, it provides its emphasis on theoretical and empirical literatures. Subsequently, the study will refer to the set objectives in order to fill the gap that has been identified in other studies.

The notion that international trade and economic growth are related in one way or another has received a significant amount of attention in recent literature. The literature on endogenous growth and international trade has relied mostly on models that yield single steady state solutions.

During the review of relevant literatures, the researcher came across with various published critical studies on the effects of trade balance on economic growth. Therefore, the review of books, reports, papers and articles and other related sources found as useful materials to the topic enabling the researcher to be aware of how other pre-researchers have been written and interpreting their topics related to the topic under study. Many books, papers, reports, papers and articles are available in order to provide enough and adequate information whereby key words shall have been clearly defined.

Hence, emphasis on the previous researchers' findings, definition and meaning of key terms is obvious as it makes the research much clearer.

Thus, understanding and analyzing the effect of the economic growth on the trade balance on the Rwandan economy is of great importance, also integrating other variables affecting the trade balance will constitute the emphasis of this study.

2.1. Key concepts

2.1.1 Gross Domestic Product (GDP)
Gross Domestic Product (GDP) refers to the market value or monetary value of all officially recognized final goods and services produced within a country in a given period. This will serve as a proxy variable for economic growth (investopedia, 2017).

Economic growth (increase of GDP) is the increase in the market value of the goods and services produced by an economy over time. Gross domestic product is often considered the best measure of how well the economy is performing. (Mankiw G.N, 2001)

Determination of GDP

GDP can be determined in three separate ways, all of which should in principle provide the same results. They are namely:

a)   The product (or output) approach,

b)   The income approach and lastly

c)   The expenditure approach

Among the three approaches, the direct applied approach is the product approach, that sums altogether the outputs of every class of enterprise to arrive at the total amount, the expenditure approach works on the principle that all of the products produced within the economy must be bought by somebody, therefore the value of the total products must be equal to people's expenditures in buying things. Finally, the income approach works on the principle that income of productive factors (producers) must be equal to the value of their products produced (Mankiw G.N, 2001).

The Components of Expenditure

Economists and policymakers care not only about the economy's total output of goods and services but also about the allocation of this output among alternative uses. The national income accounts divide GDP into four broad categories of spending:
- Consumption (C)
- Investment (I)
- Government purchases (G)
- Net exports (NX).

Thus, letting Y stand for GDP,

$Y = C + I + G + NX$ (Mankiw G.N, 2001)

2.1.2 Trade Balance

The trade balance refers to the activity of exports and imports commonly as known as" net exports", sometimes denoted as NX) or alternatively Trade Balance (TB) is the difference between the monetary value of exports and imports in an economy over a certain period of time.

It refers also to the relationship between savings and the investments.

A positive balance of trade is known as a "trade surplus" consists of exporting more than is imported or savings are greater than investments.

Subsequently a negative balance of trade known also as "trade deficit" refers to importing more than is exported or investing more than saving.

The balance of trade refers to the gap, if any, between a nation's exports, or what its producers sell abroad, and a nation's imports, or the foreign-made products and services purchased by households and businesses. If exports exceed imports, the economy is said to have a trade surplus.

If imports exceed exports or savings are lesser than investments, the economy is said to have a trade deficit.

Then, if exports and imports are equal, then trade is said to be balanced.

The balance of trade is divided into goods and services balances. The balance of trade is one the component of the current account, marking the inflow and outflow of goods and services. Note

that the current account record other transactions such as income from the international investment position as s well as international aid.

Ideally, the trade balance is the difference in value over a period of time between a country's imports and exports of goods and services, usually expressed in the unit of currency of a particular or economic union (e.g. dollar for the United States, pounds sterling for the United Kingdom, or Euros for the European Union)

The trade balance is part of a larger economic unit, the ``balance of payments`` which is the sum total of all economic transactions between one country and its trading partners around the globe.

In fact, the balance of payments includes three major components namely:

- The current account,
- The capital account,
- The financial account,

Over a given period of time the time, a country or a territory whose value of exported goods is higher than its value of imported goods, it is known as a "net exporter". For example, Saudi Arabia and Canada are both net exporting countries because they have an abundance of oil which they then sell to other countries that are unable to meet the demand for energy.

Therefore, it is more crucial to note that, a country can be a net exporter in a certain area or domain, while being a net importer in other areas or domains.

A typical example is the one experienced by JAPAN, where Japan is the net exporter of electronic devices but it must import oil from other countries to meet its needs. Conversely, a country or a territory which the value of exported goods is lesser than its value of imported goods over a given period of time, it is called a "net importer".

For example, Rwanda is a net importer of the East African Community member states because a third of its total imports are from the East African Community with Kenya and Uganda as major importer countries (investopedia, 2017).

 Measuring Trade Balances

A few decades ago, it was common to measure flows of trade by amounts of goods; that is, the solid, physical items that were transported by ships or trucks or airplanes between countries.

2.2 Economic growth, Trade Balance and Empirical literatures
2.2.1 Overview of Economic Growth and Trade Balance

Global growth was projected to slow to 3.1 percent in 2016 before recovering to 3.4 percent in 2017. Growth in emerging market and developing economies is expected to strengthen slightly in

2016 to 4.2 percent after five consecutive years of decline, accounting for over three-quarters of projected world growth this year (IMF 2016).

The decrease in growth is merely associated with the weak growth in the in advanced economies resulting from the UK's decision of quitting the European Union commonly known as "Brexit", and lower than expected growth so far in the U.S Economy. Conversely, within emerging market economies, the overall trend position is positive with growth increasing 4.2 percent for the year 2016, explaining by the continuing low interest rates and a slight pickup in commodity prices (MINECOFIN, 2016).

In the fiscal year 2015-2016, GDP at current market prices was estimated to be RWF 6,139 billion, up from RWF 5,631 billion in the previous fiscal year. The Services sector contributed 47 percent of GDP while the agriculture sector contributed 33 percent of the GDP. The industry sector contributed 14 percent of the GDP and 6 percent was attributed to adjustment for taxes and subsidies on products (NISR, 2016).

2.2.2 Empirical Literature

The causal relationship between economic growth and trade balance has brought room of discussion for many economists for many years ago. In the traditional trade literature, there has been a proper and well- developed area analyzing growth, however, no much has been done on the relationship between economic and trade balance. The main literatures developed date from 1950s and 1960s.

The importance of globalization has been also recognized for each country being small or big. Thus, if a country has resorted to free trade, this implies that the country is absolutely having many benefits from the trade openness. Therefore, trading with other countries or to be a part of any trade agreement (EAC for example) means that trade openness has positive impact on economic growth.

Other theorists have concluded that trade deficits are absolutely detrimental for any country's economy, meaning that deficits are a drag on Gross Domestic Product (Economic growth). Favorable Trade balance is assumed to be a major determinant of growth in any country, since surplus accelerates growth while and deficit shrinks it.

Matthias B. and Jens K. (2012), examined the relationship between trade and economic growth and has discussed that the empirical evidence for a causal linkage between trade and growth is ambiguous. However, the study concluded that there is a significant relationship between the variables. Trade has been found to be effective in fostering economic growth in developing countries.

Karolina and Södersten (2002) conducted a study by assuming terms of trade being a proxy for Trade. Terms of trade being a useful concept when analyzing the relationship between trade and

growth. Again, exports were attributed a role of functioning as an engine of growth. The study seemed to highlight some similarities and differences among Asian and western countries. The study appeals that Asian countries have achieved tremendous results in as far as growth is concerned compared to western countries when they registered a fast growth in GDP per capita; average annual growth in the time period studied amounted to 5.5 per cent. Thus, their per capita GDP nearly quadrupled between 1970 and 1995. This growth is export biased resulted from higher growth rated in export volumes. The idea behind the growth is that these countries have either been specializing in sectors with a relatively favorable development with regard to world market prices, or that they have managed to successively improve quality within existing sectors.

Santo D. (1993), assessed exports and economic by reconsidering causality relationship between the two variables using time series data of LDC from 1967-1986 by adopting linear regression method. The study concluded that the causality test proposes a very fragile support for the controversy that export growth promotes GDP. Support for the another controversy which induces that GDP growth promotes export growth is also insignificant though it is a bit stronger than the anterior controversy.

Vanek, J. (1971), analyzed the effects of the terms of trade on the economic growth equilibrium for a small economy, the same for a large open economy have well noticed the importance of the terms of trade on the economic growth in the form of imports, exports and technological progress under a number of assumptions as discussed in his work. One of the major conclusion is that there is tendency of an increase in demand for capital when the price of capital goods declines in international markets. therefore, a rise in the price of the consumer good in international markets is chiefly linked to a rise in the equilibrium capital- labor ratio of the small trading economy.

Thus, the increase in the equilibrium capital-labor ratio may, but need not, increase the equilibrium consumption per capita. The offset effects of a higher price of the consumption good on the one hand and of a higher capital-labor ratio on the other resulted. Another argument is that an improvement in terms of trade, or introduction of trade starting from autarky, does not necessarily imply improved living standard for a country in the long run. Shawa JM. and Shen Y. (2013), during their analysis of the determinants of trade balance. Foreign Direct Investment, Human Capital Development, Household Consumption Expenditures, Government Expenditure, inflation, Natural Resources Availability, Real Exchange Rate Foreign Income and Trade Liberalization were among the explanatory. They have applied OLS Method for estimation, the variables were stationary after the first difference, meaning they all follow I(1) series. All the variables were found to have an impact on the trade balance while only the real exchange rate was found to be statistically not significant.

Ayhan K. M., et al. (2005), analyzed growth and volatility noticing that the relationship between the variables has been influenced by numerous aspects of globalization. It was a cross-sectional study conducted for a sample of 85 countries of which 21 were industrialized countries while the rest 64 were developing economies for a period covering 1960-2000.

