MAKERERE UNIVERSITY

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EFFECTS OF TRADE OPENNESS ON THE ECONOMIC GROWTH OF UGANDA

BY

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A DISSERTATION SUBMITTED TO THE DIRECTORATE OF RESEARCH AND GRADUATE TRAINING TO MAKERERE UNIVERSITY BUSINESS SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF ARTS IN ECONOMIC POLICY AND MANAGEMENT OF MAKERERE UNIVERSITY

PLAN A

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DECLARATION

I Ayebale Job hereby declare that this Dissertation titled "Effects of Trade Openness on the Economic Growth of Uganda" is my original work which to the best of my knowledge has never been submitted to any other institution of higher learning for any academic award.

Sources of information have been duly acknowledged.

Signature

Date
29th/05/2024

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2021/HD10/2777U

DEDICATION

I dedicate this report to my parents for the support they have always extended to me in various aspects of life, I don’t always take that for granted. I would like to extend further my sincere gratitude and dedicate this dissertation to Mr. Ronald Osekeny for the support he rendered unto me throughout my career which he expressed verbally and through action.

APPROVAL

This is to approve that the dissertation has been examined and under supervision by the respective supervisors below;

Dr. Olyanga Anthony Moni

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Date 14/06/2024

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TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AIC	Akaike Information Criterion
ADF	Augmented Dicker Fuller
ARCH	Autoregressive Conditional Heteroscedasticity
ARDL	Autoregressive Distributed Lag
CTS	Composite Trade Share
DW	Durbin Watson
ECM	Error Correction Model
ECT	Error Correction Model
FDI	Foreign Direct Investment
FY	Financial year
FY	Financial Year
GDP	Growth Domestic Product
GMM	Generalized Method of Moments
HO	Heckscher-Ohlin
ICT	Information Communication and Technology
JJ	Johansen and Juselius
LDC	Low Developed Countries
MOFPED	Ministry of Finance Planning and Economic Development
OLS	Ordinary Least Squares
RER	Real Exchange Rate
SIC	Schwarz's Information Criterion
USD	United States Dollar
VAR	Vector Autoregressive Model
VAT	Value Added Tax
VECM	Vector Error Correction Model
WDI	Word Development Indicators
WTO	World Trade Organization
OECD	Organization for Economic Co-operation and Development
OECS	Organization of Eastern Caribbean States
DYNARDL	Novel Dynamic Autoregressive Distributed Lag
GNP	Gross National Product

ABSTRACT

Economic growth plays an important role in improving the quality of life in an economy. This study focuses purposely on examining the effect of Trade Openness on economic growth in Uganda. The study objectives are; to examine the short-run effects of trade openness on the economic growth of Uganda, to examine the long-run effects of trade openness on the economic growth of Uganda, to examine the impact of interest rate on the economic growth of Uganda, to examine the influence of exchange rate on the economic growth of Uganda, and to establish the contribution of Foreign Direct Investment on the economic growth of Uganda.

The study adopted a causal research design and used time series of secondary data obtained from World Bank indicators from the period 1986 to 2021. The study variables include trade openness, foreign direct investment, Interest rate, real exchange rate, Inflation, total labor force, capital formation as the independent variable and gross domestic product as the dependent variable.

The study uses multivariate time series econometric techniques of the Autoregressive Distributed Lag (ARDL) model as the most reliable and suitable estimation technique because it is suitable for relatively small samples and can be employed, whether the underlying series are integrated of order zero [I(0)], order one [I(1)] or mixed order to examine the effect of the identified determinants on gross domestic product in Uganda for the period under study. This was also subject to a diagnostic tests aimed at verifying the validity of the econometric model estimation results for the period under study.

The results show that in the short run Interest rate, Real exchange rate, and Capital formation have a significant negative effect on GDP growth. However, in the long run, the Real exchange rate and total labour force exhibits a positive significant effect on GDP growth, and on the contrary interest rate exhibits a negative significant effect on GDP growth.

Finally, using the ARDL Regression consisting of the robust standard error results conclude that depreciation of the foreign currency, total labor force, and capital formation significantly impact positively on Uganda’s GDP and appreciation of the foreign currency brings about a negative effect on the Economic growth whereas Trade openness and FDI exhibit a positive insignificant effect on GDP and then Interest rate together with Inflation exhibit a negative statistically insignificant effect on GDP.

Among the recommendations there is a need to expand Uganda’s exports with more emphasis on value addition as a way of exporting products and discourage those that are not value-added as this affects price fluctuation on the international market.

CHAPTER ONE

1.0 Introduction

This chapter covers the background of the study, the problem statement, the purpose of the study, the objectives of the study, the hypothesis, the scope of the study, the significance of the study, and the theoretical framework.

1.1 Background

Economic growth has consistently existed, yet its speed has changed from slow and sporadic to dynamic, fast, and steady particularly following the Industrial Revolution (Baines, 2003). The main disquieting question of crucial interest concerning economic growth among the developed nations like China and the great 8 nations plus Scandinavian countries compared to most of Sub-Saharan Africa is: why are some countries in the world poor and others rich? (Stiglitz, 2016). As some empirical literature indicates, the main macroeconomic policy goal of every economy is how best to achieve rapid economic growth (Gabriel & David, 2021). Economic growth theory is usually applied to explain the steady-state or long-run growth measured by the percentage increase in national income or some measure of the standard of living such as HDI (human development index) (Sengupta, 2011).

While empirical studies support the relevance of factors such as human capital, research and development activity, macroeconomic and structural policy settings, trade policy, and financial market conditions for economic growth, trade openness is considered the main gear that accelerates development issues in many countries in the world (Qamruzzaman & Jianguo, 2020). Trade openness implies that when the economy freely interacts from within and other outside economies for trade purposes, it is assumed that trade is boosted which is assumed to increase economic growth within the economy. Trade openness is composed of the removal of trade barriers that is to say; eliminating all internal customs barriers, avoiding internal rules of origin, and removal of invisible barriers for the mobility of goods, international trade tariffs, non-tariff barriers like; discriminatory rules of orign, lengthy customs procedures , quota shares among others.

Trade openness through exchange rates and controlling interest rates as a result of exports and imports is assumed to play a central role in promoting economic growth for both developed and developing countries through international trade. When Trade Openness increases, production can be made more efficient, domestic technology is likely to improve accordingly and productivity is expected to increase. Economic theory puts forward several channels through which an increase in trade openness could result in higher economic growth rates. Trade Openness is the sum of imports and exports normalized by GDP (Abdullah & Mishra, 2014). There has been considerable research interest in this literature on a country's openness to international trade. There's empirical evidence showing that trade openness increases economic growth through its ability to provide consumers with a wide variety of goods and services, which leads to improved well-being among the citizens (Krugman, 1980). However, despite countless efforts and a long debate on the issue, no shared understanding has been reached on the relationship between trade openness and economic growth. (Georg *et al*., 2019). On the other hand, in the new growth theory, changes in trade policy can influence long-term rates of economic growth. However, the nature of the impact of trade openness on the long-term rate of growth when trading partners are structurally different in terms of innovation capabilities is ambiguous. Studies that use revealed openness address the question of whether countries that engage in more foreign trade have superior economic performance to countries that trade less. (Dowrick & Golley 2004).

