Do Burundi's Exports and Imports Really Help the Country's Economic Growth?

—Burundi Case Study from 1978 to 2020

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Abstract

Background: Burundi's imports are increasing every day and exports are not showing real growth to cover the trade deficit, which can affect the country's trade balance and can cause slow down the country's economic growth. Both exports and imports have an influence on the economy as a result of foreign commerce. Exports are regarded as a contribution to national income and the economy, whereas imports are regarded as an outflow from the economy. According to the research, exports have both direct and indirect beneficial benefits on the economy, whereas imports have a negative direct impact on national revenue. **Purpose:** The goal of this research is to look at the influence of exports and imports on Burundi's economic growth. **Case description:** Using trade and economic growth theories as a guide, the quantitative research technique was utilized to analyze yearly time-series data of trade and economic growth reported as Gross Domestic Product (GDP), collected from World Bank websites, from 1978 to 2020. Burundi's exports, imports, and economic growth were studied using econometric analysis and Ordinary Least Square linear regression. **Conclusion:** According to the study's findings, there is a positive significant long-run causality between Burundi's GDP, exports, gross capital formation, and exchange rate factors, while imports in the long-run doesn't affect GDP. A one-percentage-point increase in export values causes GDP to rise by 0.24 percent, whereas a one-percentage-point increase in imports causes GDP to rise by 0.31 percent.

Keywords

Burundi, Exports and Imports

1. Introduction

1.1. Background of the Study

The gross domestic product (GDP) is a broad measure of a country's total economic activity. Imports and exports are significant components of the GDP calculation technique based on expenditures.

Countries that have opened up to international trade have a tendency to grow faster, innovate, improve productivity, and provide higher incomes and more opportunities to their citizens. The opening of a business also benefits low-income households by providing consumers with more affordable goods and services.

As early as the classical period of the 18th century, David Ricardo and Adam Smith felt that commerce might have a beneficial influence on economic growth and performed study on the link between international trade and economic growth (Al Hemzawi & Umutoni, 2021).

Consumers are accustomed to seeing items from all over the world at their local grocery stores and retail establishments in today's global economy. These imported goods from other countries provide customers greater options. Imports also assist customers manage their pressured household finances because they are often made at a lower cost than any domestically produced counterpart.

International trade tends to lower consumption goods prices, resulting in welfare advantages for consumers in importing nations. Households that participate in the manufacturing of exported commodities may benefit from additional welfare benefits in addition to savings on consumer items.

The reason for this is because international commerce creates resources that fund industrialization allows more goods to be produced, more employment to be created, and hence greater economic expansion (Hachicha, 2003).

Burundi is open to international trade. According to the World Bank, international trade accounted for 42% of Burundi's GDP in 2019. This proportion has risen in recent years, reaching 32 percent of the country's GDP in 2016. Gold and coffee are the most important export items (37 percent and 20.9 percent, respectively), followed by tea (12.2%), while refined petroleum (18.1 percent), cement (5 percent), motor cars (6.3 percent), and medicines are the most important imports (5 percent).

Burundi's top suppliers in 2019 were China (15.4%), Saudi Arabia (15.2%), India (7.9%), the United Arab Emirates (6.9%), and Tanzania (5.5 percent). Burundi's exports were mostly aimed to the United Arab Emirates (39%), the Democratic Republic of the Congo (11%), Pakistan (6.1%), and Switzerland (5.7 percent). Burundi is a member of the WTO, COMESA (Common Market for Eastern and Southern Africa), ECCAS (economic community of Central African states), and the East African Community (Uganda, Kenya, Rwanda and Tanzania).

Carbaugh (2000) discovered a positive relationship between imports and eco-

nomic growth, with causation flowing in both ways. Increased imports do result from quicker economic growth, but nations that are open to commerce, imports, and exports tend to expand faster than ones that are closed or less accessible.

International Trade and Economic Growth of Burundi

A landlocked country in East Africa, Burundi is a low-income economy where 80% of the population are employed in the agricultural sector.

Burundi's economy is heavily dependent on agriculture, which accounted for 32.9% of GDP in 2008. Agriculture supports over 70% of the working population, the majority of whom are subsistence farmers.

The top exports of Burundi are Gold ($137M), Coffee ($58M), Tea ($22M), Niobium, Tantalum, Vanadium and Zirconium Ore ($10.8M), and Wheat Flours ($10.3M), exporting mostly to United Arab Emirates ($141M), Democratic Republic of the Congo ($19.9M), Germany ($12.1M), China ($12M), and Pakistan ($11.9M).

Burundi's main imports are refined petroleum ($149 million), packaged drugs ($44.5 million), cement ($36 million), raw sugar ($30.1 million) and cars ($25.8 million), imported mainly from China ($127 million), Saudi Arabia. Arabia ($122 million), India ($75.5 million), Kenya ($62 million) and United Arab Emirates ($59.6 million).

For a nation with a tiny economy, such as Burundi, which is not among the top countries in terms of technical advancement, trade becomes the most important component in stimulating the country's economic growth. Burundi, while being a low-income country, is attempting to transition to a middle-income economy.

Burundi's government is actively attempting to strengthen the economy and restructure the financial and commercial sectors.

1.2. Problem Statement

International trade enables countries to develop their markets and obtain access to competitively priced goods and services that consumers do not have easy access to in their home country. For a long time, many researchers have been curious in the relationship between international commerce and economic growth, wondering if international trade may boost a country's income growth rate. Many authors believe that nations that engage in overseas commerce are more likely to enjoy some level of growth than those that refrain from engaging in global trade.

Several studies have been done to determine the growth of the GDP. Intermediate goods, like as machinery and transportation equipment, are critical inputs into the manufacture of other commodities.

Imports of these items from developed nations bring new technology to emerging countries, improving factor productivity and resulting in output growth.

Health is also a key indicator of a country's progress, as a country with a healthy population is better able to experience sustained growth. Because, if people are healthy, they can achieve their full potential and workers are more productive.

Otinga (2009) investigated the importance of exports in Kenyan economic growth from 1975 to 2007 in comparison to other components of GDP. He came to the conclusion that exports had a larger positive influence on GDP than other components. Imports, private and public investments were shown to be adversely connected with GDP, but exports, foreign aid, and government expenditure were found to be favorably correlated with GDP, with exports having a bigger influence.

Kipkosgei (2011) concluded in a study aimed at providing an analysis of the empirical link between the trade balance and a set of key macroeconomic variables that the real exchange rate, government consumption expenditure, domestic income, and mass money are important determinants of Kenya's balance of trade from 1970 to 2010, as opposed to foreign income, which was statistically insignificant.