The group of industrial countries matches to a sub-sample of the Organization for Economic Cooperation and Development (OECD) economies for which data used in the empirical analysis were deemed available. For the descriptive analysis purpose, in the next two sections, developing countries were also grouped into two clusters-more financially integrated economies {MFI} and less financially integrated economies {LFI}. This refers to 23 MFI and 41 LFI economies respectively in the sample.

For exports and imports, the basic growth-volatility relationship was performed over the full sample period across the three groups of countries. Averagely, industrial countries display the highest level of growth and lowest volatility, with MFI and LFI economies following in the usual order. Despite that, also the patterns of growth and volatility across decades again reveal some differences.

The study's results revealed a positive relationship between growth and volatility among industrial countries and a negative one among developing countries.

In the beginning of development, Japan exported raw silk and tea in exchange for textiles. Thereafter, Manufacturing industry enhanced textiles in order to be substitutable for imports leading to fact that the share of capital goods and textile materials increased in its total imports. manufacturing of textiles, especially cotton textiles, grew and became main export item.

It has been well noticed that Japan has not experienced a balanced economic growth in the sense of the uniform rate of growth in all industries and constant pattern of trade, however it experienced drastic changes both in his industrial structure and in the commodity composition of its exports and imports (Yamazawa I., 1972).

The author concluded that the steady reduction of domestic price relative to import price promotes import substitution, and imports will decline in absolute volume when the price effect more than offset the income effect (increase in domestic demand).

Hoang Thu Thi, et al. (2010) analyzed the effect of foreign direct investment (FDI) on economic growth in Vietnam using panel data of sixty-one provinces over the 1995-2006 period. This study concluded that there exists a strong influence of FDI on economic growth in Vietnam. However, this study argued that FDI inflows themselves do not apply an independent influence on Vietnamese economic growth. It does not affect economic growth through the interaction effects of FDI with human capital and trade. Finally, it implied that the advance technology and knowledge transfer from the FDI inflows in Vietnam are not yet applicable for increasing Vietnam's economic growth. The study suggested that the additional capital from the FDI Inflow is the only channel that helps increase the economic growth in Vietnam.

The growth effect of FDI is not conditional upon the level of human capital in developed host countries (Moudatsou A.,2003).

In his study over 14 European countries for the period 1980-1986, where some of the variables of interest were subjected to two-way interaction were introduced lagged form, they seemed to be interrelated, thus testing these relationship was very crucial for the author. The findings revealed that current FDI Inflows were influenced by past FDI Inflows for all countries except Greece and Italy. In as far as FDI and Economic Growth is concerned, the study findings concluded on grow that FDI past Inflows seem to affect the economies of the most of the countries. However, the effect of FDI on Economic growth differ from countries and depend growth levels of countries.

Ahmad E., & Hamdani, A. (2003), conducted a study the effects of Foreign Direct Investment (FDI), domestic private investment, government expenditure and labour on economic growth 32 developing countries for the period spanning from 1965 to 1992.

This study concluded that the contribution of domestic private investment to economic growth is more dependable and reliable than what FDI contributes. Therefore, FDI loses its attraction as an instrument of growth if the adverse balance of payments consequences of the resulting profits repatriation is also taken into account. Ahmad E., & Hamdani, A. (2003).

Hamida R. (2012), examined the intertemporal causal relationship between energy consumption and economic growth in Sfax (a second largest City in Tunisia), applying series from 1980-2010, using, medium-voltage electricity consumption as proxy of energy consumption destined for use by the industrial sector and gross domestic product as a proxy for gross domestic product (GDP) for the industrial manufacturing using Granger causality test. The author concluded the empirical results of this reveals a distinct directional causal flow from electricity consumption to economic growth, both the short and long runs. The results ascertained that electricity consumption encourages economic growth in Sfax. Krishna Lala B., et al (2000) conducted a study on the relationship between energy and gross domestic products. The research utilized a said genuine data set (Energy information Administration for 1999). The study was conducted on 53 countries for which data was obtainable. It concluded by ascertaining that The sole driving force of economic development as nations attempt to increase their standards of living is absolutely dependent on access to gigantic applications of primary energy for production. Grigg, D. (1994) in his study, inspected food expenditure and economic development by exploring variations of the amount of income devoted to food consumption where the author revealed spatial differences.

There were very exciting regional differences in the percentage of total expenditure devoted to food in the early 1980s. The lowest proportions, less than 15% were to be established in North America, Australasia and four countries in north west Europe namely the United Kingdom, Sweden, the Netherlands and Denmark. A second category, with between 15% and 24%, included Japan and the rest of Western Europe. Europe, North America, Australasia and the Russia all had - with three exceptions in Eastern Europe, expenditure upon food below 35% of total expenditure. In contrast nearly all countries in Afro- Asia and Latin America had over 35%; furthermore, the proportion was higher in Afro-Asia than in Latin America. Grigg, D. (1994).

The study affirmed the Engel's Law that stipulates the inverse relationship between the proportion of income to be spent upon food and per capita income.

Over the years, flexible exchange rate regimes (encouraging market forces to play without fear of intervention) have positively affected in a noticeable way to the pace of economic performance (Azid Toseef et. al, 2005).

In the same study, ADF, Granger causality test and VAR were used to analyze the effect of exchange rate volatility on economic growth, manufacturing product being a proxy for the latter variables. Variables were stationary after the first difference. Under the hypotheses that exchange rate uncertainty depresses vis-à-vis promoting manufacturing products. The findings found were positive but again insignificant, whereby they do not support the position that excessive volatility or shifting of exchange regimes has marked effects for manufacturing products.

Following the study of Janus T., and Daniel R.C. (2015), examining the effect the effect of real effective exchange rate volatility on economic growth as well as the euro's impact on real effective exchange rate using panel data spanning from 1980 to 2011 on OECD countries. The study concluded the exchange rate with consistent volatility has a negative effect on growth. Movements in the exchange rate that are consistent with market players' expectations have limited effects on the macro economy. In contrast, in many developing countries high variability of exchange rate fluctuations around its anticipated value may generate adverse effects in the form of higher price, inflation and larger output contraction. (Kandil, M., & Ida Mirzaie. 2005).

It is generally believed inflation has negative and significant impact on economic growth in medium and long-run (Khan M., & Abdelhak S. Ssnhadji.,2001)

Iqbal, N., & Nawaz, S. (2009), conducted study for Pakistan on investment, inflation and economic growth nexus using annual data from 1961 to 2008. ADF tests were used to test for the stationarity of series. Variables were found not having unit roots, however, having different levels of integrations. The study confirmed the negative effects of inflation on economic growth while the investment was confirmed to be positively related to economic growth using OLS regressions Munir Qaiser, et al. (2009), conducted a study on the relationship between economic growth and inflation using yearly data for the period extending from 1970-2005 with the specific objective of obtaining the threshold of inflation in Malaysia and its implication on economic growth, the threshold found was 3.89 per cent. The study started by testing whether the series were stationary by employing ADF and PP and the series were found not having unit root. Therefore, since the threshold was found, a threshold above 3.89 %, inflation has a significant negative effect on economic growth, or alternatively, inflation retards economic growth. The paper gave credit to inflation target (IT) policies.

Thus, for Malaysia, the empirical results strongly suggest the existence of one threshold value beyond which inflation exercises a negative effect on economic growth. This implies that there is non-linear relationship between inflation and economic growth this country. A threshold below

3.89 per cent promotes economic growth while a threshold beyond 3.89 per cent is considered to be detrimental.

Pollin R., & Andong Zhu. (2006), examined economic growth and inflation, a cross-country analysis performed for 80 countries being low and middle income for a period varying between 1961-2000. Bearing in mind the usage of the full data set of 80 countries for the period under study, the study concluded that higher inflation is associated with moderate gains in GDP growth up to a roughly 15-18 percent inflation threshold.

On the separate note, there is divergence when the data set is divided according to the level of income.

However, there was still a varied assortment of inflation rates that are very likely to be positively related to economic growth. Unquestionably, for the middle- and low-income countries for example, the findings strongly affirm that allowing inflation to be maintained in the range of 10 percent or somewhat higher is likely to be consistent with higher rates of economic growth. (Pollin R. and Andong Zhu. (2006).

2.3 Research gap

Reference being made from the literatures. Openness and trade have impact on income growth. However, most of the researchers have considered a favorable trade but much hasn't been done on the effects of trade deficit on economic growth. Also, the fact that Rwanda has been recording an economic growth coupled with an increased trade deficit. Thus, this study helps understanding the magnitude effect of this trade deficit on growth.

CHAPTER THREE: METHODOLOGY

This chapter is very essential, thus, in terms of assessing, understanding, linking economic growth and trade balance, first and foremost, the study presents the estimation methods employed, data used, Model specification, and expected signs.

Economists generally agree that open economies grow faster than their counterparts (closed economies). However, the relationship between trade openness and economic growth has been theoretically controversial.

Increased international trade can generate economic growth by facilitating economic the diffusion of knowledge and technology from direct-high tech goods. (Barro and Sala-i-Martin, 1997).

The model to be applied has the root from Mankiw principles of computing Gross Domestic Product (GDP) using the expenditure approach. The total value of final goods produced in a country equals the total value of what is purchased. These purchases can be broken down into several components: Consumption Expenditures, Investment, Expenditures (I), Government Spending (G), Net Exports (Exports – Imports) [Mankiw, 2014].

Exports are portion of domestic production while imported goods are produced abroad. Thus since imports are included in measures of consumption, investment and government

Expenditures, yet they are produced abroad, this implies that imports should be subtracted out.