Uganda has implemented significant economic reforms, including the liberalization of the trade regime through exchange rates, and controlling interest rates among others. Since 1986, Uganda has undertaken reforms of development economic policies focusing on core economic activities. Recognizing that the trade regime of the 1970s was a major deterrent to export production and an impediment to growth, the government embarked upon a unilateral liberalization program in the early 1990s designed to reduce anti-export bias and encourage increased international trade. Non-tariff barriers were gradually removed following the introduction of automatic licensing under an import certification scheme in 1991. The coffee export tax was abolished and replaced with import tariffs (Collier and Reinikka, 2001).

The period since 2002 has been one of consolidation and adjusting to political and personnel changes. The emphasis of economic policy has shifted from poverty eradication to economic growth, with a somewhat more interventionist role for government. (Kuteesa, 2010). The openness of trade to the rest of the world could attract foreign investors in the country through foreign direct investment (FDI) which would increase Economic growth. The study by Babatunde, (2013) study explores the relationship between trade openness, infrastructure, foreign direct investment (FDI) and economic growth using a panel of forty two sub Saharan Africa (SSA) countries over the period 1980-2003. The results show that FDI depends on trade openness and GDP per capita. Further results show that the interaction between trade openness and infrastructure leads to a slight increase in FDI inflows. The results also indicate that FDI has a positive and significant effect on growth. Uganda's real GDP has been growing at a rate of around 6% per annum on average for the period from 1994 to 2006 on the grounds of trade openness (World Trade Organization (WTO), 2010). The GDP of Uganda has grown quite rapidly from below US$4 billion in 2000 to over US$33 billion in 2019 (World Bank, 2022). Data shows that the average GDP growth rate between 1986 and 2000 was 6.1% per year, increasing to 6.6% for the period 2001 - 2016, Word Development Indicators (WDI, 2017). Generally, Uganda’s economy has turned in strong growth since the early 1990s. However, between the financial periods 2011/12 to 2021/22, the economy of Uganda has not reached the target of 6% despite trade openness which has negatively affected the overall growth of other sectors. This study intends to contribute to the debate on the relationship between economic growth and trade openness by further examining the effect of trade openness on the economic growth of Uganda using time series data.

1.2 Problem statement

Economic growth plays an important role in improving the quality of life in an economy (Tung & Hoang, 2023). To increase economic growth in Uganda, the Government of Uganda embraced trade openness by opening its borders to the global economy and easing trade through single customs territory at different boarder points as well as offering tax holidays among other interventions to foreign investors to make it easy for them to operate which would result in increased economic growth (World Bank, 2022). Despite different strategies of trade openness to increase economic growth; the economy has registered low levels of growth of less than the targeted 6% for the last 10 years (MOFPED, 2021). For example, the economy grew at an average of 4.5% in FY 2015/16 and FY 2017/18. In the financial years 2019/20, 2020/21, and 2021/22, the economy has not exceeded a 5% growth rate compared to the set target of 6% which does not match with the NDPIII goal of growth (MOFPED, 2022). If this challenge is left unchecked, it may deter Uganda from achieving the ambitions of the Sustainable Development Goals, NDP III and Vision 2040. If there was no trade openness, the economy would majorly trade from within the territorial boundaries which would affect growth of the economy however, it is still debatable in the empirical literature whether trade openness affects growth hence the need for further the study. The review of literature associates this challenge to low volumes of both imports and exports which by proxy can be associated with the flows of FDI, real exchange rate, and the control of interest rate that hinder trade to GDP ratio. This study therefore examines the effects of trade openness on the economic growth of Uganda from the period 1986 to 2021of which this period was not fully captured fully by Stephen Esaku, (2021).

1.3 Purpose of the study

The purpose of the study was to examine the effect of Trade Openness on economic growth in Uganda.

1.4 Objectives of the study

i. To examine the short-run effects of trade openness on the economic growth of Uganda.
ii. To examine the long-run effects of trade openness on the economic growth of Uganda.
iii. To examine the impact of interest rate on the economic growth of Uganda.
iv. To examine the influence of the exchange rate on the economic growth of Uganda.
v. To establish the contribution of Foreign Direct Investment to the economic growth of Uganda.

1.5 Research hypothesis

H1: Trade openness has a significant effect on Economic Growth in Uganda in the short run.

H2: Trade openness has a significant Effect on Economic growth in Uganda in the long run

H3: Interest rate significantly influences the economic growth of Uganda.

H4: The exchange rate significantly influences the economic growth of Uganda.

H5: Foreign Direct Investment significantly influences the economic growth of Uganda.

1.6 Scope of the study

1.6.1 Subject Scope

The study focuses on reviewing the empirical and theoretical literature to explain trade openness and economic growth and their relationships.

1.6.2 Time scope

This study uses time series data spanning the period between 1986 and 2021. The reason for selecting this period is because it entails major reforms that include; trade reforms, revenue reforms, aid management and expenditure reforms that were adopted by Uganda after the economic wars and re-structuring of the economic policies under the main public financial management reforms.

1.6.3 Geographic scope

The study was carried out in Uganda so that it captures the challenges associated with the economic growth of Uganda.

1.7 Significance of the Study

i. This study gives an empirical analysis of trade openness strategies and policies in Uganda to give decision-makers a clear picture of Uganda's global economic status to give policy recommendations among others to enhance the economic growth of Uganda through policy reformation as a means to achieve greater and more enduring results, status, and benefits.

ii. The study also contributes to the enhancement of the ability and capacity of researchers and academia as this research falls in the field where few scientific researches have been done in the particular case of Uganda.

1.8 The Theoretical Framework

This study was based on two theories; The Neo-classical growth theory (1956) introduced by Robert Solow (1924) and Trevor Swan (1918–1989) which explains growth and secondly, the New trade theory (NTT) developed in 1979 which explains free trade. These theories together with empirical literature, guided in identifying the study variables. The neo-classical growth theory was key in determining critical factors for economic growth that were added to the model and the new trade theory was key for identifying variables for trade openness. The Neo-classical model of long-run economic growth, introduced by Robert Solow (b. 1924) and Trevor Swan (1918–1989) in 1956, analyses the convergence of an economy to a growth rate set by exogenous population increase and, as added the following year by Solow (1957), an exogenous rate of technical change.