Sentsho (2002) examined the link between exports and economic development in Botswana's mining industry from 1976 to 1997. The study's goal was to determine if money from primary export sectors (such as mining) might contribute to positive and considerable economic growth in Botswana. He investigated the role of exports on Botswana's economic growth. The author discovered data to support the statistical analysis, indicating that capital, labor, primary exports, manufactured (non-traditional) exports, imports, the public sector, prior period Real GDP growth, and global GDP are major elements influencing Botswana's economic growth.

Because exports and imports play such a crucial role in economic growth, it is vital to understand the nature of the connection and the variables that influence it. The study examines the empirical relationship between imports and exports and economic growth. Because international commerce (exports and imports) is believed to contribute to economic growth, Burundi, like many other developing nations, has pursued trade-oriented economic growth strategies in order to accomplish both economic development and poverty reduction. This is the motivation for doing this research, which aimed to address a gap in empirical information by evaluating the hypothesis of increased exports and imports exclusively for Burundi.

1.3. Research Objective

The primary goal of this study is to examine the influence of exports and imports on Burundi's economic growth from 1978 to 2020.

Specific objectives were measured in order to reach the overall goal:
- Identify the link between exports, imports, and economic growth;
- Estimate the impact of a percentage change in exports and imports on eco-

nomic growth; and

- Evaluate the long-run effect between GDP and Exports as well Imports.

1.4. Significance of the Study

The study's findings are significant in the following aspects.

1) The findings are intended to contribute to the current literature on imports, exports, and their impact on the economy as a whole by scholars and researchers.

2) The study's findings will advise the government in altering foreign trade policies in order to boost the growth and development of the Burundi economy. Furthermore, the findings will help the government develop a domestic investment strategy that would create a supportive enabling environment that supports capital creation in the economy.

3) This study will also serve as a resource for scholars conducting more research on similar trade concerns.

2. Literature Review

2.1. Introduction

The goal of this chapter is to clarify key theories that will allow us to explore the link between commerce (exports and imports) and economic growth in depth within the context of this research. International trade and economic growth are two of these theories.

International commerce and economic growth are inextricably linked. Such a relationship has been demonstrated in the literature on international commerce and economic growth. Discussions over the importance of international commerce in encouraging economic growth have been going on for some years. To comprehend and examine the impact of foreign commerce on Burundi's economic growth, various theories must be grasped.

2.2. Review of Theories

2.2.1. International Trade Theories

The exchange of products and services between two nations is known as international trade.

International commerce allows countries to profit economically by selling their domestically produced items to foreign countries. As a result, dealing with other nations or being a part of any trade agreement brings a positive impact on economic growth.

Classical, neoclassical, and contemporary trade ideas are the three phases of international trade theory. According to classical theory, countries can profit economically if they all embrace free trade. The two well-known classic ideas are Adam Smith's absolute advantage theory and David Ricardo's comparative advantage theory. According to Neoclassical views, countries can benefit from free trade by manufacturing items in which they specialize while making optimal use

of resources. The Heckscher-Ohlin Trade Theory is the most well-known Neo-classical theory.

Modern theories back up the comparative advantage idea by recognizing economies of scale as a key source of economic growth. There was a mercantil-ism hypothesis created in the sixteenth century before Adam Smith. According to this hypothesis, boosting exports and discouraging imports determine a country's prosperity. This idea did not support free trade, and the world's wealth was fixed since countries could not gain from trade at the same time (Berkum & Beijl, 1998).

1) Absolute Advantage Trade Theory

Adam Smith developed the concept of absolute advantage in The Wealth of Nations to demonstrate how countries can gain by specializing in the production and export of goods that they produce more efficiently than other countries, as well as importing goods that other countries produce more efficiently. Specia-lizing in and trading in items where they have an absolute advantage can benefit both nations, as long as each has at least one product where they have an abso-lute edge over the other.

The capacity of one entity to produce a product or service at a lower absolute cost per unit utilizing fewer inputs or a more efficient process than another ent-ity providing the same good or service is referred to as absolute advantage.

2) Comparative Advantage Trade Theory

The theory of comparative advantages corrects that of the absolute advantages of Adam Smith. This said that a country benefits from free trade if it specializes in the production of goods for which it has an absolute advantage. According to the theory of comparative advantages, it matters little whether a country has ab-solute advantages or not: it gains by specializing in the production of goods for which its comparative advantage is the highest, i.e. whose relative costs are the lowest, and to exchange the goods which it does not produce. So this is an argu-ment for free trade: all countries can gain from free trade if they specialize.

3) Heckscher-Ohlin Trade Theory

The model considered to be the culmination of the theory of comparative ad-vantages is the one developed by the Swedish economists Eli Heckscher (1919) and Bertil Ohlin (1933) then by Paul Samuelson (1948), called the Heck-scher-Ohlin model. Basically, the model justifies trade openness to the outside, therefore free trade, in the same way as Ricardo: trade with the outside increases economic efficiency by allowing each country to specialize in productions for which it has a comparative advantage and the structure of international trade is explained by differences in opportunity costs depending on the country. The difference with Ricardo's model lies in the source of comparative advantages. It no longer resides in differences in production techniques but in differences in factor endowments (labor, capital, etc.): a country has a comparative advan-tage in production which is intensive in the relatively abundant factor (Heck-scher-Ohlin (H-O) theorem). The principle of supply and demand leads to a

(single) equilibrium (relative) price for all goods at the international level. It is important to clearly understand that, as with Ricardo, it is the market mechanisms (competition), and they alone, that are at work in this (neo-classical) model: they determine the specialization of countries and the equilibrium price.

2.2.2. Major Theories of Economic Growth

Economic growth is defined as the rise in the inflation-adjusted market value of an economy's products and services over time. Traditionally, it has been expressed as a percentage of actual GDP growth. More broadly, economic development refers to the expansion of an economic system's potential productivity to generate the commodities and services required for its members' survival within a given time frame.

1) Harrod-Domar Economic Growth Model

The Harrod-Domar model is a Keynesian model of economic growth. It is used in development economics to explain the growth rate of an economy in terms of savings and capital. This implies that there is no inherent cause for an economy to grow in a balanced way.

According to Harrod Domar's model, the rate of economic growth is determined by two factors: the amount saved (higher savings allow for greater investment); the capital-output ratio (capital-output). A lower capital/output ratio indicates that the investment is more efficient and the growth rate is higher.