This can be written from Makiw's simple identity:

Y = C + I + G + (EX-IM)

Equivalent to:

Y = C + I + G + NX

Where:

Y stands for GDP

I stands for Investment

G stands for Government Expenditures

NX stands for Net Exports (Trade balance component)

Following the study by Solow (1956) with its emphasis on steady states and growth rates, foresees that international differences in steady state output per person are due to international differences in technology for a constant capital output ratio. Most of the empirical growth literature that refers to the Solow model has employed a specification where steady state differences in output per person are due to international differences in the capital output ratio for a constant level of

technology. Gundlach E. (2007). Capital is necessary for a country to be able to produce in order to feed the local demand and surpluses to be channeled abroad as exports. However, technology plays an important role in the production processes.

Mankiw et al. (1992), in the augmented version of the Solow model, growth, measured as the difference between the logarithm of output per worker in period t and its initial value is determined by the level of technology, the rate of technological progress, the initial output per worker, the saving rate, the share of capital/ human capital in output, the rate of convergence to the steady state, the depreciation rate, the growth rate of the labor force, and investment in human capital.

Also Pam Z. (2015), utilized this method of estimation when analyzing the effects of trade openness on economic growth. The study focused on 42 sub-Saharan Africa countries. Below was the model applied under OLS estimation:

Below are the variables details used:

$$\mathrm{Y}_{it} = \alpha_i + \mathrm{Y}_{it-1} + \sum_{p=1}^{k} \beta_{pi} \mathrm{X}_{it}^{p} + \gamma_{1i} trade_{it} + \gamma_{2i} trade_{it}^{2} + \varepsilon_t$$

Y_{it} is GDP per capita for country i at time t, X is the vector of control variables, including education, rate of population growth, investment rate, financial development, institutions, crisis, and debt. Trade is a trade openness variable and ε_{it} is an error term.

Inflation, investment, financial development measured by private as share of GDP were included in the model. The empirical results of the study designated that a trade threshold exists below which greater trade openness has beneficial effects on economic growth and above which the trade effect on growth declines. (Pam Z.,2015).

In our research, the above findings were the essence of using a similar model. However, we have used control variables that fit the Rwandan context. The model was applied for panel analysis (cross countries analysis), however, this research considers it at a single country level.

Below is the model we set for our study:

$$\mathrm{Y}_t = \beta_0 + \mathrm{Y}_{t-1} + \beta_1 \mathrm{X}_t + \beta_2 TB_t + \mu_t$$

Where Y_t is the Gross Domestic Product (proxy for economic growth), Y_{t-1} is the lag of GDP, X_t standing for the control variables including Foreign Direct Investment (FDI), Consumption (Cons), Official Exchange Rate (OER) and Inflation (INFL), last TB for Trade Balance, t for Time and μ_t for the error term.

3.1. Estimation Methods

In as far estimation is concerned, the study is meant to follow three steps: i) the test of stationarity of the individual series in the regression model or in other words determining the order of

integration of the variables, ii) the test of the existence of a stable long-run equilibrium relationship between the variables iii) Error Correction Model (ECM) and iv) the estimation of the causal relationships.

3.1.1 Unit Root Testing (Stationarity Test)

For modelling purposes, it is required that all variables should be tested in order to determine their respective order of integration. Testing for stationarity before estimation is deemed necessary as most time series variables might be nonstationary and estimating with these series might produce spurious results.

Therefore, stationarity test will allow the researcher to determine the order of integration of the variables so as to choose an appropriate estimator. Hence, the study uses the Augmented Dickey Fuller (ADF), in performing the stationarity test.

❖ **Augmented Dickey Fuller (ADF) Test**

The ADF test developed by Dickey and Fuller is an augmented version of the Dickey-Fuller (DF) test conceived in the late 1979, and is more useful for more complicated and larger time series models.

The augmentation term is very crucial to ensure the residuals are turned into white noise without altering the distribution of the test statistics under the null hypothesis of a unit root. The procedure of stationarity testing using the ADF is similar to that of the DF test but rather applied to a particular model as specified as follows:

$$\Delta\gamma_t = \mu + \delta_t + \beta\gamma_{t-1} + \alpha\Delta\gamma_{t-1} + \ldots\ldots + \alpha_{j-1}\Delta\gamma_{t-j+1} + \varepsilon_t$$

Simplified in the following form:

$$\Delta\gamma_t = \mu + \delta_t + \beta\gamma_{t-1} + \sum_{t=1}^{j}\alpha\Delta\gamma_{t-1} + \varepsilon_t$$

where **μ** is a constant term, **δ** is the coefficient of the time trend, **j** is the optimal lag length, **Δ** is the difference operator, **t** represents the time trend and **ε** represents the Gaussian white noise (error or stochastic term). The test for stationarity is being performed under the null hypothesis **β = 0,** that affirms presence of unit root, as against the alternative hypothesis **β < 0**. After computation and generation of probabilities, it is then compared with the critical values. Therefore, if the probability is lower than the critical value, then the null hypothesis of **β = 0** is rejected implying that there is an absence of a unit root, meaning that the series are stationary. Similarly, the acceptance of the null hypothesis implies that the series has a unit root and hence non stationary. In this case, the probability is greater than the critical values or simply, if the ADF test statistics is greater than the critical values, the null hypothesis is rejected and vice versa.

3.1.2. Long-run relationship_Cointegration Testing

It is well warned that the regression of a nonstationary time series on another nonstationary time series may produce a spurious regression (Gujarati,2004). Let us suppose that we consider the LGDP and LTB time series. Subjecting these time series individually to unit root analysis, we will find that they both are at least stationary; that is, they don't contain a unit root. Suppose, then, that we regress LTB on LGDP as follows:

$$LGDP_t = \beta_1 + \beta_2 LTB_t + \mu_t$$

$$\mu_t = LGDPt - \beta_1 - \beta_2 LTB_t$$

Assume the extension of the unit root to μt and we found that it is stationary; that is, it is I (0). This is an interesting situation, for although $LGDP_t$ and LTB_t are individually I(1) or different, that is, they have stochastic trends, their linear combination. So to speak clearly, the linear combination cancels out the stochastic trends in the two series. From economic perspective, two variables will be cointegrated if they have a long-term, or equilibrium, relationship between them.

The valuable contribution of the concepts of unit root, cointegration, etc. is to force us to find out if the regression residuals are stationary. The cointegration test is considered as a pre-test to avoid spurious regression situations (Gujarati,2004).

In the good accent of cointegration theory, a regression equation is known as a cointegrating regression and the slope parameter β_2 is known as the cointegrating parameter. However, the concept of cointegration may be extended to a regression model containing many regressors. In this case, the regression is likely to have many cointegrating parameters.

In many cases and different scenarios, given two variables that are I(1) are linearly combined, then the combination will also be I(1). More generally, if variables with differing orders of integration are combined, the combination will have an order of integration equal to the largest (Brooks C. 2008).

Hence, Variables in time series analysis are classified as co-integrated if they exhibit long-run equilibrium relationship and share common trends. For the purpose of this study, Both Johansen technique and Engle-granger test will be employed to analyze the existence of long-run relationship between the variables since VARs Models are being used.

3.1.3. Error Correction Model (ECM)

Error correction models are recognized as an important way of modelling economic series. After testing whether the time series data have long run relationship, it is crucial also to assess whether the series exhibit short run relationship over time. The coefficient of the error correction term RESID_LR(-1) which measures the speed of adjustment is meant to have a negative sign and be significantly different from zero, if it is with positive sign ,it means that effects of shocks increase with time. The error correction model is specified with primary difference values of variables.

We therefore assume that the error term follows a white noise process (constant mean and variance, and zero autocovariances), also, estimating using OLS technique.

Finally, The Granger causality test will be used in order to test the presence of causality relationship between the variables under review, and if any to know the direction of the causality (either distinct-directional or bi-directional using) VAR.

This study introduces lagged dependent variable model to observe the causal relation between GDP and TB, FDI, CONS, OER and INFL. (GDP and the explanatory variables).

3.2. Data

The analysis employs a secondary data approach, time-series of macroeconomic variables spanning from 1995 until 2015. The variables to be used are (Gross Domestic products, Trade Balance, Final Consumption, Foreign Direct Investment, Exchange rate, inflation). The data is obtained from the WB Group data set.

3.3. Model specification

For the purpose of investigating the relation between economic growth (with GDP as a proxy) and Trade Balance in Rwanda reflecting the same situation in most of developing countries for the case of Rwanda for the period 1995-2015, the regression in this study, reflect the said variables with additional ones, namely Foreign Direct Investment (FDI), Consumption (with Final consumption expenditure as Proxy),[CONS], Official Exchange Rate (OER) and Inflation (INFL). In reference with the simplest Mankiw's identity of component of GDP, Investment was not added in the regression because of the straight forward relationship between economic and investment (especially construction sector). Also government expenditures were not considered because of its well-known magnitude in influencing the growth, however, FDI, OER and INFL were added as explanatory variables for GDP.

The methodology of this study is deemed to estimate the following equation:

$$GDP_t = \beta_0 + \beta_1 TB_t + \beta_2 FDI_t + \beta_3 CONS_t + \beta_4 OER_t + \beta_5 INFL_t + \mu_t$$

where:

GDP$_t$ stands for Gross Domestic Product and is a proxy for Economic growth at period t, (GDP current LCU is employed).

TB$_t$ stands for the Trade Balance or Trade deficit since Rwanda registers negative values at period t, with the Current account balance (percentage of GDP) as proxy.

FDI$_t$ stands for Foreign Direct Investment at period t, with Net inflows as % of GDP as proxy.

Cons$_t$ represents the Consumption at period t, with Final Consumption Expenditures Constant LCU as proxy,

OER$_t$ stands for official exchange rate at period t

INFL$_t$ stands represents inflation at period t

$\boldsymbol{\beta}_0$ being the intercept,

$\boldsymbol{\beta}_1, \boldsymbol{\beta}_2, \boldsymbol{\beta}_3, \boldsymbol{\beta}_4$ are the coefficient of the model under regression,

$\boldsymbol{\mu}_t$ stands for the stochastic or error term at period t,

Based on the theory and correlation test the following is expected:

$\boldsymbol{\beta}_1, \boldsymbol{\beta}_2 \boldsymbol{\beta}_3$, and $\boldsymbol{\beta}_4 > 0$: This implies that explanatory variables TB$_t$, FDI$_t$, CONS$_t$, OER$_t$ and INFL$_t$ are positively related to dependent variable GDP$_t$.