For this study, the researcher modified the neo-classical growth theory that is presented by the production function. This study was based on a neo-classical growth theory model. The researcher assumed a linear production function given by;

$Y = A(K, L)$ ……………………...…...……………..……………………………………… (i);

Where Y is the output, K is capital, L is labour and A is the level of technology, Labour and technology are assumed to grow exogenously at different rates say n and g respectively. Solow allowed for neutral technical change by writing the production function as; $Y = A_t(K, L)$ therefore, the model was re written as;

$Y_t = A_t[K_t, L_t]$……………………………………………….………………….…………. (ii);

Where: Y_t is output or the Gross Domestic Product (GDP) at time t, K_t is physical capital stock, at time t, L_t is the amount of labor stock in the economy at time t, A_t is a scaling factor or productivity parameter at time t, which reflects the state of technological progress.

In equation (ii), the model now states that technological progress is labour augmenting and that workers' productivity depends on the level of technology in an economy.

According to Yaya Keho (2017), the production function can be extended by assuming that technological progress can be influenced by trade openness. Trade openness as a global variable was assumed to as well boost the labour stock in the economy thus contributing to the economy's growth due to free trade. A_t was then specified as follows:

$A_t = \delta Open_t Z_t$ ……………………………………..……………………………… (iii);

Where; δ is a scaling factor, $Open_t$ stands for Trade Openness and Z_t represents other factors that may influence the trade openness and state of technology. Substituting Equation (iii) into Equation (ii), gives:

$Y_t = \delta\ Open_t(K_t, L_t, Z_t)$ …………………………..……………………………… (iv);

This study used proxy variables that include, FDI, the real exchange rate, interest rate and inflation.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section presents and discusses the literature of the study. It starts with the theoretical underpinnings of the study, discusses the concepts in the study, and finally discusses objectives in line with the study.

2.2 Theoretical review

The study was based on the neo-classical growth theory (Robert Solow (b. 1924) and Trevor Swan (1918–1989) in 1956) and the new trade theory by Krugman (1979).

2.2.1 The Neoclassical Growth Theory

The neoclassical model of long-run economic growth, introduced by Robert Solow (b. 1924) and Trevor Swan (1918–1989) in 1956, analyses the convergence of an economy to a growth rate set by exogenous population increase and, as added the following year by Solow (1957), an exogenous rate of technical change. The theory assumes that Economic growth is driven by the accumulation of capital and technological progress, the rate of economic growth will eventually slow down as the capital stock approaches its maximum level, and that Government policies can affect the rate of economic growth by influencing the amount of savings and investment (Solow and Swan, 1956).

In the Neoclassical theory, trade openness acts as a vehicle for providing entry of capital-intensive inputs essential for production directly contributing to the process of economic growth. In the theory, trade openness also encourages knowledge transfer and accumulation and human capital development (Grossman and Helpman 1991).

Although an ideal measure of trade openness will be an index that considers all trade distortion measures as well as all privileged instruments applied to export production to reflect on the concept of ‘neutrality’ (Sabina and Eldin, 2017), this study also considered the augmented Solow (1956) where technological progress is exogenous.

2.2.2 The New Trade Theory

New trade theory (NTT) comprises a set of economic models in the field of international trade that emphasize the significance of increasing returns to scale and network effects. Originating in the late 1970s and early 1980s, NTT emerged as a response to traditional trade models (referred to as "old trade theory"), which fully explains the role of exchange rate, interest rate, and FDI on how they influence the growth of the economy. Contrary to expectations, a substantial portion of world trade occurs between countries that share similarities in terms of development, structure, and factor endowments. Unlike traditional models like the Ricardian model of comparative advantage and the Heckscher-Ohlin model, which relied on productivity and factor endowment differences to account for international trade, new trade theorists introduced the concept of increasing returns to scale. They demonstrated that trade between similar countries could be driven by industries concentrating on niche products, benefiting from economies of scale in those areas. Consequently, even identical countries find incentives to engage in trade with each other.

Specialization in particular industries or niche products allows countries to exploit larger economies of scale, leading to mutually beneficial trade relationships. Some proponents of NTT argue that protectionist measures could be strategically employed to foster the growth of specific promising industries, enabling them to gain dominance in the global market. Trade theorists in various non-quantitative forms have previously advocated this idea, akin to the "infant industry" argument as a counter to free trade.

2.3 Empirical review

2.3.1 Economic growth

According to Ahmed (2022), Economic growth is described as a growing market value of commodities, the people able to purchase things that can be supported through time. Gross domestic product (GDP) is one of the most widely used indicators of economic performance. GDP quantifies the monetary worth of final products and services produced in a nation over a specific time, like a quarter or a year that are purchased by the final consumer (Stewart & Budnikova, 2022). GDP measures a national economy's total output in a given period and is seasonally adjusted to eliminate quarterly variations based on climate or holidays (Basak *et al*, 2022). The most closely watched GDP measure is also adjusted for inflation to measure changes in output rather than changes in the prices of goods and services (Szustak *et al*, 2022). It accounts for all the output produced inside a nation's boundaries. GDP is made up of products and services generated for market consumption as well as certain nonmarket production, such as government-provided defense or educational services. Gross national product, or GNP, is a different concept that accounts for all national output. GDP is significant since it provides information on the size and health of an economy (Jakovljevic *et al,* 2020). Real GDP growth

is frequently used as a gauge of the economy's overall health. In general, growth in real GDP is seen as a positive indicator of the health of the economy.
According to Mohamed (2022), Economic growth in Uganda has been a contentious issue primarily because Uganda like other developing countries, aims at raising the level of GDP in their economies through finding the most efficient means of increasing their productivity. Uganda is well endowed with huge deposits of raw materials with very fertile soils accompanied by good weather conditions for agricultural practices, which is one of the major practices that contribute to its Economic growth. Uganda relies on the exportation of mainly primary products which are characterized by lower prices, unfortunately putting Uganda at the wrong end of an unbalanced trade environment that favors nations, which are already well industrialized.

2.3.2 Trade openness

Trade openness is defined as the lack of constraints or a flexible approach to trading activity. As a result, trade openness refers to how much a home country allows for international trade. Exports, imports, foreign direct investment (FDI), lending, borrowing, and the repatriation of foreign funds are typically included in trading activities (Alam & Murad, 2020). Trade openness refers to a country's economy's outward or inward direction. An economy is said to be outwardly oriented if it actively pursues international trade prospects. An economy is said to be inwardly oriented if it neglects or is unable to seize possibilities for international trade. Trade barriers, import-export, infrastructure, technology, scale economies, and market competitiveness are a few of the trade policy choices made by nations that support outward or inward orientation (Amna Intisar, *et al* 2020).
Trade openness and human capital are the major factors affecting economic growth (Musila & Yiheyis, 2023) Trade openness promotes the development of new technologies as well as the flow of new ideas and knowledge. It also includes the buying and selling of products and services. An economy has a higher chance of expanding if a nation takes steps toward trade openness (Amirov & Avazov, 2023). Additionally, trade openness fosters growth in several ways. Increasing investment improves capital formation and widens markets. Generating new manufacturing techniques, greatly improves the nation's industrial sectors. It also boosts employment by opening up additional job options and could eventually reduce poverty (Musila & Yiheyis, 2023).