With appropriate revisions, this model can also serve as a reference for less developed countries. The Harrod-Domar approach was popular among planners in developing countries. This model was used to calculate income, savings and investment goals, which were essential to planning for the developing economy. To grow and prosper, a country must divert some of its resources from current consumption needs and invest them in capital training.

2) The Solow Neo-Classical Model of Economic Growth

In 1987, Robert Solow was awarded the Nobel Prize in Economics for developing the neoclassical theory of economic development. He made a significant addition to our understanding of the elements that influence the economic growth rates of various countries. Growth is achieved by increasing capital and labor inputs, as well as ideas and new technology.

According to the Solow model, a continuous increase in capital investment raises the growth rate only momentarily since the capital/labor ratio rises.

However, the marginal product of the additional units of capital may drop (there are diminishing returns), and an economy returns to a long-term development path, with real GDP expanding at the same pace as labor force growth.

A "steady-state growth path" is accomplished when production, capital, and labor all grow at the same pace, resulting in constant output and capital per worker.

Neoclassical economists think that increasing the trend growth rate requires an increase in labor supply as well as a greater level of labor and capital productivity.

2.3. Review of Empirical Studies

According to Wu, Eric, & Blessed (2020), the impact of exports and imports on economic growth in Burundi was investigated. The findings indicate that exports and imports have unidirectional causality. These findings show that Burundi's growth was fueled by both a growth-led import strategy and an export-led import strategy.

According to Humpage (2000), a country pays for its imports through either current-output exports or financial claims on future production. When exports rise (or fall) in tandem with imports, GDP remains steady. Exports add precisely what imports deduct, and net exports (the trade balance) remain constant. The requirement to fund imports through exports that directly add to output or capital inflows that support other forms of spending assures that imports do not impair GDP or the pace of growth. Imports and economic development, on the other hand, have a positive link.

According to Levine and Renelt (1992), international commerce has only a strong positive link with economic growth. Trade can result in lower manufacturing costs (since imports utilized in production are cheaper), lower pricing for completed goods and services, and, eventually, a lower cost of living.

Fullerton et al. (2012) investigated the relationship between exports, imports, and economic growth in Mexico from 1980 to 2007, utilizing causality testing and vector error correction methods, and discovered that imports are more important than exports in terms of economic growth in Mexico. Mexico.

Andrews (2015) used historical data from 1970 to 2011 to evaluate the link between Liberia's exports, imports, and GDP. The study found bidirectional causation between GDP and imports, as well as unidirectional causality between exports and GDP and exports and imports. The findings revealed that Liberia's economy is driven by a combination of exports and imports, with the latter having a long-term influence.

Rekha (2011) investigated the short-term-long-term link between capital formation and economic growth. The study spans a considerable time period, from 1950-51 through 2009, and uses yearly time series data in the analysis. The findings revealed that capital production has an impact on economic growth.

The majority of long-lasting commodities are luxury items required to preserve society's well-being. Food is one of the most important non-durable consumer items in Sub-Saharan Africa. The causal relationship between food imports and local output is uncertain, according to Jaeger (1992). If local foods are not a perfect alternative for imported meals, rising earnings may be driving the increased demand for imported foods. Domestic output may have declined as a result of policies that have stifled productivity increases (Jaeger, 1992).

Awokuse (2007) investigated the influence of exports and imports on economic development in many Eastern European nations, including the Czech Republic, Bulgaria, and Poland. Vector autoregressive (VAR) models were used to try to discover empirical evidence suggesting a positive and substantial effect

of exports and imports on economic growth in these nations using co-integrated neoclassical economic growth models (Ramos, 2001).

Islam et al. (2011) discovered, using a sample of 40 developed and newly industrialized nations, that the impact of imports on igniting economic growth is stronger than the impact of exports on boosting national income and output levels in these countries. Other recent research has called into doubt the beneficial impacts of exports on long-term growth (Medina-Smith, 2001; Oviemuno, 2007; Owolabi Akeem, 2011).

Michaely (1977) used Spearman's rank correlation to find the relationship between export growth and economic growth using cross-sectional data from 41 less developed nations. The study discovers evidence of a positive association between export growth and economic growth while emphasizing that export expansion only adds to economic growth when nations achieve a certain degree of development.

Dutta and Ahmed (2004) investigated the patterns of behavior of aggregate import levels in relation to GDP growth rates in India from 1971 to 1995. The study demonstrated, using econometric techniques, that real GDP levels determine import demand rather than the other way around. According to Humpage (2000), imports have a positive and statistically significant impact on the level of economic growth in the United States.

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2.4. Summary of Literature Review

International trade broadens markets and increases global competition, and firms that achieve significant economies of scale may be better positioned to adapt to new technologies. Importation, particularly of capital goods, facilitates technology transfer and encourages the development of new products and manufacturing processes. Through exposure to foreign markets, exports can also promote technology transfer.

While other factors such as human capital proficiency, infrastructure development, and political stability are important in determining GDP growth, a country's import and export policies are also very important.

In order to boost GDP growth, responsible agencies should critically assess a country's needs and priorities and seek to transparently exploit available opportunities for both imports and exports.

3. Research Methodology

This chapter describes the procedures and methodologies used to conduct the

study and reach conclusions about the impact of imports and exports on Burundi's economic growth.

3.1. Research Design

The plan that provides an appropriate framework for the study to answer the research question is referred to as the research design. A time-series quantitative research design was used to examine the impact of exports and imports on economic growth in Burundi from 1978 to 2020. This design was chosen because it was discovered to be the best foundation for achieving my goal.

Research methodology is defined as a systematic approach to solving a research problem that includes collecting data using various techniques, interpreting the data, and drawing conclusions based on the research data. Because the nature of this study necessitates comparing numerical data, testing theory, and making broad generalizations about the entire population, quantitative research was conducted to meet the study's objectives. As a result, quantitative research methodology was used in the statistical analysis of time-series data collected from 1978 to 2020。

3.2. Data

Burundi is a landlocked country in East Africa with a low-income economy that employs 80 percent of its population in agriculture. Following the Burundian Civil War, which lasted from 1993 to 2005. The government is attempting to stabilize the political situation while also reviving the economy. Burundi is a low-income country that aims to become a middle-income economy by improving its business environment and competitiveness.

Burundi has actively pursued reforms to improve the business environment in recent years. Burundi is dedicated to improving trade relations with neighboring countries and addressing the numerous non-tariff barriers that continue to stymie intra-regional trade. Being landlocked necessitates regional integration in order to facilitate free trade.