$\boldsymbol{\beta}_1, \boldsymbol{\beta}_2, \boldsymbol{\beta}_3$, and $\boldsymbol{\beta}_4 < 0$: This illustrates that explanatory variables TB$_t$, FDI$_t$, CONS$_t$, OER$_t$ and INFL$_t$ are negatively related to dependent variable GDP$_t$

3.4. Expected signs

Table 1: Expected signs

S/N	Independent Variable	Explanatory variable	Expected sign
1	GDP	TB	Positive
2	GDP	FDI	Positive
3	GDP	CONS	Positive
4	GDP	OER	Positive
5	GDP	INFL	Negative

CHAPTER FOUR: FINDINGS, DISCUSSION AND INTERPRETATION OF RESULTS

4.1 PRESENTATION

This subsection helps to understand the key variables to be used for the study and their respect current trends. Refer to the appendices.

4.2 Introduction to Data Analysis

The study is majorly understanding the effect of trade balance on GDP, understanding the correlation between these variables and also the causality link among them for the Rwandan Experience. therefore, the use of econometric modelling deemed of being paramount. A number of tests are assumed to be performed, however, stationarity test is very important (Gujarati, 2004).

4.2.1 Stationarity of variables

For the purpose of this study, stationarity test of all variables is to be performed for empirical analysis using the Augmented Dickey Fuller (ADF), for us to affirm that the variables used in the model are stationary or non-stationary, and also knowing their respective levels of integration, in order to avoid spurious regressions as early mentioned.

To test the stationarity or unit root, below are the hypothesis:

H_0: $\beta = 0$ (presence of unit root or the series is not stationary)

H_1: $\beta \neq 0$ (the series is stationary)

Decision Approach

- ❖ If the ADF test statistics<Critical values or Simply P_Values>Critical value: H_0 is accepted, the series has unit root, it is therefore not stationary.
- ❖ If the ADF test statistics>Critical values or P_Values<Critical value: H_0 is rejected, the series has no unit root, it is therefore stationary.

Table 2: Stationarity Results.

Series	ADF Test statistics	Critical Values			P_Value	Conclusion
		1%	5%	10%		
LGDP	-3.660971	-4.616209	-3.710482	-3.297799	0.0545	I(1), Has both trend and intercept
LTB	-5.654486	-4.532598	-3.673616	-3.277364	0.0012	I(1), Has both trend and intercept
LFDI	-4.563979	-4.616209	-3.710482	-3.297799	0.011	I(1), Has both trend and intercept
LCONS	-3.006994	-3.831511	-3.029970	-2.655194	0.0522	I(1), Has intercept only
LOER	-2.594428	-2.692358	-1.960171	-1.607051	0.0125	I(1), Has no trend and no intercept
LINFL	-4.795944	-4.571559	-3.690814	-3.286909	0.0066	I(1), Has both trend and intercept

Source: Author's Estimation in Eviews 8 with data from World Bank Group data set

❖ **Summary about Stationarity Tests.**

All variables are stationary at between 1 and 10% level of significance. The test reveals that **GDP** is stationary at first difference, I(1), it has a trend and an intercept, **TB** being stationary at First difference, I(1), having a trend and an intercept, **FDI** is stationary at First, I(1) and has both trend and intercept **CONS** is stationary at the first difference, I(1), having an intercept only, **OER** is being stationary at First difference, having no trend and no intercept while finally **INFL** is stationary at First difference, having both trend and intercept.

The stationarity gives us the confidence to proceed with the study and later on, perform the cointegration test and estimating the model stated in the methodology.

4.3 Estimation of the model

$$GDP_t = \beta_0 + \beta_1 TB_t + \beta_2 FDI_t + \beta_3 CONS_t + \beta_4 OER_t + \beta_5 INFL_t$$

The above is to estimated, below are the results:

Table 3: Estimation of the model

Dependent Variable: LGDP
Method: Least Squares
Date: 07/16/17   Time: 14:40
Sample: 1995 2015
Included observations: 21

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTB	-0.004921	0.001957	-2.514763	0.0238
LFDI	0.026378	0.005823	4.529868	0.0004
LCONS	1.057468	0.014336	73.76275	0.0000
LOER	0.012075	0.028143	0.429061	0.6740
LINFL	-0.000255	0.001262	-0.202394	0.8423
C	-1.652590	0.263918	-6.261746	0.0000

R-squared	0.999809	Mean dependent var		28.03740
Adjusted R-squared	0.999745	S.D. dependent var		0.911368
S.E. of regression	0.014542	Akaike info criterion		-5.388629
Sum squared resid	0.003172	Schwarz criterion		-5.090194
Log likelihood	62.58060	Hannan-Quinn criter.		-5.323861
F-statistic	15708.37	Durbin-Watson stat		2.122959
Prob(F-statistic)	0.000000			

Source: Author's Estimation in E-views 8 with data from World Bank Group data set

LGDP= -1.652590 - 0.004921LTB + 0.026378LFDI + 1.057468CONS + 0.12075OER- 0.000255 INFL

$R^2 = 0.999809$

Adjusted $R^2 = 0.999745$

Given these estimation results, the model is fitted by the Trade Balance (LTB), Foreign Direct Investment (LFDI), Consumption (LCONS), since their respective probabilities are less than 5%, the set significance level while LOER and LINFL are concluded to be statistically insignificant. The findings confirm the expected signs.

R^2 informs the researcher about the goodness of fit of the model. In other words, it asserts the extent at which independent variable is being INFL influenced by the explanatory variables.

 By removing variables that are not significant (LOER and LINFL), below are the results of estimation:

Table 4: Estimation after removing insignificant variables.

Dependent Variable: LGDP
Method: Least Squares
Date: 07/16/17   Time: 14:38
Sample: 1995 2015
Included observations: 21

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTB	-0.004707	0.001239	-3.799214	0.0014
LFDI	0.025278	0.005044	5.012032	0.0001
LCONS	1.062435	0.007356	144.4345	0.0000
C	-1.718785	0.200117	-8.588906	0.0000

R-squared	0.999806	Mean dependent var	28.03740
Adjusted R-squared	0.999772	S.D. dependent var	0.911368
S.E. of regression	0.013771	Akaike info criterion	-5.562811
Sum squared resid	0.003224	Schwarz criterion	-5.363854
Log likelihood	62.40951	Hannan-Quinn criter.	-5.519632
F-statistic	29191.72	Durbin-Watson stat	2.095388
Prob(F-statistic)	0.000000		

Source: Author's Estimation in E-views 8 with data from World Bank Group data set

$LGDP= -1.718785 - 0.004707LTB + 0.025278LFDI + 1.062435LCONS$
$R^2 = 0.999806$

Adjusted $R^2 = 0.999745$.

Thanks to the above results, the LTB, LFDI and LCONS are statistically significant because 0.0014, 0.0001 and 0.0000 being their respective probabilities are less than critical value of 5%. The significance has increased after removing the variables that were insignificant.

Additionally, R^2=0.999806 and is greater than 0.5. This means that in this estimation, Economic growth is being explained at 99.9806% by the regressors that are namely Trade Balance, Foreign Direct Investment and Consumption.

From the above results, the economically speaking:
When LTB increase by 1%, or in other words, when the trade deficit increases by 1%, then the LGDP will shrink (since it has a negative sign) by 0.004707% Ceteris paribus. This is from the strong relationship between the two variables from the GDP calculus using the expenditure approach. However, the sign obtains for the coefficient (negative) differs from the expected sign (positive). For the whole period of the study Rwanda has been registering trade deficit explaining the negative sign obtained.

The R^2=0.999806 >0.5 means that the goodness of fit is good. The variation in LGDP is explained at 99.9806% by LTB in the model including other significant explanatory variables.

In as far as the effect of FDI on Economic growth is concerned, through the estimation, we can conclude that if FDI increase by 1%, Economic Growth improves by 0.025278%, other things held constant. The coefficient's sign obtained (positive) is the same as the expected sign (positive). No divergence. Rwanda has recorded a steady growth over the past years averagely 8%, this resulted from joint policies and factors, among others, FDI has been proved significant. This is in relation with Hoang Thu Thi, et al. (2010) study that analysed the contribution of FDI on Growth in Vietnam, and concluded that FDI has a strong effect on growth in this country.

Consumption has a strong effect on growth in the estimation. The latter ascertains that if final consumption rises by 1%, this brings about 1.062454% increase in GDP ceteris paribus in Rwanda. Consumption is a component of GDP using the expenditure approach. This reveals a strong effect on growth as per the above findings. This confirms the study done by Hamida R. (2012), that assessed the relationship between energy consumption and industrial sector being a proxy for GDP of the industrial manufacturing and analysed the causality between the two variables and found a distinct direction from electricity consumption to economic growth. This affirms the strong effect of consumption on growth. Krishna Lala B., et al (2000) conducted a similar study and concluded about the absolute advantage of the importance of energy on economic growth. The coefficient's sign obtained is the same as the expected one. (both are positive).

On the separate notes, LOER and LINFL were statistically insignificant from the estimation. Rwanda has been implementing monetary policy that protects exchange and inflation from higher disturbance. Exchange rate is stable and well controlled in Rwanda. It has an impact on growth if it is consistently volatile. Janus T., and Daniel R.C. (2015), also confirmed that consistent volatility has a negative effect on growth, other things being equal.

For inflation, this is in contrast with (Khan M., & Abdelhak S. Ssnhadji.,2001) and Iqbal, N., & Nawaz, S. (2009) that strongly agree that inflation has significant negative effect on economic growth.