According to Abdisalan (2022), Uganda has a free trade and foreign exchange policy. Such a policy encourages international trade, which permits nations to offer to sell locally produced things to outside nations which is referred to as the buying and selling of commodities and services between nations.

2.3.3 Trade openness and economic growth

This section presents the literature and empirical review of the above relationship. The effect of trade openness on the economic growth has been of great debate both theoretically and empirically for some time inconclusively on whether trade openness significantly affects growth or not.

According to Zahonogo (2016), using pooled ordinary least square, fixed effects, and the system generalized methods of moment estimation approaches to analyze balanced panel data from 52 African nations from 2000 to 2018. The results showed an intriguing mixed pattern between trade openness and GDP per capita. Firstly, POLS show trade openness had a mixed influence on economic growth. Similarly, when subdividing Africa into sub-regions, trade openness demonstrated a non-linear relationship with GDP, but the result in Northern Africa is studied in terms of economic growth. Secondly, Trade openness has a negative and statistical effect on GDP per capita, as per the fixed-effects model. Finally, the sys-GMM verified that trade openness is not resilient across various openness measures and robustness regression estimates. In particular, the findings suggested that imports stifle growth while exports boost growth in Africa.

Pigka-Balanika (2013), used a sample of 71 developing countries over the period 1990 – 2005. Incorporating an augmented Solow growth model in a panel data analysis, this study supported the neoclassical theory of growth model that this study intended to use, his finding indicated that trade liberalization has a positive and significant effect on economic growth. However, the Sub-Saharan Africa region did not appear to be different; high natural barriers to trade, export dependence on primary commodities, and poor overland infrastructures to distant large markets could explain why increased trade openness does not contribute to economic growth.
To further support the theoretical literature, using static panel regression techniques, Belloumi, (2014), in his study, he investigated empirically the relationship between Trade openness (OPEN) and Foreign Direct Investment (FDI) on the economic growth for a panel of four (4) West African countries (Côte d'Ivoire, Ghana, Nigeria, and Senegal) during the period of 1998 to 2017. The evidence of his study suggested that aggregated trade openness, investment, and

inflation do have a positive and significant impact on economic growth, especially for developing countries. Based on static random effects, the addition of foreign direct investment (FDI) did not deviate from the results, notwithstanding its negative impact on economic growth. The contribution of trade openness, investment, and inflation was observed to be relatively higher than foreign direct investment.

Using the Augmented Dickey-Fuller (ADF) and Phillip-Peron (PP) unit root test, Gabriel and Arambada (2022), examined the effect of trade openness on the economic growth of Nigeria using data from 1970 to 2016. Their study findings indicated that Trade openness and economic growth depicted a positive relationship but a negative relationship existed between economic growth and exchange rate.

Nguyen and Toan (2019) examined the causal relationship between economic growth and trade openness for 15 Asian countries over the period 1990-2017 and applied panel cointegration and causality approaches to examine the long-run and causal relationship between variables. The Empirical results from their study confirm the presence of cointegration between variables, as the impact of trade openness on economic growth is found to be positive while the panel vector error correction model Granger causality analysis revealed the bidirectional causality between economic growth and trade openness.

By utilizing the Autoregressive Distributed Lag (ARDL) bounds test to cointegration and the Granger causality tests for the period from 1990 to 2017. Shayanewako (2018) investigated the relationship between trade openness and economic growth in the BRICS countries. His study confirmed the presence of a long-run relationship between trade openness and economic growth as Evidence from the bounds test of cointegration indicated that there exists a bi-directional causality from trade openness to economic growth in the BRICS countries. Furthermore, this study provided evidence of a unidirectional causality between trade openness and output growth, particularly in the case of China.

Stephen Esaku (2021), studied the relationship between trade openness (proxied by three indicators: openness, exports and imports) and economic growth in Uganda from 1983 to 2019 using the ARDL bounds testing approach to cointegration. The empirical results on the long-run relationship revealed the existence of a positive and statistically significant relationship when openness index and imports are used as proxy for trade openness. In the long-run, using exports to proxy for trade openness does not influence the relationship between trade openness and economic growth in any significant manner.

In the short-run, however, openness, exports and imports do lead to increased economic growth. This implies that a significant proportion of economic growth in Uganda has been due to short-run increase in exposure to trade, exports and imports in the country.

In sum, these results indicate that trade openness has a long-run positive impact on economic growth.

Mohamed Abdisalan Ahmed (2022) investigated the impact of international trade on Uganda's economic growth, taking into consideration key economic growth and international trade indicators. Secondary data was gathered. From 1988 through 2019, the study findings showed that Exports and economic growth have a significant positive association. In addition, there was a substantial negative connection between inflation and GDP and other factors. Exports and GDP had a substantial association coefficient when compared to trade and economic growth except for inflation, where the data demonstrated a substantial negative correlation between GDP and inflation, and there was a significant positive link between GDP and the studied variables.

Waleed Mohamed Youssef (2023) investigated the impact of trade openness on economic growth in Egypt. It adopted an Autoregressive Distributed Lag (ARDL) model to identify the short-run and long-run effects of trade openness on economic growth in Egypt from 1982-2020 while using the composite trade share (CTS) introduced by Squalli and Wilson (2011) as a measure of trade openness. The results show that trade openness contributes positively to economic growth in Egypt both in the short and long run.

2.4 Other factors that affect economic growth

2.4.1 Inflation and Economic Growth

Empirically, there are different studies among researchers about whether inflation has neutral, negative, or positive effects or impacts on Economic growth at certain levels.

Durguti (2019) carried out a study to investigate the inflation rate and its impact on the growth rate or GDP growth for Eurozone countries, using panel data for the period 1997-2017, on an annual basis with a total of 257 observations and multiple linear regression model with the least squares regression is used. The results indicate that the Inflation rate has a positive impact on the economic growth rate for the euro area.

A study by Tariq Ahmad (2022) about the relationship between inflation, and economic growth for Pakistan was carried out for the period between 1985 to 2019. The study used the Wald and F-Bound test to find out the long-term relationships between these variables and investigate the effect of Inflation on Pakistan economic growth and trade. Results indicate inflation is negatively affecting economic growth and terms of trade in the long run, which is in disagreement with the above study.