This study used secondary annual time series data from 1978 to 2020 to assess the relationship between trade and economic growth. The variables of interest in this study were GDP (which represents the total value added by all of its producers), gross capital formation, exchange rate, exports, and imports.

All annual time-series data used in this study were obtained from the World Bank data portal, which was accessible via Excel. To facilitate data analysis, all data was downloaded and organized into a single excel sheet using Microsoft Excel. EViews Version 10 software was used to analyze and interpret organized data containing GDP, gross capital formation, exchange rate, exports, and imports.

3.3. Models Used and Variables Description

The impact of imports and exports on economic growth was investigated using a

regression model. Because we are dealing with more than two variables, the study used a multiple regression model. Exports (LEX), imports (LIMP), gross capital formation (LGCF), an exchange rate (LEXR), were the study's independent variables. The dependent variable was Gross Domestic Product (GDP), which was used as a substitute for Economic Growth. As a result, the regression equation looks like this:

$$GDP = \beta_0 + \beta_1 LEX + \beta_2 LIMP + \beta_3 LGFC + \beta_4 LEXR + \mu$$

where:

LGDP: Log of Gross Domestic Product

LEX: Log of Exports

LIMP: Log of Imports

LGCF: Log of Gross Capital Formation

LEXR: Log of Exchange Rate

μ: Error term

The following variables are used in this model:

GDP represents the total value added by all of its producers in this study. Economic growth is defined as an increase in the output of goods and services over a specific time period. GDP was also calculated in millions of US dollars (US) at current prices.

Gross capital formation: Capital is required for a country to be able to produce enough to meet local demand and surpluses to be exported. Capital Formation is defined as the portion of a country's current output and imports that are not consumed or exported during the accounting period but are set aside as an addition to the country's stock of capital goods. In other words, total capital formation is concerned with the physical capital stock of a country.

Exchange rate: A strong exchange rate can dampen economic growth by making exports more expensive, resulting in lower demand for exports. Imports are becoming more affordable, resulting in increased demand for imported goods (and therefore less demand for domestically produced goods) Aggregate Demand is reduced as a result.

Burundi's imports (imp) are the total value of goods and services purchased from other countries. Imports were also measured in millions of US dollars in this study

Exports (exp) are the total value of goods and services produced in Burundi but sold outside the country. Exports were measured in millions of US dollars in this study.

3.4. Data Analysis and Estimation Methods

EViews 10 software was used to run econometric tests that allow us to determine if there is a relationship between exports, imports, and economic growth expressed in gross domestic product in this study. The following are the various analytical tests carried out in this study.

3.5. Unit Root Test

The Dickey-Fuller test in statistics tests the null hypothesis that a unit root exists in an autoregressive time series model. When the statical properties of a distribution, such as mean, variance, and covariance, remain constant over time, a time series is said to be stationary. In other words, a stationary series exists when there is no trend in a time series. Before performing the regression analysis, a stationarity test is required because if the time series is not stationary, the regression results will be spurious. The series is not stationary if there are unit roots.

Following computation, the ADF-test statistic is compared to the critical value. If the ADF test statistic's absolute value is greater than the critical value's absolute value, the null hypothesis is accepted, implying that the series is stationary. On the contrary, if the absolute value of the ADF test statistic exceeds the absolute value of the critical value, the null hypothesis is accepted, indicating that the series has a unit root and is thus non-stationary.

EViews 10 software aids in the testing of stationarity for each variable. A variable was tested at a level denoted by I (0). If it is stationary at level, it would be interesting to hear the findings. If it is not stationary at level, this does not imply that it is not stationary; it will be tested again at the first difference I (1). This means that the variable may be stationary at various levels, such as the first difference expressed as I (1), the second difference expressed as I (2), and so on.

3.6. Cointegration Test (Long-Run Relationship)

It is advised that the regression of nonstationary time series (a nonstationary time series on another nonstationary time series) may result in a spurious regression. The reason for individually testing the stationarity of time series used in the regression is to ensure that they are all at least stationary.

If two or more variables are integrated in the same order, it is assumed that they have a long-run equilibrium relationship, i.e. they are cointegrated. The term "long-run relationship" encompasses cointegration as well.

Because the variables were discovered to have unit roots, which means they are non-stationary at level but became stationery after the first difference, a cointegration test was performed to determine whether or not the variables were cointegrated. The presence of a cointegrating relationship indicates that the variables have a long-run equilibrium relationship, which serves as the foundation for the Vector Error Correction specification. Three steps were taken. 1) Lag length selection 2) cointegration test 3) Auto Regression distribution lag bound tests if the variable was discovered to be cointegrated.

Both trace statistics and maximum Eigen values are highlighted after running the Johansen Cointegration Test. If the trace statistics and maximum Eigen values are greater than the critical values at 5%, the null hypothesis of no cointegration between variables is rejected, implying the existence of a cointegration relationship between LGDP and other dependent variables (Exports, imports, gross

capital formation and exchange rate).

3.7. Estimation of Regression Model

A regression equation is estimated once the data is found to be stationary and there is a long-run relationship between the dependent variable (GDP) and the independent variables. To describe the relationships between a set of independent variables and the dependent variable, use regression analysis. Regression analysis yields a regression equation, the coefficients of which represent the relationship between each independent variable and the dependent variable. Because of its mathematical simplicity, the researcher estimated the regression using the Ordinary Least Square (OLS) method, which is the best method for estimating multiple regression models to provide non-spurious regression results.

As a result, the OLS method was used to assess the impact of exports and imports on economic growth in Burundi. The following are the expected signs for each variable based on the aforementioned multiple regression model.

$$GDP = \beta_0 + \beta_1 EX + \beta_2 IMP + \beta_3 GFC + \beta_4 EXR + \mu$$

3.8. Research Quality Assurance

Quality assurance is an essential component of any research and demonstrates management and researcher commitment to ensuring the dependability of results and data generated and providing confidence in the research undertaken. The conditions of (Best Linear Unbiased Estimates) must be followed to ensure that the results of OLS regression estimation are reliable. Otherwise, the results may show spurious regression, which may interfere with future decision-making. As a result, the nature of the time series data must be investigated.

3.8.1. Serial Correlation Test

Serial correlation (also known as Autocorrelation) is the transfer of error terms in a time series from one period to the next. In other words, a serial correlation occurs in time-series studies when the errors associated with a given time period carry over into subsequent time periods correlated with a subsequent time period's error. It calculates the relationship between a variable's current value and its previous values. A serially correlated variable suggests that it is not random.