Based on the theory, these results can be concluded to be because when the Trade Balance persists or increases without other major of adjustments are being taken, the economic growth will shrink or the pace of growth will reduce.

4.4 Cointegration Tests

H_0: No cointegration
H_1: There is presence of cointegration

The notion of cointegration in time series analysis is a paramount concept to examine if the long run relationship between the variables under study exists. Additionally, this assists in affirming the statistically significance relationship exists in the long run for the variables of interest in the model being regressed. In as far as this study is concerned, Johansen Cointegration Tests are being performed. Both trace statistics and maximum Eigen values are above the critical values at 5% thereby, rejecting the hypothesis of cointegration between variables under consideration. this implies the presence of cointegration relationship between LOGGDP as endogenous variable and exogenous variables (LOGTB, LOGFDI, LOGCONS, LOGOER and LOGINFL).

Below are the results:

Table 5: Test of trace statistics

Date: 07/16/17   Time: 18:45
Sample (adjusted): 1997 2015
Included observations: 19 after adjustments
Trend assumption: Linear deterministic trend
Series: LGDP LTB LFDI LCONS LOER LINFL
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.981771	150.7611	95.75366	0.0000
At most 1 *	0.848547	74.67074	69.81889	0.0194
At most 2	0.570735	38.80864	47.85613	0.2680
At most 3	0.475589	22.74071	29.79707	0.2590
At most 4	0.376858	10.47660	15.49471	0.2458
At most 5	0.075424	1.489981	3.841466	0.2222

 Source: Author's Estimation in E-views 8 with data from World Bank Group data set
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
 **MacKinnon-Haug-Michelis (1999) p-values

Table 6: Test of Maximum Eigen values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.981771	76.09034	40.07757	0.0000
At most 1 *	0.848547	35.86210	33.87687	0.0286
At most 2	0.570735	16.06793	27.58434	0.6600
At most 3	0.475589	12.26411	21.13162	0.5218
At most 4	0.376858	8.986621	14.26460	0.2873
At most 5	0.075424	1.489981	3.841466	0.2222

Source: Author's Estimation in E-views 8 with data from World Bank Group data set

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level

From above tables with findings, both trace statistics and maximum Eigen value are above the critical values at 5%, resulting to the rejection of the null hypothesis stating the absence of cointegration between variables under consideration. Estimation affirms the presence of cointegration or alternatively, the long run relationship between the independent variable LOGGDP and its explanatory variables that are (LOGTB, LOGFDI, LOGCONS, LOGOER and LOGINFL).

4.5 Error Correction Model (ECM)

The ECM helps in assessing the short run relationship between variables. To run and validate the short run relationship between the Economic growth and trade balance, the Error correction model methods should be applied. The error correction term, is computed from the long-run equation; the coefficient of the error correction term RESID_LR (-1) plays a significant role since it measures the speed of adjustment of the variables evolving over the long run. In the normal case, it should be having a negative sign and for statistical significance, it should be different from zero.
Thus, in the case it is bears a positive sign, it means that effects of shocks or disturbances rise over the time. The error correction model is specified and should be applicable for first difference values of variables of the model.
Hence, the important results of the tests are the coefficients of the error correction variable.

4.5.1 Estimation of the Error Correction Model

Estimation Equation:

$DLGDP_t = \beta_0 + \beta_1 DLTBt + \beta_2 DLFDI_t + \beta_3 DLCONS_t + \beta_4 DLOER_t + \beta_5 DLINFL_t + RESIDLRt(-1)$

Where:
- $D(LGDP_t)$ stands for The difference of LGDP at period t,
- $D(LTB_t)$ stands for the difference of LTB at period t,
- $D(LCONS_t)$ is standing for the difference of LCONS at period t,
- $D(LOER_t)$ stands for the difference of LOER at period t,
- $D(LINFL_t)$ stands for the difference of LINFL at period t,
- $RESIDLR_t(-1)$: Error correction or Stochastic term

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$: refer to the Short run parameters to be estimated, β_0 is the coefficient.

Below are the results that were generated:

Table 7: Error Correction Model

Dependent Variable: DLGDP

Method: Least Squares

Date: 07/16/17   Time: 14:51

Sample (adjusted): 1996 2015

Included observations: 20 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLTB	-0.006725	0.001361	-4.942896	0.0003
DLFDI	0.012329	0.005332	2.312434	0.0378
DLCONS	0.920057	0.052678	17.46564	0.0000
DLOER	-0.151036	0.061856	-2.441731	0.0297
DLINFL	0.001397	0.000893	1.564765	0.1416
RESIDLR(-1)	-1.064710	0.237751	-4.478253	0.0006
C	0.029864	0.010151	2.942031	0.0114

R-squared	0.982959	Mean dependent var	0.142278
Adjusted R-squared	0.975094	S.D. dependent var	0.070237
S.E. of regression	0.011085	Akaike INFLo criterion	-5.897314
Sum squared resid	0.001597	Schwarz criterion	-5.548808
Log likelihood	65.97314	Hannan-Quinn criter.	-5.829282
F-statistic	124.9767	Durbin-Watson stat	1.685784
Prob(F-statistic)	0.000000		

Source: Author's Estimation in Eviews 8 with data from World Bank Group data set

Substituting the estimated parameters in the model,

DLGDP$_t$= 0.029864 - 0.006725DLTBt + 0.012329DLFDI$_t$ + 0.920057DLCONS$_t$ – 0.151036DLOER$_t$ + 0.001397DLINFL$_t$ – 1.064710RESIDLRt (-1)

$R^2 = 0.982959$

R^2 Adjusted= 0.975094

The statistical significance of the Error Correction term is that it measures the deviation of the dependent variable from its long run trend. The error collection term represents the mechanism of self-correcting of the system for deviation from its long run trend, However, DLINFL becomes insignificant even in the short-run. Additionally, some changes occurred since some of the signs that were found differ from the expected signs. Also, this means from the economic perspective, that inflation in the short run does not retard economic growth ceteris paribus. There is no short-run relationship between the inflation rate and economic growth in other words. However, DLTB, DLFDI, DLCONS, DLOER, DLINFL have short run effects on the GDP, proxy of economic growth.

Below are the results of the estimation after removing DLINFL

Table 8: Error Correction Model after removing DLINFL that is insignificant

Dependent Variable: DLGDP
Method: Least Squares
Date: 07/16/17   Time: 19:50
Sample (adjusted): 1996 2015
Included observations: 20 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLTB	-0.006472	0.001419	-4.560904	0.0004
DLFDI	0.016469	0.004862	3.387016	0.0044
DLCONS	0.970408	0.043813	22.14885	0.0000
DLOER	-0.120626	0.061687	-1.955457	0.0708
RESIDLR(-1)	-1.089606	0.249188	-4.372632	0.0006
C	0.020365	0.008546	2.382973	0.0319

R-squared	0.979749	Mean dependent var		0.142278
Adjusted R-squared	0.972517	S.D. dependent var		0.070237
S.E. of regression	0.011644	Akaike INFLo criterion		-5.824752
Sum squared resid	0.001898	Schwarz criterion		-5.526033
Log likelihood	64.24752	Hannan-Quinn criter.		-5.766439
F-statistic	135.4665	Durbin-Watson stat		1.720609
Prob(F-statistic)	0.000000			

Source: Author's Estimation in Eviews 8 with data from World Bank Group data set

However, additionally DLOER becomes statistically insignificant even in the short-run after removing DLINFL that became insignificant in the first instance, but, if we relax the assumption of 5% confidence interval and let 10% be applied, the variable is still significant to influence economic growth. However, let us remove it from the estimation.

Below are the results after removing DLOER

Table 9: Error Correction Model after removing DLOER that is insignificant

Dependent Variable: DLGDP
Method: Least Squares
Date: 07/16/17   Time: 19:54
Sample (adjusted): 1996 2015
Included observations: 20 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLTB	-0.004867	0.001262	-3.857239	0.0016
DLFDI	0.019046	0.005102	3.733059	0.0020
DLCONS	1.001977	0.044399	22.56775	0.0000
RESIDLR(-1)	-1.154331	0.269225	-4.287599	0.0006
C	0.008842	0.006747	1.310523	0.2097

R-squared	0.974218	Mean dependent var	0.142278
Adjusted R-squared	0.967343	S.D. dependent var	0.070237
S.E. of regression	0.012693	Akaike info criterion	-5.683274
Sum squared resid	0.002417	Schwarz criterion	-5.434341
Log likelihood	61.83274	Hannan-Quinn criter.	-5.634680
F-statistic	141.7013	Durbin-Watson stat	1.726683
Prob(F-statistic)	0.000000		

Source: Author's Estimation in Eviews 8 with data from World Bank Group data set

$$DLGDP_t = 0.008842 - 0.004867DLTB_t + 0.019046DLFDI_t + 1.001977DLCONS_t - 1.154331RESIDLR_t (-1)$$

R^2 Adjusted= 0.967343

R^2= 0.974218

Interpretation

The above table confirm that the coefficient of the ECM is significant and has met the expectation of the sign (it is negative) sign (see Table 7). Where, RESID_LR$_t$ (-1) is standing for the stochastic term.

The stochastic term coefficient RESID_LR$_t$ (-1) is negative **-1.154331**.

The error correction term, RESID_LR (-1) is negative -1.154331 and this implies that 1.154331 % of short -run disequilibrium or errors will be definitely eliminated or cleared in the following year. The strong significance of the ECM is an indication of the existence of a long run equilibrium relationship between economic growth and its explanatory variables.

Thanks to the above results, the study concludes that there is a short run relationship in our model, DLGDP being the dependent variable while DLTD, DLFDI and DLCONS are the regressors or explanatory variables, because their respective probabilities (P-values) of the regressors are less than 5% critical value.