According to Olugbenga and Dada (2020), in the study research to examine the influence of inflation on the growth prospects of the Nigerian economy, the study employed the autoregressive distributed lag on the selected variables, that is to say; real gross domestic product (GDP), inflation rate, interest rate, exchange rate, degree of economy`s openness, money supply, and government consumption expenditures for the period 1980–2018. The study findings indicated that inflation and real exchange rate exert a significant negative impact on economic growth, while interest rate and money supply indicated a positive and significant impact on economic growth. This study related to the above findings of study, which indicated a negative effect on economic growth, however, it did not show whether it was significant or not.

2.4.2 Technological Development and Economic Growth

According to Hülya (2015), Technological development brings economic growth. However, it also enhances social wealth on the one hand by increasing income levels and wealth and causes certain social problems on the other hand.

Technology inflow is the major determinant of economic growth in a world that is rapidly moving towards an information-based economy (Tahir *et al*, 2020). Among the main benefits of technology inflows, we can mention the reduction in transportation costs, the improvement of marketing information, and the increase in the efficiency of industrial production (Jahanger *et al*, 2022). A large number of studies showed that telecommunications infrastructure is essential not only for domestic economic growth but also for attracting foreign direct investment and participating in increasingly competitive global markets (Ostic *et al*, 2022). As for the insufficient availability of ICT services, it constituted an obstacle to economic growth in the least developed countries.

Advanced technological developments facilitate international communications between parents and subsidiaries abroad in the current trend of global economic integration driven by cross-border investment by multinational corporations (Ahmed, *et al*, 2022). Technological developments, particularly in the field of information and communications technology, have facilitated new avenues for conducting business on a global scale (Kihombo *et al*, 2022).

Maximizing the use of technology development for developing countries requires an understanding not only of the opportunity technology inflows presents but also of the tradeoffs involved and of the particular ways in which ICT access has to be tailored if any developmental benefits are to be reaped (Porter & Kramer, 2019).

2.4.3 Labor force and Economic growth

The labor force has a significant contribution towards the Economic performance of the given economy in a specified period under study. Several studies yield related results as argued out in the subsequent literature.

According to Usman and Chinewndu, (2021), the autoregressive distributed lag (ARDL) and the novel dynamic ARDL (DYNARDL) simulation analysis over the periods 1981–2019 was used in the research about the role of electricity consumption, capital, labor force, carbon emissions on economic growth in Nigeria. The empirical results showed that electricity consumption, capital, and labor exert positive inelastic impacts, while carbon emissions exert negative inelastic significant impacts on economic growth in Nigeria. This suggests that there is a need to strengthen and have efficient labor to enhance the contribution of the sector to economic growth.

In the study about Demographic Change, Human Capital, and Economic Growth in Korea by Jong-Suk Han and Jong-Wha Lee (2019), over the past three decades results show human capital has grown steadily at about 1% per year, contrasting to a continuously declining trend of total work hours. The growth was attributed to a rise of better-educated baby boom cohorts. A growth accounting exercise shows that human capital contributes significantly to economic growth accounting for 0.5% points of annual GDP growth over the period. The findings are in agreement with the above study however, the above impacts are inelastic.

Korkmaz & Oya Korkmaz (2017) studied the relationships between labor productivity and economic growth in seven Organization for Economic Co-operation and Development (OECD) countries for the period between 2008 and 2014 by utilizing the panel data analysis method and the results showed unidirectional causality relationship from economic growth to labor productivity.

According to Itumeleng (2019), a study on the implications of Labour Productivity and Labour Costs on the South African Economy was carried out. There was use of the Ordinary Least Square (OLS) based Autoregressive Distributed Lag (ARDL) approach employed to analyse the quarterly time series data from 1998 to 2018 and the findings indicated labour productivity had a significant positive impact on economic growth but the labour costs had a significant negative impact on the economy of South Africa.

2.4.4 Exchange rate and economic growth

Recent studies have discovered an association between real exchange rate (RER) undervaluation and economic expansion. Different explanations for this link have been put out, but they all imply that developing nations should have stronger mechanisms (Baker *et al* 2023). Edmira (2014), using the Johansen cointegration method and Vector Error Correction Model, studied the possible impact of the real exchange rate on economic growth in Albania. The finding from this study indicated that the real exchange rate had no significant impact on the Albanian economy, suggesting that policies to promote economic growth, both in the short and long term should not rely on this variable.

Evidence showing the real exchange rate-growth relationship is more common in emerging nations was carefully analyzed and discovered. We demonstrated that his conclusion was sensitive to the standard employed to separate the sample into developed and developing nations. We discovered that the impact of currency undervaluation on growth is in fact greater and more consistent for emerging economies when using various classification criteria and empirical approaches to assess the existence of asymmetries between groups of nations. The least developed and richest nations however, were mainly excluded from the non-monotonic relationship between real exchange rate undervaluation and per capita GDP. This gap is a riddle that needs further investigation.

The real exchange rate has an impact on the economy by affecting important economic indicators including employment, inflation, and most notably economic growth. Because of increasing exports or imports, changes in the actual exchange rate have an impact on the growth of the trade balance (Baker *et al*, 2023).

According to Eunice, 2019 used the ARCH and GARCH Models introduced by Engle (1982) and Bollerslev (1986) to model the volatility of the exchange rate using monthly data from January 1983 to December 2010 to estimate the exchange rate volatility and to examine the effect of exchange rate volatility on economic growth in Ghana. The investigation covered the period between 1983 and 2010.The variables of concern were five in all which included Exchange rate volatility and Trade Openness, GDP per capita and Physical capital stock and Human capital stock. The exchange rate volatility variables generated were then used in the growth determinant function. The timeseries analysis the study employed is the Autoregressive Distributed Lag Approach. Conclusion drawn was that exchange rate volatility exerted significant negative effect on economic growth during the period both in the short and long run.

Using the Generalized Method of Moments (GMM) technique, Olanrewaju, (2019) examined the issues regarding the effects of inflation and real exchange rate on unemployment in Nigeria, his findings showed that real exchange rate depreciation and inflation have a positive impact on unemployment which in turn erodes the economic growth.

Since exports are more expensive, there is a potential for slower economic growth due to the strong real exchange rate. Because imports are less expensive, there is a greater demand for them (and a decrease in demand for domestically produced items). This lowers aggregate demand overall (Abdalla, 2021).

The cost of a nation's goods and services increases as its currency appreciates about other nations' currencies. Costs for imports decrease. In the long run, this can result in a decline in exports and an increase in imports (Singhal *et al,* 2019). Maintaining a constant currency rate is necessary because it gives importers and exporters more certainty, which promotes more international trade and investment assisting the government to keep inflation low, which can have beneficial long-term impacts like lowering interest rates (Roman, 2021).

2.4.5 Interest rate and economic growth

The cost of borrowing or profit on lending is what is referred to as the interest rate. A rise in interest rates typically motivates people to increase their savings because the latter increases income. The cost of capital also rises with an increase in interest rates, which reduces investment in the economy (Joof & Jallow, 2020). Because lower financing costs can encourage borrowing and investing, economies lower interest rates to boost economic growth. Rates, on the other hand, might encourage excessive growth and consequent inflation when they are too low, which would lower buying power and jeopardize the sustainability of economic development (Fekrazad, 2020).