To detect the presence of the autocorrelation problem, the Breusch-Godfrey serial correlation, Lagrange multiplier test, or Durbin Watson h-test can be used. This test's null hypothesis is that there is no serial correlation up to lag order p. If R-squared is greater than the critical p-value of 5%, the null hypothesis is rejected, indicating that no serial correlation exists.

3.8.2. Autocorrelation Test

When analyzing a set of historical data, it is necessary to test for autocorrelation. The degree of correlation of the same variables between two successive time intervals is referred to as autocorrelation. It assesses how the lagged version of a variable's value compares to the original version in a time series. The degree of

correlation of the same variables between two successive time intervals is referred to as autocorrelation, also known as serial correlation.

H0: Error autocorrelation is not present.

H1: Error autocorrelation exists.

If the results show that the probability is greater than 5% up to the last lag, the model has no autocorrelation.

3.8.3. Normality Test

The normality test is essential for continuous data as it determines the measures of central tendency, dispersion and the selection of parametric/non-parametric tests.

The normality of the residuals should be tested for the OLS regression model. Abuse of this assumption implies that although OLS estimators exhibit BLUE properties, their statistical reliability cannot be easily determined by statistical significance tests. Accordingly, the histogram normality test was used in the study.

3.8.4. Heteroscedasticity Test

After building the linear regression model, it is customary to check the residual heteroscedasticity. The reason for this is that it is useful to see if the model thus constructed is unable to explain a pattern in the response variable Y that appears in the residuals. This would result in an inefficient and unstable regression model, which could later produce bizarre predictions.

The following are the test hypotheses:

H0: There is no heteroskedasticity.

H1: Heteroskedasticity is present.

If the Chi-square value exceeds the critical p-value, the null hypothesis is ruled out. This means that no heteroscedasticity exists. Otherwise, homoscedasticity exists.

3.8.5. Stability Test

The stability test determines whether or not regression coefficients are stable. This test is critical because when the parameters are stable, the regression model used can forecast or predict. The RESET stability test was used for this test.

4. Results and Findings

This chapter discusses the research findings as well as an interpretation of the data that was analyzed. The results are presented using tables and figures. It should be noted that research objectives are used to explain the findings.

4.1. Trade and GDP Growth during the Last 42 Years (from 1978 to 2020) Are Examined

Figure 1 depicts a strong relationship between GDP and imports from 1978 to 2020. As can be seen, imports and GDP have a similar trend, which means that
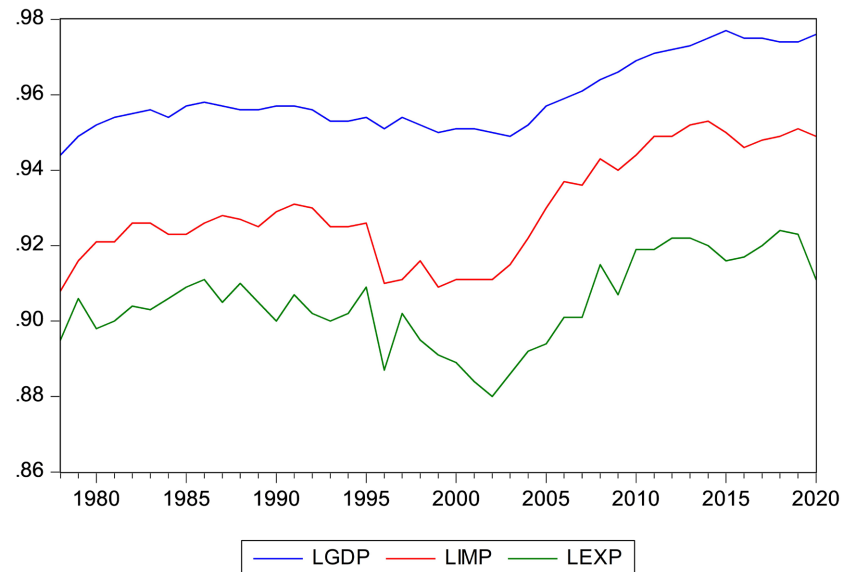
Figure 1. Imports, exports and GDP growth trends in Burundi from 1978 to 2020. Source: Author's estimates in EViews 10 based on World Bank data.

imports and GDP rise together and fall together. Figure 1 depicts again a strong relationship between GDP and exports from 1978 to 2020. As can be seen, exports and GDP have a similar trend, which means that exports and GDP rise together and fall together.

4.2. Results of the Econometric Tests

The figure above shows a similar linear pattern of GDP, exports, and imports, which is a good indicator for analyzing the linear relationship between them.

4.2.1. Stationarity Test
As a first step in the analysis, an Augmented Dickey-Fuller (ADF) test was used to confirm that all of the variables used in the model are stationary in order to avoid the error problem.

Table 1's unit root test results show that all variables (in logarithm) are stationary. At a 1% significance level, the variables GDP, exchange rate, gross capital information, exports, and imports are stationary in the first difference. This stationarity test allows the cointegration test and estimation of the designed regression model to proceed.

4.2.2. Analysis of Cointegration
We tested co-integration to ensure that the regression model to be estimated is not false and is based on an empirically significant relationship. Johansen's co-integration test was used to detect the number of co-integration equations and test the long-term relationship between variables. The lags in the model were determined using the VAR Lag order selection criteria method prior to running this test. The VAR lag order selection criteria results show that the number of lags chosen is equal to two (Table 2).

Table 1. Shows the results of the ADF stationarity test.

Series	Stationary order	ADF test statistic	Critical values			p value
			1%	5%	10%	
LGDP	I (1)	−5.046747	−3.600987	−2.935001	−2.605836	0.0002
LIMP	I (1)	−5.984477	−3.600987	−2.935001	−2.605836	0.0000
LEXP	I (1)	−10.09979	−3.600987	−2.935001	−2.605836	0.0000
LGCF	I (1)	−6.622801	−3.600987	−2.935001	−2.605836	0.0000
LEXCH	I (1)	−7.190647	−3.600987	−2.935001	−2.605836	0.0000

Source: Author's estimates in EViews 10 based on World Bank data.

Table 2. Shows the results of the lag order selection criteria.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	492.6167	NA	3.22e−17	−23.78618	−23.57721	−23.71008
1	684.2228	327.1324	9.60e−21	−31.91331	−30.65947*	−31.45673
2	720.1933	52.63982*	5.95e−21*	−32.44846*	−30.14976	−31.61140*

Source: Author's estimates in EViews 10 based on World Bank data.