Empirically, the above results reveals that the inflation and exchange rate do not affect the GDP (Economic Growth), this may be explained by the fact that our inflation is not fluctuating so much, again, the exchange is maintained at a favourable condition compared to the Region. However, TB (0.0016) is statistically significant at 5% level of significance with negative sign coefficient, different from the expected signs (positive). This is purely supported by the theory of computing GDP using the expenditure approach where TB is one of the components of calculation, it explained the magnitude effect of TB on GDP since they enter both the same calculus. Rwanda over the years has been registering a deficit on its trade balance, meaning Rwanda imports more than it exports. From the results, if the deficit increase by 1% in the short run, it causes a drop in economic growth by 0.004867%, other parameters remaining constant. On the other note, FDI was also significant (P-value is 0.0020), for most of developing countries, FDI have been recognized of great importance since FDI assist in technology and capital from the developed countries to the less developed countries. From the short run estimation, if there a 1% increase in FDI, the GDP increase by 0.019046% ceteris paribus in the short-run.

On the separate note, final consumption, a proxy for consumption was deemed very significant. Recall that consumption is part of major components of calculating GDP using the expenditure approach. Consumption comes from the disposable income, (Income minus Taxes), a sign of wealth and well-being of the population, showing that the country's economy is growing, its probability values was 0.0000 less than the level of significance in the short run. The results have shown a close one on one relationship, where they empirically assert that if CONS increase by 1%, this leads to 1.001977% increase in GDP ceteris paribus. The signs of the coefficients found are similar to the initial set expected signs for both FDI and CONS.

R^2= 0.97421 R^2 and Adjusted= 0.967343 they both indicate the goodness of the fit of the estimated model since they are both above 0.50 threshold.

4.5.2 Diagnostic tests

The diagnostic tests are useful whether the regression is meaningful. The estimators of the model should be BLUE (Best Linear Unbiased Estimator), hence, a set of classical assumption should be verified. Subsequently, the supplementary tests are very crucial to verify these classical assumptions. Thus, the diagnostic tests to be performed for the purpose of our study are as below:

 i. Residual tests
ii. Stability tests

4.5.2.1 Residual diagnostic tests

The tests are supposed to be investigated on residuals. The residuals tests performed on our regression in as far as residual test are concerned are as follow:

- Residual Histogram Normality Test
- Serial correlation LM test
- Heteroskedasticity Test
- Correlogram test for autocorrelation
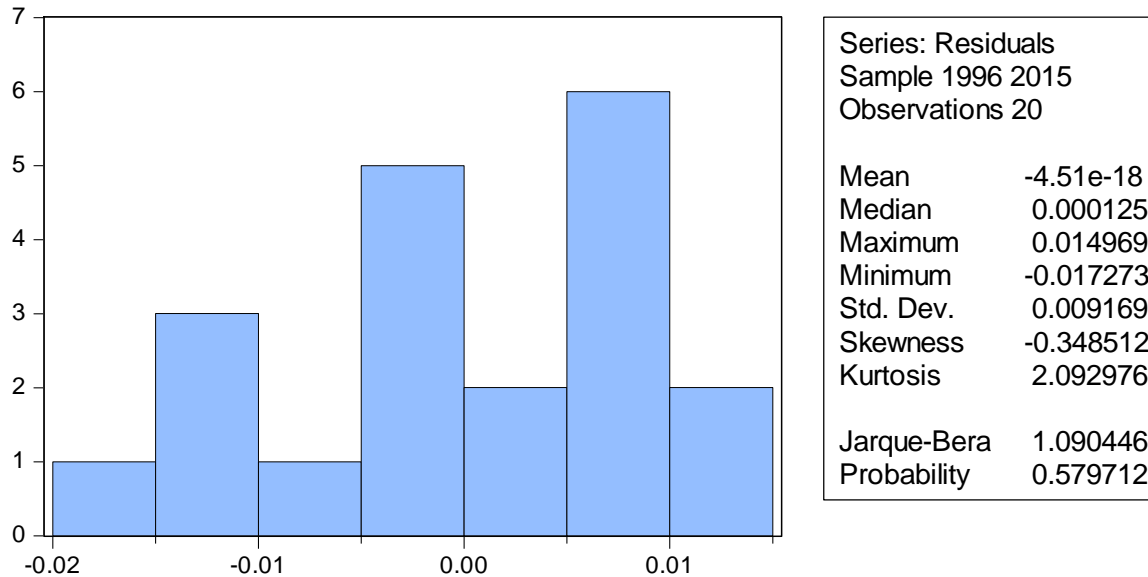
❖ **Histogram_ Normality Test**

The normality test is performed on residuals in order to ascertain that residuals are normally distributed. In this respect, hypotheses to be verified are:

✓ Null hypothesis: H_0: The residuals are normally distributed
✓ Alternative hypothesis: H_1: The residuals are not normally distributed

The estimation using the E-views 8, provided with below results:

Figure 1: Histogram

Series: Residuals	
Sample 1996 2015	
Observations 20	
Mean	-4.51e-18
Median	0.000125
Maximum	0.014969
Minimum	-0.017273
Std. Dev.	0.009169
Skewness	-0.348512
Kurtosis	2.092976
Jarque-Bera	1.090446
Probability	0.579712

Source: Author's Estimation in Eviews 8 with data from World Bank Group data set

From this table the probability of JARQUE-BERA is equal to 0.579712, greater than 5%. Thus, the JARQUE-BERA probability is greater than critical probability 5%, the H_0 is accepted. We are confident to conclude that residuals are normally distributed. The normality of residuals test reveals that the residuals are stationary.

❖ **Serial correlation**

This test helps the researcher to ensure that there is no presence of serial correlation. The no serial correlation is one of the ten classical assumptions that are supposed to be verified to conclude that the estimation is BLUE. The following hypotheses are to be tested in this regards:

H_0: Absence of serial correlation
H_1: Presence of serial correlation

Still probabilities are applicable. The H_0 is accepted when the probability is greater than 5%, contrary, it is rejected and the model contains a serial correlation that is dangerous for econometric modelling.

Table 10: BREUSCH-GODFREY serial correlation LM test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.620748	Prob. F(2,11)	0.5554
Obs*R-squared	2.028340	Prob. Chi-Square(2)	0.3627

Source: Author's Estimation in Eviews 8 with data from World Bank Group data set

The Breush-Godfrey Serial Correlation LM Test was utilized considering 2 lags. Since the probability that is 0.5554 greater than the critical value, the null hypothesis is accepted that was anticipated for the absence of serial correlation in the model.

❖ **Heteroscedasticity test**

The heteroscedasticity test is executed to comprehend whether the variance of residuals is constant and if the classical assumption of homoscedasticity is esteemed. The following are the hypothesis of the test:

H_0: No heteroskedasticity (presence of homoscedasticity)

H_1: Presence of heteroskedasticity (absence of homoscedasticity).

Table 11: Heteroskedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.618934	Prob. F(6,13)	0.7123
Obs*R-squared	4.443810	Prob. Chi-Square(6)	0.6168
Scaled explained SS	1.026036	Prob. Chi-Square(6)	0.9846

Source: Author's Estimation in Eviews 8 with data from World Bank Group data set

The test uses the Breusch-Pagan-Godfrey method. The probabilities and critical values are still employed for decision taking between the hypotheses. The null is accepted is accepted if the probabilities of the method are greater than the critical values. 0.7123 is great than 0.05 critical, the null hypothesis that ascertains presence of homoscedasticity or non-heteroskedastic residuals is accepted against the null that is rejected.

❖ **Correlogram squared residuals**

H_0: Absence of autocorrelation of errors

H_1: Presence of the autocorrelation of errors.

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The E-views 8.1 provided the following results:

Table 12: Correlogram-Q-residuals

Date: 08/06/17   Time: 13:51
Sample: 1995 2015
Included observations: 20

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. | . |	. | . |	1	0.060	0.060	0.0845	0.771
. *| . |	. *| . |	2	-0.167	-0.171	0.7648	0.682
. *| . |	. *| . |	3	-0.195	-0.178	1.7457	0.627
. | . |	. | . |	4	0.063	0.059	1.8552	0.762
. | . |	. | . |	5	0.005	-0.065	1.8559	0.869
. *| . |	. *| . |	6	-0.149	-0.174	2.5558	0.862
***| . |	***| . |	7	-0.348	-0.354	6.6528	0.466
. |* . |	. |* . |	8	0.114	0.076	7.1307	0.523
. |* . |	. *| . |	9	0.119	-0.068	7.6935	0.565
. | . |	. *| . |	10	-0.001	-0.137	7.6936	0.659
. *| . |	. *| . |	11	-0.156	-0.148	8.8810	0.633
. | . |	. | . |	12	0.022	-0.053	8.9078	0.711

Source: Author's Estimation in Eviews 8 with data from World Bank Group data set

The results generated affirm that there is no autocorrelation in the model because up to 12th lag the probability is greater than 5% critical value (the initial set critical value).

4.5.2.1 Stability and specification tests

❖ Stability Diagnostic tests

The stability tests are done by the Recursive Estimates_Cusum Test and Ramsey_Rest tests.
  ✓ The Recursive Estimates_Cusum is based on the on the cumulative sum of recursive residuals. The cumulative sum is plotted with the 5% critical lines. The parameter instability is found when the cumulative sum goes outside the area between the two critical.