According to Saba and Danish (2016), using random effect and system generalized method of moments (GMM) model separately to data from 17 non-Islamic and 17 Islamic countries from 2005 to 2013. They found out that people in Islamic countries are not concerned about the interest rate on saving, but in non-Islamic countries, the interest rate, per capita income, and inflation have significant positive impacts, and national expenditure has a significant negative impact on saving. However, in Islamic countries, remittances received and national expenditure has negative significant impacts, and per capita income has a positive significant impact on saving.

While Sergey *et. al.,* (2017), used a structural vector autoregression (VAR) to evaluate econometrically the effectiveness of the interest rate channel of the Bank of Russia's monetary policy transmission mechanism. They found out that, the analysis of international relatively tight monetary policies shows that high nominal and real interest rates may not dampen economic growth amid low inflation expectations, the economy’s attractiveness to foreign investors, the technology transfer effect and accumulation of domestic savings.

Khurshid, (2015) used a nexus Johansen Co-integration test for the long run and a Vector error correction model (VECM) for the short-run association throughout 2003-2012. His study findings indicated that there was a long-term relationship association among variables. It had a negative relationship in the long run but positive in the short run, thus, the effect of interest rates on investment scale is comparable to the opportunity cost of investment on total investment while investment income remained constant. Because of this, when investment costs rise, lower-income investors will surely leave the market, which will reduce investment demand, push up unemployment, lower income per capita, the tax base, and the country's GDP, all of which have an impact on how quickly the economy grows (Javid *et al.*, 2022).

However, as interest rates decline, investment costs come down, encouraging more investment and increasing total social investments. This affects economic expansion, due to reduced unemployment, increasing per capita income, and widening the tax base of the nation (Lian, Ma, & Wang, 2019).

2.4.6 FDI and Economic Growth

According to Das & Sethi (2020), they concluded that the contribution of FDI to Chinese growth is quite substantial (on the order of 3-4 percentage points per year). Noordzy *et al* (2016) states that, FDI strongly promotes income growth at national and provincial levels. Saidi & Hammami (2015) analyzed the growth performance of FDI in Chinese cities with data from 1990-2002 using GMM and found a positive effect of growth from FDI in these cities. Song & Wu (2022) used the augmented Solow-Swan model of Mankiw, Fischer (2018) data from provinces of China over the reform period 1978-2018, finds that FDI had a positive and statistically significant impact on economic growth as theory predicts and the augmented Solow-Swan model provides an excellent fit of the data.

Lastly, Nlandu and Kareem (2018), utilized panel data consisting of annual data covering the period 1988-2013 from 34 countries, including the six Organization of Eastern Caribbean States (OECS) economies, and estimated a dynamic panel growth model using the generalized method of moments (GMM). The empirical results showed that although FDI positively affects growth, its impact is minimal when considered in isolation. In other words, its significant effect was rather indirect.

2.4.7 Summary of the gaps identified in the literature review

The effects of trade openness on economic growth are still debatable on empirical grounds. From the reviews of the various literature, what appeared as a gap is that trade openness and its proxy variables have a mixed influence on economic growth, this could either be positive or negative as seen from the study from Esaku (2021) depending on the methodology and the period whether short run or long run. In the study findings by Mohamed Abdisalan Ahmed (2022) showed that Exports and economic growth have a significant positive association which contradicts with Esaku (2021) that used exports to proxy for trade openness which does not influence the relationship between trade openness and economic growth in any significant manner. This study left out some control variable like human capital and other variables that contribute to trade openness like real exchange rate and interest rate to be studied together.

Consequently, significant evidence using Solow’s and Swan's (1956) neoclassical growth theory seemed to suggest the importance of other factors that might determine economic growth. This study further introduced the new trade theory by Krugman (1979) to complement the growth theory to ably explain the short and long-run effects of trade openness on economic growth using time series data collected from Uganda between 1986-2021. The Researcher used variables that contribute to trade openness, which include; the real exchange rate, interest rate, FDI, and Inflation levels together with human capital as a control variable. These variables included help to ascertain the contribution trade openness to economic growth in the period under study (1986-2021).

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter provides the research methodology used for this study. It shows the research design, data types, and sources, specification of the econometric model, operationalization and measurement of variables, data analysis, diagnostic tests, and research ethics.

3.2 Research Design

A research design is the structure that guides the process of research from the formulation of the research questions and hypotheses to reporting the research findings (Kumar, 2018). In this study, a longitudinal research design using a quantitative approach adopted where secondary data, statistics and mathematical calculations were used. This research design was selected since it permits the use of the data collected over a long period. The research design best suits the area of study since the area of study was about one country over many points in time. It further helps to minimize the costs of data collection since data had already been collected.

3.3 Data types and sources

This study utilized time series data, which was obtained from the World Bank Development indicators database. It covered the period from 1986-2021 because that was the period for which the most reliable data was available to suit the research's intended purpose. In addition, this period was considered appropriate for study because it entails major reforms that include; trade reforms, revenue reforms, aid management and expenditure reforms that were adopted by Uganda after the economic wars and re-structuring of the economic policies under the main public financial management reforms.

3.4 Specification of the econometric model

This study aimed to examine the effects of trade openness on the economic growth of Uganda. The empirical model for analysis in this study was anchored on the neoclassical growth model by Solow (1956) where technological progress is exogenous. In the modification of the neoclassical growth theories, Mankiw, Romer, and Weil (1992) created a human capital augmented version of the Solow–Swan model that explains the failure of international investment to flow to poor countries (Mankiw, Romer & Weil, 1992). In this model output and the marginal product of capital (K) are lower in poor countries because they have less human capital than rich countries. Using the production function, hence, equation (iv) can be written as; $Y_t = \delta\ Open_t[K_t, L_t] + Hc_t$ …………………………………..……………. (v);

Where; Y_t is output or the Gross Domestic Product (GDP) at time t, K_t is physical capital stock or gross capital formation at time t; L_t is total labour force in the economy at time t; δ is a scaling factor or productivity parameter which reflects the state of technology of technological progress, Hc_t is Human Capital represented by average schooling years.

On the other hand, the new trade theory by Krugman (1979) provides a basis for free trade. However, additional control variables of trade openness were assumed to contribute to Solow (1956) in (v) above in that; Interest rate is assumed to influence the physical capital stock whereby when the interest rate on borrowing increases, interest rate is expected to directly have an impact on maintaining the physical capital stock. The exchange rate is assumed to affect the physical capital stock because of free trade globally. FDI is assumed to influence labour as it is expected to increase labour force because of increased economic activity. Finally, inflation is assumed to have an influence on the physical capital stock whereby when prices to maintain the physical capital are high inflation is expected to directly affect the level of economic activity.