Following that, the cointegration test was used to confirm the existence of cointegration relationships between the variables studied using the cointegration tests.

The Johansen test results, as summarized in Table 3, show the presence of a cointegration relationship between the variables studied. The results of the trace and maximum eigenvalue tests show that there are at least three cointegrating equations at the 5% level of significance. As a result, the dependent and independent variables have a valid and stable long-term relationship. This test grants permission to proceed with the estimation of a previously designed regression model.

According to the long-run cointegration test results we can see that in the long-run Exports, Exchange rate, and gross capital formation all variables have a positive impact on GDP, while Imports have no effect on GDP in the long-run.

The null hypothesis of no cointegration is rejected against the alternative of a cointegrating relationship in the model.

4.3. OLS Regression Validity Diagnostic Tests

After determining that all of the variables in the model are stationary and have a cointegrating relationship, the study went on to estimate the multiple regression model. Diagnostic tests were required to ensure that the regression coefficients were valid and could be used to make future predictions.

4.3.1. Test for Serial Correlation

The Breusch-Godfrey serial correlation LM test revealed no serial correlation

Table 3. Shows the results of the cointegration test as well as the long-run cointegration test results.

	Trace statistic	Critical value	Prob.**	Max-Eigen Statistic	Critical value	Prob.**
None *	125.2629	69.81889	0.0000	52.63160	33.87687	0.0001
At most 1 *	72.63127	47.85613	0.0001	37.88995	27.58434	0.0017
At most 2 *	34.74131	29.79707	0.0124	24.07719	21.13162	0.0187
At most 3	10.66412	15.49471	0.2330	8.940593	14.26460	0.2911
At most 4	1.723530	3.841466	0.1892	1.723530	3.841466	0.1892

Source: Author's estimates in EViews 10 based on World Bank data.

Normalized cointegrating coefficients (standard error in parentheses)				
LGDP	LIMP	LGCF	LEXCH	LEXP
1.000000	0.021865	−0.006964	−0.012866	−0.337070
	(0.05772)	(0.00178)	(0.00086)	(0.04048)
Adjustment coefficients (standard error in parentheses)				
D(LGDP)	−0.790734			
	(0.13489)			
D(LIMP)	−0.642364			
	(0.42783)			
D(LGCF)	−7.905612			
	(12.4722)			
D(LEXCH)	−12.71381			
	(3.32696)			
D(LEXP)	−0.366595			
	(0.63112)			

between the model variables (the square is 0.6411, which is greater than the critical p-value) (Table 4). As a result, the decision is made to accept the null hypothesis of no serial correlation.

4.3.2. Autocorrelation Test

The results of autocorrelation analysis using the Correlogram-Q-residuals test, as shown in Table 5, show that there is no autocorrelation in the model because the probability is greater than the critical value of 5% up to the 10th lag.

4.3.3. Normality Test

The residuals are subjected to the normality test to determine whether they are normally distributed around the mean and constant variance. In the absence of this condition, the OLS estimators are always BLUE, but we can't assess their statistical reliability using traditional significance tests.

The residuals are normally distributed, according to the normality test shown in Figure 2 below (the JACQUE-BERA probability is equal to 0.802965 and

Table 4. Breusch-Godfrey serial correlation LM test results.

F-statistic	0.378531	Prob. F(2, 35)	0.6876
Obs *R-squared	0.889240	Prob. Chi-Square (2)	0.6411

Source: Author's estimates in EViews 10 based on World Bank data.

Table 5. Autocorrelation analysis results using the Correlogram-Q-residuals test.

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. |*. |	. |*. |	1	0.190	0.190	1.6565	0.198
. |*. |	. | . |	2	0.079	0.044	1.9487	0.377
.*| . |	**| . |	3	−0.176	−0.207	3.4508	0.327
. | . |	. | . |	4	−0.042	0.027	3.5364	0.472
.*| . |	.*| . |	5	−0.097	−0.069	4.0137	0.547
.*| . |	**| . |	6	−0.199	−0.222	6.0748	0.415
. |*. |	. |** |	7	0.157	0.280	7.4035	0.388
. | . |	. | . |	8	0.045	−0.047	7.5135	0.482
. |*. |	. | . |	9	0.106	−0.026	8.1502	0.519
. | . |	. |*. |	10	0.031	0.141	8.2077	0.609

Source: Author's estimates in EViews 10 based on World Bank data.
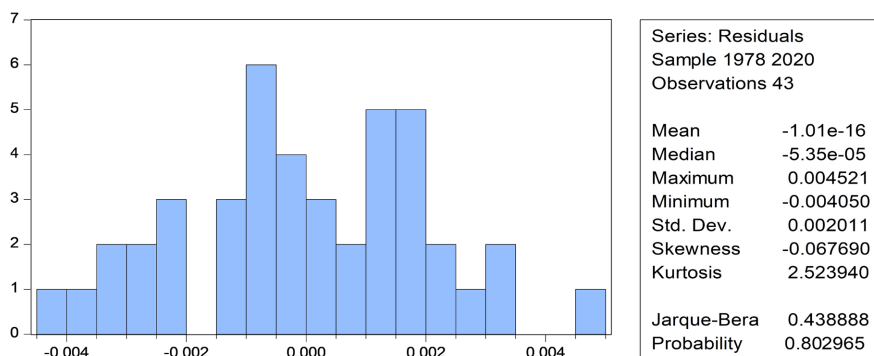

Figure 2. Histogram normality test results. Source: Author's estimates in EViews 10 based on World Bank data.

is greater than the critical probability of 5 percent). This confirms that the estimated linear regression model has realistic predictive powers and that its results can be used to make valid predictions.

4.3.4. Heteroscedasticity Test

The OLS regression method, as previously stated, assumes that the random error terms in the regression model have constant and equal variance. As a result, a Breusch-Pagan/Godfrey heteroscedasticity test was used to determine the presence of heteroscedasticity in the regression model.

Table 6 shows the results of heteroscedasticity tests using the ARCH approach,

which show that there is no heteroscedasticity (the chi-square of 0.2046 is above the critical p-value of 5 percent).

4.3.5. Stability Test

The Ramsey reset approach was used to conduct a stability test to determine whether the coefficients of the regression equation are stable. For the probabilities (t-statistic and F-statistic equal to 0.0887) were found greater than 5%, it was determined that the coefficients are stable and can be used for prediction (Table 7).