Figure 2: COSUM test for stability of parameters
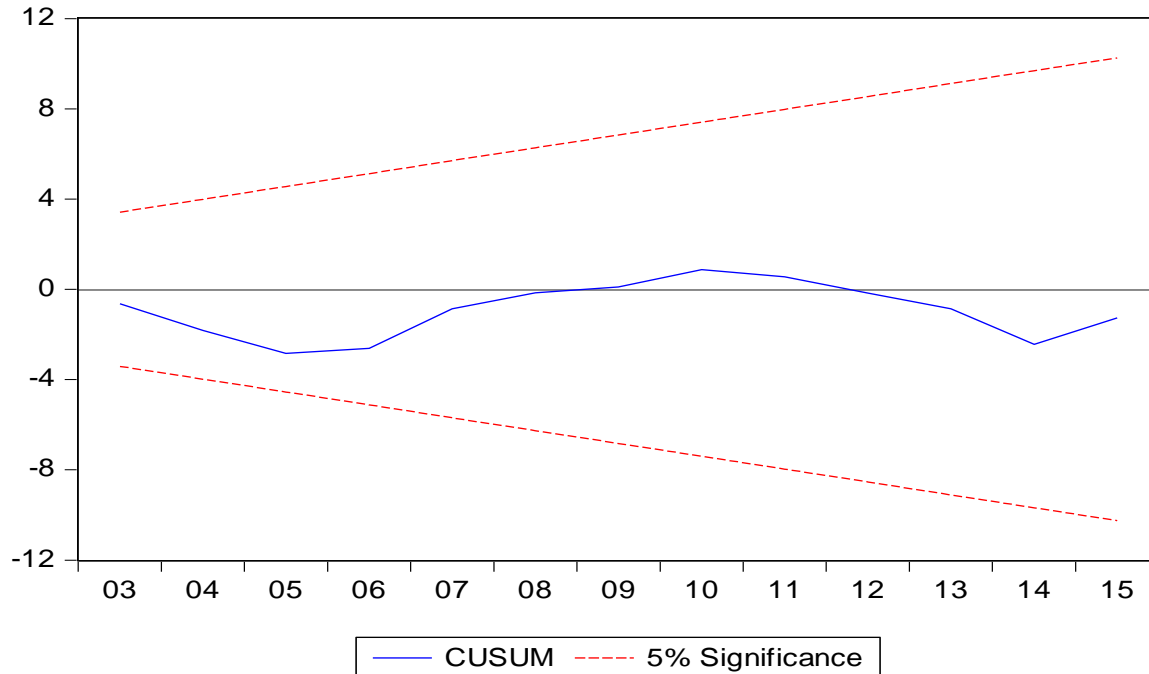
Source: Author's Construction in Eviews 8 with data from World Bank Group data set

The parameters are stable because the cumulative sum does not go outside the area of two critical lines at 5% significance. This test is very important in econometrics because when the parameters are stable, the predictions or forecasting are possible with the model used.

❖ **Ramsey Reset Test**

Table 13: Ramsey Reset Table

Ramsey RESET Test
Equation: ECM
Specification: DLGDP DLTB DLFDI DLCONS DLOER DLINFL RESIDLR(-1)   C

Omitted Variables: Squares of fitted values

	Value	Df	Probability
t-statistic	0.330924	12	0.7464
F-statistic	0.109511	(1, 12)	0.7464
Likelihood ratio	0.181690	1	0.6699

Source: Author's Estimation in Eviews 8 with data from World Bank Group data set

Using 1 (one) as number of fitted terms, the parameters estimated are stable since the rule of comparison between the probabilities and critical values is still applicable. Therefore, since the probabilities are greater than 5% critical, we conclude that the parameters are stable and can be used for forecasting or prediction.

4.6 VAR and Causality

In this subcategory, an attempt is made to test the presence and direction of causality between Economic Growth (GDP), Trade Balance (TB), Foreign Direct Investment (FDI), Consumption (CONS), Official Exchange Rate (OER) and INFL(Inflation) by applying the standard econometric approach of Vector Autoregressive Model.

As explained earlier, the method includes lagged values of both these variables in each equation to test whether all the lags of a variable jointly have zero effect on the other variable. This requires the selection of the appropriate lag length. Standard criteria are available for this purpose.

Table 14: Causality Tables

Pairwise Granger Causality Tests
Date: 07/18/17   Time: 16:29
Sample: 1995 2015
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LTB does not Granger Cause LGDP	19	1.53434	0.2497
LGDP does not Granger Cause LTB		1.12506	0.3523
FDI does not Granger Cause LGDP	19	0.40014	0.6777
LGDP does not Granger Cause LFDI		2.59774	0.0948
LCONS does not Granger Cause LGDP	19	0.14649	0.8650
LGDP does not Granger Cause LCONS		1.51596	0.2535
LOER does not Granger Cause LGDP	19	2.03344	0.1678
LGDP does not Granger Cause LOER		6.30885	0.0111
LINFL does not Granger Cause LGDP	19	0.29732	0.7474
LGDP does not Granger Cause LINFL		1.49128	0.2587
LFDI does not Granger Cause LTB	19	2.58231	0.1110
LTB does not Granger Cause LFDI		0.62808	0.5480
LCONS does not Granger Cause LTB	19	1.23534	0.3206

LTB does not Granger Cause LCONS		3.56522	0.0560
LOER does not Granger Cause LTB	19	1.22791	0.3226
LTB does not Granger Cause LOER		9.39046	0.0026
LINFL does not Granger Cause LTB	19	0.45432	0.6439
LTB does not Granger Cause LINFL		3.21086	0.0712
LCONS does not Granger Cause LFDI	19	2.71872	0.1006
LFDI does not Granger Cause LCONS		0.34971	0.7109
LOER does not Granger Cause LFDI	19	1.69130	0.2198
LFDI does not Granger Cause LOER		0.28869	0.7536
LINFL does not Granger Cause LFDI	19	0.69897	0.5136
LFDI does not Granger Cause LINFL		0.49575	0.6194
LOER does not Granger Cause LCONS	19	1.45415	0.2668
LCONS does not Granger Cause LOER		3.59319	0.0550
LINFL does not Granger Cause LCONS	19	0.09717	0.9080
LCONS does not Granger Cause LINFL		0.57084	0.5777
LINFL does not Granger Cause LOER	19	5.16688	0.0209
LOER does not Granger Cause LINFL		0.00562	0.9944

Source: Author's Estimation in Eviews 8 with data from World Bank Group data set

Recall that the hypotheses are:

H_0: TB Does not cause economic growth of Rwanda

H_1: TB Does cause economic growth of Rwanda, however it has been for all the variables.

From Table 12, all the null hypothesis to be either accepted or rejected. The role of probabilities and level of significance still applies for decision taking. Thus, if the probability is great than the level of significance, the null hypothesis is accepted against the alternative hypothesis. If the probability is less than the significance level, the null is rejected against the acceptance of the alternative that affirms the existence of causality between the two variables.

Let us start with the variables of interests. Both Economic Growth and Trade Balance causality interpretation. The findings reveal the absence of any causality direction between the two variables. The probabilities which are 0.2497 and 0.3523 greater than 0.05 level of significance, from the initial set null hypothesis LTB does not Granger Cause LGDP and LGPD does not Granger Cause LTB respectively. As per decision rule, since the probability found are above the significance level, these both null hypotheses are accepted. This is from the argument that, though

Rwanda is experiencing a trade deficit, the country has recorded a steady and impressive economic growth of averagely 8% for the past five years. This means, even if the trade balance is one of the components to cater for while computing Gross Domestic Products (GDP) using the expenditure approach, it is not having that power of causing growth itself for the Rwandan experience. Also, the achieved growth does not cause trade deficit itself, however, joint policies have the power to reduce trade deficit in Rwanda. Also, statistical relationship does not imply causation.

On the other note, there is a distinct directional causality from LGDP to LFDI. The probability is 0.0948 if we consider 10% (0.1) level of significance. This is from the argument that different impressive rankings of the Rwandan Economy through its growth is able to attract some foreign investors.

Additionally, among the variables of the estimation, there is detection of causality. There is a distinct directional causality from LGDP to LOER since the probability is 0.0111 which is less than 5% level of significance, also from LTB to LOER (probability being 0.0026), from LINFL to LOER since the probability is 0.00209.

Again, if we are relaxing the 5% level of significance and consider 10% more directional causality are detectable. For instance, from LTB to LINFL, probability being 0.0712, from LTB to LCONS since the probability is 0.0560 and lastly from LCONS to LOER, probability being 0.0550.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

The chapter represent the summary of the key findings of the study, conclusion and the recommendations in as far the effects of Trade Balance (TB) and Economic Growth (GDP) are concerned in Rwanda for the period spanning from 1995 to 2015. Foreign Direct Investment (FDI), Consumption (CONS), Official Exchange Rate (OER) and INFL (Inflation) were also the explanatory variables.

For the purpose of this study, different econometric tests have been performed. The tests include:
- Unit root test (stationarity of variables),
- Estimation of the Long Run Equations,
- Co-integration Tests (Long run relationship of variables),
- ECM Estimation, where different errors terms tests have been performed, they included: the residual diagnostic tests, stability and specification tests.
- Engle Granger tests for were performed to test any presence of causal relationship among the variables within the model.

Below is the summary

In as far as unit root test is concerned: all series which include GDP, TB, FDI, CONS, OER and INFL were stationary after the first difference. Which means, they are all I (1).

On the other note, for the long run equation estimation, all variables estimated together, the dependent variable being LGDP while the explanatory included LTB, LFDI, LCONS, LOER and LINFL, the results have shown that LOER and LINFL were respectively insignificant reason being that their probabilities 0.6740 and 0.8423 respective were above 0.05 level of significance.

However, the signs of the coefficients that were found are similar to the initially set expected signs expect for TB where the sign obtained was negative while the we anticipated to get a positive sign. Later on, both LOER and LINFL were removed in the estimation, the remaining variables were absolutely significant. Findings were that if the deficit increases by 1%, it retards or reduces the economic growth by 0.004707, other things being equal.

Findings could be confirming the study by Matthias B. and Jens K. (2012), for the relationship between trade balance and economic growth. However, it is the inverse since Rwanda registers a deficit on its balance of trade.