These theories made a key contribution by providing substantial support for the analysis of the effects of trade openness on the economic growth of Uganda. Equation (v) becomes; $Y_t = \delta\ Open_t[K_t, L_t, IntR_t, Exch_t, FDI_t, Infl_t] + H_t + \mu e$ ………..………………. (vi);

Where; $IntR_t$ is interest at time t, $Exch_t$ is Exchange rate at time t, FDI_t is Foreign Direct Investment at time t, $Infl_t$ is Inflation rate at time t, μ represents observable factors that influence GDP at time t (Y_t) that are not explicitly indicated in the extended neoclassical growth model and e is the Euler's constant. The rest of the variables are defined as in equation (v) above.

In the empirical analysis, Y_t was measured by GDP (gdp) at time t; K_t was measured by gross capital formation at time t (gkf); L_t was measured by Total Labour force at time t (Tlf), and H_t was measured by Stock of human capital measured by average schooling years (Hc) at time t.

Introducing the variable notations in the empirical model, equation (vi) becomes: $gdp_t = \delta \; Open_t[gkf_t Tlf_t IntR_t Exch_t FDI_t, Infl_t] + Hc_t + \mu e$ ……………………..…(vii);

The ordinary linear econometric model was used in this study is as follows:

$Y_t = \beta_o + \beta_1 \chi_t + \beta_2 \chi_t + \cdots \ldots \ldots + \beta_n \chi_n + \mu_t$ ………………………………………….. (viii);

The applied econometrics model included trade openness and all other factors that control trade openness and economic growth, these include, interest rate, exchange rate, and FDI. The econometric model was transformed to achieve linearity and reduce errors within the model. The empirical relationship between Economic growth and its explanatory factors in equation (vii), we get a multivariate linear regression and this was obtained as follows; $\ln gdp_t = \beta_o + \beta_1 \ln Open_t + \beta_2 \ln gkf_t + \beta_3 \ln Tlf_t + \beta_4 \ln IntR_t + \beta_5 \ln Exch_t + \beta_6 \ln FDI_t + \beta_7 \ln Infl_t + \beta_8 \ln Hc_t + \mu_t$ ………………………………………………. (ix)

Where; $\ln gdp_t$ is the natural logarithm of GDP at time t, $\ln Open_t$ is the natural logarithm of Trade openness at time t, $\ln gkf_t$ is the natural logarithm of gross capital formation at time t, $\ln Tlf_t$ is the natural logarithm of total labor force at time t, $\ln IntR_t$ is the natural logarithm of interest rate at time t, $\ln Exch_t$ is the natural logarithm of exchange rate at time t, $\ln FDI_t$ is the natural logarithm of Foreign Direct Investment at time t, $\ln Infl_t$ is the natural logarithm of Inflation rate, $\ln Hc_t$ is the natural logarithm for Human capital measured by average schooling years at time t, $u(t)$ is the error component in the time series empirical model; and δ is a constant. As a way of standardization of the model variables, the above model was expressed in logarithm form. This helped to eliminate the possible condition of heteroscedasticity (lack of constant variance) and ensure that distributions are normal.

3.5 Operationalization and measurement of variables

From the neoclassical growth theory, GDP of the economy was predicted by variables in the table below;

Table 1: Variables, Data Type and Source

Variable	Definition	Unit of measurement	Data Sources	Expected sign
Dependent Variable				
Gross Domestic Product (GDP)	GDP is the sum of gross value added by all resident producers in the economy plus any product taxes minus any subsidies not included in the value of the products	(USD)	World Bank Development Indicators 2022	+/-
Independent variables				
Trade Openness	Total exports plus total imports as a proportion of GDP	Percentage	World Bank Development Indicators 2022	+/-
Foreign Direct Investment	Foreign direct investment (FDI) is an ownership stake in a foreign company or project made by an investor, company, or government from another country.	(USD)	World Bank Development Indicators 2022	+
Interest rate	The lending interest rate adjusted for inflation as measured by the GDP deflator	(USD)	World Bank Development Indicators 2022	-
Real Exchange rate	A measure of the value of a currency against a weighted average of foreign currency (a dollar) divided by a price deflator or index of costs	(USD)	World Bank Development Indicators 2022	-
Inflation	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that	Percentage	World Bank Development Indicators 2022	+/-

	may be fixed or changed at specified intervals, such as yearly.			
Stock of Human capital.	Human Capital is the skills, knowledge, and experience possessed by an individual or population, viewed in terms of their value or cost to an organization	(USD)	World Bank Development Indicators 2022	+
Total labour force	Total labour force includes people who are currently employed and unemployed at age 15 and older	Total number of labour force in the country for the given period of study.	World Bank Development Indicators 2022	+

3.6 Data Analysis

After the data was collected, the next step was analysis of the data. The study utilized STATA software to estimate a time series regression model.

3.6.1 Descriptive statistics

First, descriptive statistics were run to provide a general description of the study variables (LaFlair, Egbert & Plonsky, 2015). In particular, the descriptive analysis is presented by the mean, minimum, maximum variance, standard deviation, and coefficient of variation. This helped to ensure that there is normal distribution and to identify and deal with outliers etc. The descriptive analysis is presented in tables.

3.6.2 Correlation analysis

Under correlation analysis, the primary objective is to measure the strength or degree of linear association between two variables (Gujarati, 2004). In correlation analysis, we treat any (two) variables symmetrically; there is no distinction between the dependent and explanatory variables whereby, all variables were assumed to be random since correlation theory is based on the assumption of randomness of variables.

3.7 Diagnostic tests

The Data was processed and analyzed using the STATA statistical package. In the context of time series regression modeling, diagnostic tests were conducted to ensure that the data behaved well, was adequate for analysis, and that it would produce good results. These tests include; normality tests, multicollinearity tests, unit root tests, cointegration tests, and causality tests. These tests were conducted before regression analysis. This was also done to ensure that the model does not face any econometric problems and make sure that the model is BLUE (Best, Linear, and Unbiased Estimator) (Wu *et al.*, 2021).

3.7.1 Normality Test

A normality test was done to examine whether the error term is normally distributed in the model. The kernel density was used to examine whether the model is normally distributed (Gujarati, 2004)

3.7.2 Unit root tests

One of the major problems faced by times series data is having not having stationary variables over time. This test investigates the stationarity of the variables in a time series. The study used the Augmented Dicker Fuller (ADF) test, which, unlike the DF test, considers serial correlation in the series. According to Granger and Newbold (1974), a regression model with unit root means there is non-stationary which causes a spurious regression problem. Spurious regression means two variables are unrelated but show a high correlation when trending over time. For example, two variables can have a high r-squared and high autocorrelation but low Durbin Watson (DW) statistic even when both variables are unrelated and this may lead to unreliable results (Engle & Granger, 1987). Unit root tests revealed whether the time series variables in the model were stationary in levels or became stationary after differencing. If there is the presence of a unit root in any of the variables in our model, the stationarity can be secured through differencing the variables. Under this test, the null hypothesis is that there is a unit root if the probability value is greater than 0.05 and there is no unit root if the probability value is less or equal to 0.05.