Following the completion of various diagnostic tests, it was determined that the regression is not false and that its coefficients can be used for predictions or future projections. As a result, after establishing that there is a long-term relationship between the variables, the research moved on to estimate the regression equation. The regression results for the relationship between gross domestic product, exports, imports, gross capital formation, and the exchange rate are shown in Table 8.

We can see from the regression model's results in Table 8 that both imports and exports are statistically significant due to the F statistic, which has a probability of 0.00000 and is less than 0.05. This outcome demonstrates that the regression model is correct. R-squared is another factor to consider. R-squared measures the regression model's goodness of fit and explains how well the model fits the data.

According to the table above, R squared (0.958226) explains 95.8% of variations in GDP growth in Burundi, with other regressors explaining the rest. 4.2 % of the change in GDP occurred outside of the model. As a result, the data best fits the regression model.

The table also shows that the coefficients for imports (LIMP), exports (LEXP), gross capital formation (LGCF), and exchange rate (LEXCH) are statistically significant (p values are less than 0.05). The following is the estimated model based on the regression results:

Table 6. ARCH Heteroskedasticity test results.

F-statistic	1.593844	Prob. F(1, 40)	0.2141
Obs*R-squared	1.609407	Prob. Chi-Square (1)	0.2046

Source: Author's estimates in EViews 10 based on World Bank data.

Table 7. Ramsey RESET stability test results.

	Value	df	Probability
t-statistic	1.748271	37	0.0887
F-statistic	3.056453	(1, 37)	0.0887
Likelihood ratio	3.412991	1	0.0647

Source: Author's estimates in EViews 10 based on World Bank data.

Table 8. OLS regression results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.398166	0.037701	10.56103	0.0000
LEXP	0.237509	0.061263	3.876911	0.0004
LEXCH	0.006976	0.001131	6.166810	0.0000
LGFC	0.005435	0.002549	2.131961	0.0395
LIMP	0.308143	0.063150	4.879546	0.0000
R-squared	0.958226	Mean dependent var		0.959442
Adjusted R-squared	0.953829	S.D. dependent var		0.009361
S.E. of regression	0.002011	Akaike info criterion		−9.470932
Sum squared resid	0.000154	Schwarz criterion		−9.266141
Log likelihood	208.6250	Hannan-Quinn criter.		−9.395411
F-statistic	217.9159	Durbin-Watson stat		1.397677
Prob(F-statistic)	0.000000			

Source: Author's estimates in EViews 10 based on World Bank data.

5. Summary, Conclusion and Recommendations

5.1. Analysis and Discussion

5.1.1. Gross Capital Formation Coefficient

According to the regression results, the gross capital coefficient of 0.005435 is positive and statistically significant. (The *p*-value is 0.0395, which is less than the level of significance of 0.05), implying that a 1% increase in capital leads to a 0.005% increase in economic growth. This finding is supported by economic growth theories such as the Harrod-Damodar model, Solow's neoclassical growth theory, and the Two-Gap theories, which state that economic growth can result from an increase in a country's capital stock as well as sufficient savings on investments, raising a country's total level of income.

5.1.2. Exports' Coefficient

When a country exports goods, it sells them to consumers, businesses, or governments in another country. These exports bring money into the country, increasing the exporting country's GDP.

According to the growth theory literature, export expansion is the most important factor promoting economic growth. Several explanations have been proposed to connect these two variables. First, higher rates of capital formation stimulate export growth, which in turn stimulates total factor productivity growth. Second, increased exports help to alleviate foreign exchange constraints, allowing for greater capital-goods imports and thus faster growth. Third, foreign competition provides an efficient price mechanism that promotes optimal resource allocation and puts pressure on goods-exporting industries to keep costs low and improve technological change, thereby promoting economic growth.

These arguments clearly lead us to believe that exports contribute positively to economic progress.

The regression results showed that the export variable had a positive coefficient of 0.237509, which is also statistically significant (p-value is 0.0004 and is less than the critical value of 0.05). This is interpreted by the fact that a 1% increase in Burundi's exports influences GDP growth by 0.05%, all else being equal. According to Adam Smith and David Ricardo's theories, a country benefits from foreign trade because of the exported products that it produces (Nyasulu, 2013; Owolabi Akeem, 2011).

This finding backs up the empirical evidence of many researchers, including (Antunes, 2012; Bbaale & Mutenyo, 2011; Njikam, 2003), who found that exports of goods and services are among the most important.

This finding is consistent also with the findings of (Broda & Cédric, 2003; Medina-Smith, 2001; Sentsho, 2002), who discovered that exports have a significant impact on economic growth in developing countries.

5.1.3. Imports' Coefficient

The significant positive imports coefficient of 0.308143 estimated in the regression analysis implies that a one percent increase in imports in Burundi leads to a 0.31 percent increase in GDP, all else being equal. The main reason that can be given here is that in Burundi, a highly import-dependent country, the majority of imports are capital goods, machinery, equipment, raw materials, and those goods can boost economic growth because import of proper technology is the basis of industrial and social evolution for transferring from traditional production to industrial production and progressing through the stages of economic development. Other imports for Burundi include petrol and pharmaceuticals. First, Burundi is a landlocked country that, does not produce petrol, and for its economic activities particularly in the industrial sector, petrol imported from the rest of the world plays crucial by improving the economic growth of that developing country. So importation of Petrol was limited to the industrial sector, but it has also been seen in the transportation sector that a sector contributes to the movement of labor and products which leads to general economic growth. Burundi, where most businesses are set up is the SMEs. Due to the lack of electricity, Petrol imported helps the start-up to set up small factories which at the end of the day improves the level of GDP of that developing country.

Importing medicines can explain a country's population's health; a healthy population means that the population is active, which can be a driving force for economic development.

As a result, increased spending on imported non-consumables used in industries increases the country's capital stock, which raises Burundi's national productive capacity and thus GDP in the long run. According to theories, increased imports of intermediate products and capital that are not available in the domestic market may result in an increase in manufacturing productivity, which leads to the country's economic growth.

5.1.4. Exchange Rate Coefficient

The exchange rate is significant for several reasons: a. It serves as the primary link between the domestic and international markets for various goods, services, and financial assets. We can compare the prices of goods, services, and assets quoted in different currencies by using the exchange rate.

In foreign markets, a lower-valued currency makes imports more expensive and exports less expensive. A higher exchange rate is likely to worsen a country's trade balance, while a lower exchange rate is likely to improve it.