Additionally, if there is 1% increase for FDI and CONS respectively, the Economic Growth (GDP) increases by 0.025278 and 1.062435 other things held constant.
R^2 and the Adjusted R^2 were 0.999806 and 0.999745. They both inform the researcher about the goodness of fit of the model, or to what extent the dependent variable is explained by the dependent variables. This means LGDP is explained by LTB, LFDI and LCONS at 99.9745 in the model.

The cointegration was performed in order to ascertain the long run relationship between the variables of the model. For the purpose of the research, the Johansen cointegration was performed. Both trace statistics and maximum Eigen value were above the critical values at 5%, resulting to the rejection of the null hypothesis stating the absence of cointegration between variables under consideration. Hence, there was cointegration between the variables of the model.

The ECM model analysis was also tackled. Important tests were performed and have met the required standards for the model fitness. Recall that, ECM refers to the short run relationship between and ascertains the long run relationship. Still DLOER and DLINFL were statistically insignificant to influence DLGDP in the short run. They were consequently removed from the estimation. The remaining variables in the estimations have coefficients' signs that were similar to the expected signs. The diagnostic tests showed that the model is good and respects the classical assumption of homoscedasticity, no autocorrelation, no serial correlation, and normality of residuals, stability of parameter and correct specification of the model.

Lastly, VAR and Causality relationships were also performed. For the variables of interests (LGDP and LTB), results have shown absence of any causality relationship between the two variables. However, the same tests were performed for all variables of the model and some causal relationships were observed.

Basing on the result from this study, the following policy measures are recommended:

❖ On Trade deficit, we suggest that Rwanda should strengthen the Made in Rwanda Policy. This policy is deemed very useful in the sense that it promotes the home and locally produced goods in order to reduce the gap between imports and exports. Empowering local industries to produce, satisfy the demand and surplus to be sent abroad as exports to gain from exchanges. Rwanda needs also to diversify the products for exports and not hugely dependent on traditional export products (tea and coffee). Additionally, Rwanda should promote and enhance the domestic production capacity in all ways in order to get goods and services to present on the markets.

❖ On Foreign Direct Investment, we suggest that Rwanda can use regional integration as potential opportunity to attract FDI because regional integration can increase trade openness, enlarge the size of domestic markets. Again, Rwanda should increase the quantity as well as the quality of physical infrastructure. Likewise, the skilled labor force should be opted to, because the higher level of human capital is a good indicator of the availability of skilled which can attract FDI.

❖ On Consumption, Rwanda should strengthen programs and policies that increase disposable income ready for consumption for the population. Assistance to vulnerable should be supported to avoid famine, malnutrition and starvation. Rwanda should foster equitable national wealth distribution.

❖ On both Official Exchange and Inflation rates, we suggest that Rwanda should adopt macroeconomic policies such as monetary and fiscal policies to be enhanced in order to assure low and stable the rates in Rwanda. This will contribute to maintain stable and prospective macroeconomic environment.

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APPENDICES

Appendix 1: **Data Used**

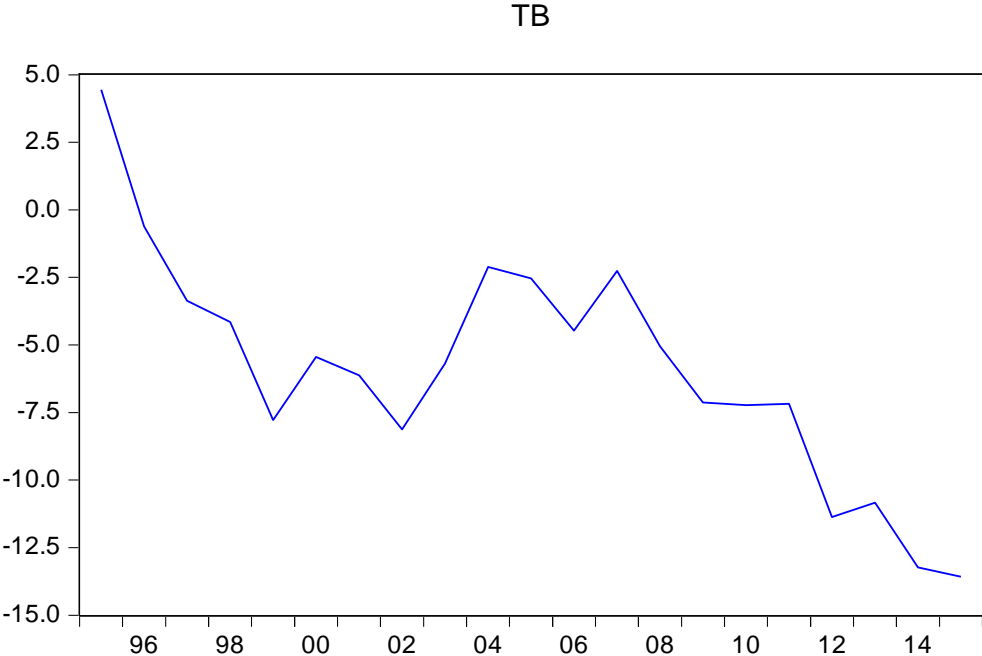| YEARS	GDP (current LCU)	Current account balance (% of GDP)	FDI (Net inflows as GDP %)	Final consumption expenditure (current LCU)	OER	INFL
1995	339,141,984,300	4.444156964	0.171019841	363,768,643,600	262.1823	9.154723
1996	424,127,987,700	-0.615932972	0.160470604	448,714,276,900	306.82	7.411372
1997	558,300,004,400	-3.363535992	0.140344496	580,983,717,900	301.5298	12.01542
1998	621,300,023,300	-4.15692775	0.356358452	638,799,999,000	312.3141	6.210067
1999	606,991,273,800	-7.778559405	0.094941906	638,279,303,500	333.9419	-2.40593
2000	676,098,848,900	-5.439321902	0.479500662	711,138,060,000	389.6962	3.89953
2001	741,871,931,700	-6.119463419	0.27671696	757,171,931,700	442.9919	3.342855
2002	797,400,000,000	-8.121104006	0.155593576	822,900,000,000	475.3652	1.992585
2003	992,500,000,000	-5.694670248	0.254607406	1,004,800,000,000	537.655	7.4497
2004	1,206,400,000,000	-2.109989986	0.3685641	1,189,600,000,000	577.449	12.25071
2005	1,440,000,000,000	-2.538754708	0.406745646	1,412,000,000,000	557.8226	9.014089
2006	1,716,000,000,000	-4.465079955	0.98523263	1,653,000,000,000	551.7103	8.882827
2007	2,065,000,000,000	-2.258854292	2.179428038	1,851,000,000,000	546.955	9.080722
2008	2,623,000,000,000	-5.05157365	2.15458079	2,385,000,000,000	546.8487	15.44493
2009	3,017,000,000,000	-7.132008941	2.235264895	2,754,000,000,000	568.2813	10.39419
2010	3,323,000,000,000	-7.228887201	0.742855771	3,079,000,000,000	583.1309	2.309146
2011	3,846,000,000,000	-7.177971212	1.657788699	3,524,000,000,000	600.3065	5.670683
2012	4,435,000,000,000	-11.36932096	2.213607958	4,077,000,000,000	614.2951	6.270903
2013	4,864,000,000,000	-10.83279948	3.425182237	4,305,000,000,000	646.636	4.23478
2014	5,395,000,000,000	-13.22795997	3.687059353	4,817,000,000,000	681.8617	1.7841
2015	5,837,000,000,000	-13.57093714	3.992168548	4,923,700,000,000	720.9751	2.518088

Source: World Bank Group data set

Appendix 2**: Trend for GDP for the period 1995-2015**

GDP
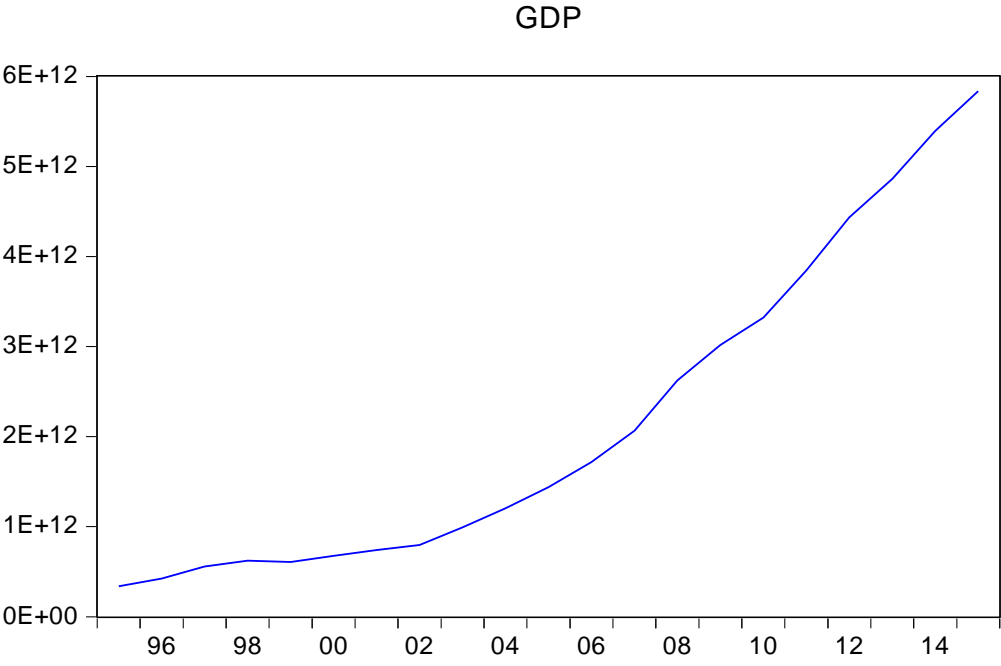
Source: Author's construction in Eviews 8 with data from World Bank Group data set

Appendix 3**: Trend for TB for the period 1995-2015**

TB

Source: Author's construction in Eviews 8 with data from World Bank Group data set