The significant positive exchange rate coefficient of 0.006976 estimated in the regression analysis implies that a one percent increase in GDP in Burundi results in a 0.007 percent increase in GDP. The exchange rate is critical to a country's economic growth because it is the primary link between domestic and foreign markets for various goods, services, and financial assets. Some theories suggest that the GDP growth rate and the exchange rate have a positive relationship.

5.2. Conclusion

The goal of this study was to examine the impact of exports and imports on Burundi's economic growth. The study was based on an econometric analysis of time series from 1978 to 2020. The Augmented Dick Fuller test demonstrates that at the first difference, GDP, exports, imports, gross capital formation, and the exchange rate are all stationary.

The cointegration test was used to determine the long-run relationship between the model's variables. The Johansen cointegration test was run, and the results show that both the trace statistics and the maximum Eigenvalues were above the critical value of 5%. As a result, there is a long-run relationship between GDP, exports, and the exchange rate, as well as gross capital formation, whereas imports have no long-run effect on GDP.

According to the results of the OLS regression, all of the variables under consideration have significant and positive coefficients. This means that a 1% increase in exports leads to a 0.24 percent increase in GDP, while a 1% increase in imports leads to a 0.31 percent increase in GDP. The study also found that a 1% increase in gross capital formation leads to a 0.005% increase in GDP, while a 1% increase in the exchange rate influences a 0.06% increase in GDP. The Adjusted R-squared was 0.958226, indicating that the model fits best. This means that exports, imports, gross capital formation, and the exchange rate all contribute to GDP.

Exports and imports had a positive and statistically significant impact on economic growth in Burundi. This finding is consistent with the findings of many other researchers, including Broda & Cédric (2003); Medina-Smith (2001); Musonda (2007); and Sentsho (2002), who discovered that exports and imports have a significant impact on economic growth in developing countries. As a result, the government of Burundi should continue to improve export-led economic growth policies while reducing import-led economic growth policies.

5.3. Implications of Policy and Recommendations

The findings of the study have important implications for Burundi's economic development policy. The policy implications of the findings have been categorized according to influencing variables such as exports, imports, gross capital formation, and exchange rates. Important policy recommendations also stem from these effects, as discussed below.

The fact that exports were positive and statistically significant has important policy implications for the country's economic growth. According to the findings of this study, the export-led growth policy is highly effective. As a result, the Burundi government should continue to strengthen its export-led economic growth policy.

Burundi has mineral resources such as gold, nickel, tungsten, and cassiterite that are not yet being exploited industrially. The main export products are gold, coffee, and tea. The Burundian government mentions mining as an important pillar of the country's economic development in its new poverty reduction strategy. However, Burundi lacks experience in industrial mining, and the commodity sector is currently under-regulated. Due to a lack of skills and resources, the State is currently unable to regulate the mining sector in accordance with good governance principles, and the country risks failing to capitalize on the significant development potential that this sector possesses. We understand that when we talk about exports, we are referring to the final link in the value chain. It is time to consider specializing Burundi exports. We all know that exports are an important source of foreign currency, but exports do not want to say currency receipts. Exportation implies currency source, but these currencies must arrive in the country. Instead of exporting raw materials from its mineral resources, Burundi needs to strengthen the technical skills and strategic management structures of the Burundian Ministry of Energy and Mines so that it can ensure effective and transparent control of mining activities in collaboration with other public and non-public actors. Burundi can also export finished goods but not raw materials, as the reliance on raw materials as an export is a source of vulnerability. The development of processing industries will allow Burundi to fight unemployment, precariousness, and overall poverty more effectively. This transformation will generate more value, labor, and investment in the infrastructure sector, which will boost growth.

In addition to traditional export products, the government of Burundi should encourage the diversification of export products that are needed at the regional level (gold, tea and coffee). Foreign goods and services will be reduced, and imports may fall. Manufacturing industries should improve product quality so that their exports can compete in the global market.

In addition, the government should move forward with promoting firm capacity to enter and grow in the export market, as well as establishing an export growth facility. To improve export quality and revenue, the government must invest in technology that aids in the processing of its primary export commodi-

ties.

Burundi should develop a (BBN) Burundi Bureau of Standards and Quality Control capable of testing, accrediting, and certifying its export commodities in accordance with international trading system technical standards.

The positive and statistically significant relationship between imports and GDP level confirms that Burundi's Import of some goods can cause growth. Still, the finds show also that the imports don't affect the GDP in the long-run. Based on this finding, it is suggested that the government of Burundi improve import policies by promoting non-direct consumable imports used in manufacturing goods so that surplus can be exported. At this point, the Burundi government should stop importing some goods like sugar, cement, and fertilizer because there are already local manufacturers producing the same goods need only promote and innovate those local manufacturers by encouraging or developing local manufacturers like Sosumo (Burundi Sugar Production Company), Burundi Cement Company, and Fomi (Fertilisants Organo-Minéraux) to produce more. This policy also aims to empower local industries to produce, satisfy local demand, and export surpluses to gain from exchanges.

Burundi's positive and statistically significant relationship between the exchange rate and economic growth suggests that the country should maintain its exchange rate economic growth strategies. According to some theories, the GDP growth rate and the exchange rate have a positive relationship. Some exchange rate determination theories, such as the monetary approach to exchange rates, predict that higher growth rates in a country lead to currency appreciation. The exchange rate's impact on growth is critical because the national currency's exchange rate falls, favoring exports and limiting imports, rebalancing foreign trade.

A strong exchange rate can dampen economic growth by making exports more expensive, resulting in less demand for exports. Because imports are less expensive, there is more demand for imported goods (and thus less demand for domestically produced goods) (AD). When the value of a country's foreign exports exceeds the value of its foreign imports, GDP rises.

The regression results in this study show that gross capital formation has a positive and significant effect on economic growth in Burundi, which has important policy implications for the country's economy. This implies that the government should maintain its policies aimed at encouraging domestic investment and attracting foreign investors in order to achieve economic growth. To attract foreign direct investment and spur capital formation and economic growth, the country must invest in infrastructure, particularly in the transportation and energy sectors. Furthermore, the government should make financial capital available to export-oriented industries, particularly small and medium-sized businesses. Export-oriented industries should be easily funded by development banks.

According to Nurkse (1953), capital formation can break the cycle of poverty

in developing countries. According to Nurkse, low income levels in these countries hinder demand, production and investment. This leads to a shortage of capital goods, which can be compensated by capital formation. Thus, capital formation increases the scale of national output, income and development, thereby solving inflation and balance of payments problems, and freeing the economy from the burden of external debt.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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