3.7.3 Cointegration test in the regression

If the Unit Root Tests indicate that the study variables are non-stationary for example; are integrated of order one (I (I)), it will be justified to conduct a cointegration test. The test aimed to investigate whether there was the existence of a long-run equilibrium relationship in the empirical model. The Johansen and Juselius (JJ) test was used, which is useful where one is using a multivariate model and can capture more than one co-integrating vector.

Co-integration indicates the existence of a long-term equilibrium relationship among the variables (Granger and Newbold, 1974). Under this test, the Null Hypothesis: is that the variables are cointegrated if the probability value is greater than 0.05 and the variables are not cointegrated if the probability value is less or equal to 0.05.

3.7.4 Variance Inflation Factor for Testing Multicollinearity

Multicollinearity analysis is a statistical examination of the relationships between predictor variables within a regression model. It focuses on identifying instances where two or more predictor variables are highly correlated with each other, potentially leading to instability and unreliable coefficient estimates in the model. Multicollinearity can make it challenging to isolate the individual effects of each predictor on the outcome variable.

Multicollinearity analysis delves deeper by examining the interrelationships among all the predictor variables simultaneously. This analysis involved calculating variance inflation factors (VIF) to quantify the degree of multicollinearity. Variance Inflation Factor (VIF) results indicate how much a predictor variable's variance is inflated due to correlations with other predictors. According to Senthilnathan (2019), a Variance inflation factor (VIF) equaling (1) implies that there is no multicollinearity; a value between (1) and (5) represents low-level multicollinearity while a value greater than 5 represents high-level multicollinearity.

3.7.5 Autocorrelation test

Autocorrelation/Serial correlation is the relationship between a given variable and a lagged version of itself over various time intervals. According to Zovko (2008), serial correlation can happen in both time series data and cross-sectional data. The Breusch-Godfrey serial correlation test was used to detect the presence of the auto-correlation problem. Serial correlation occurs when the different values of different error terms are no longer independent. In this study, serial correlation was detected by the use of Durbin Watson test since the model does not have the lagged regressors.

3.7.6 Heteroscedasticity

A heteroscedasticity problem occurs when the error term variance is different or not constant across the observation or independent variables. If there is a detection of a heteroscedasticity problem, the model should be re-estimated by using the weighted or generalized least square method (Holgersson & Shukur, 2004). To test for the heteroscedasticity problem in the model, the Autoregressive Conditional Heteroscedasticity (ARCH) Test was carried out.

3.7.7 Granger Causality

A pairwise causality test between the dependent variable and the independent variables was done. The study utilized the Granger (1969) causality test to establish the direction of Granger causality and to identify the regressors whose lags can be included in the model to improve the model explanation.

3.8 Estimation of ARDL Long-Run and Short-Run Coefficient

The ARDL model was adopted because it is a more robust econometric technique for analyzing level relationships even when the sample size is small (Tang, Citation2004). Secondly, it can be employed regardless of whether the variables are integrated of order zero or one, that is, the variables can either be I(0)s and or I(1)s.

In the ARDL test, a regression equation was utilized to predict short-term and long-term effects using time series data. The researcher utilized Cointegration in the study to test if elements that have been in coherence for a long time were present. The underlying break was (ARDL) by Pesaran *et al.* (2001), to introduce an ARDL cointegration testing framework. In addition to short-term and long-term influences, the specified result took into account the link between these components.

3.9 Research Ethics

Research ethics are rules and norms that are expected to be followed while conducting social research, including professional standards and ethical principles. Observing ethical norms in research is vital as it enhances the goal of the research study. The study was guided by the ethical rules and standards set by Makerere University, Makerere University Business School, and the economic profession.

CHAPTER FOUR

RESULTS AND INTERPRETATION OF FINDINGS

4.1 Introduction

This chapter encompasses the outcomes of the investigation along with their explanations. Both descriptive and inferential analyses were presented, aligned with the predefined study objectives.

4.2 Descriptive statistics of variables

The table below presents a summary of the key descriptive statistics of all the variables in the empirical model. The Mean and standard deviation together with the minimum and maximum statistical results were generated to summarize the observed data. This was necessary because the means represent a summary of data while the standard deviation indicates how well the means represent data. The coefficient of variation (COV) was used to determine the degree of variability in the data. This is the ratio of the standard deviation to the mean. The coefficient of variation allows for comparison between distributions of values whose scales of measurement are not comparable (Olyanga *et al.*, 2022; Baltagi, 2014).

Table 2: The mean, standard deviation, covariance, minimum and maximum of all the variables

Variable	Mean	Std Dev	COV	Min	Max
In_ gdp	23.1055	0.8677	0.037554	21.7732	24.4248
In_ Open	2.2066	1.1096	0.502855	-3.7314	2.8263
In_ FDI	19.0295	2.4475	0.128616	11.6183	22.8526
ln_ IntR	16.3662	9.6649	0.59054	-0.4415	29.0311
In_ Exch	4.8925	0.4745	0.096985	4.5189	6.2365
In_ Infl	1.9659	1.1408	0.580294	-2.6765	3.6357
In_ Tlf	16.0618	0.3361	0.020925	15.517	16.6758
In_ gkf	21.4588	1.1382	0.053041	19.6188	23.0013

Source: *Compiled by the author based on World Bank development indicators.*

Gross Domestic Product: This is the dependent variable under this study. The descriptive statistics show that gross domestic product (In_ gdp) over the study period displayed a very low coefficient of variation of 3.76% indicating that GDP has precise estimates with a minimum gross domestic product that was approximately 21.77 billion USD and a maximum gross domestic product at approximately 24.4248 billion USD. This shows that based on the averages, the gross domestic product has been growing for the last thirty-five years.

Trade Openness: The results from the above table show that trade openness (In_ Open) constituted a moderate coefficient of variation of 50%. This indicates that trade openness has an impact that does not vary so fast in determining economic growth in the period 1987-2021. A minimum of -3.7314 USD and a maximum of 2.8263 billion USD Trade Openness is recorded. This implies that Trade Openness is not the most reliable variable to measure Economic growth in that period.

Foreign direct investment: The findings above in the descriptive statistics indicate that foreign direct investment (In_ FDI) constituted a low coefficient of variation of 12.86% indicating that it is a more reliable indicator of Economic growth, with a minimum foreign direct investment recorded at approximately 11.6183 USD and a maximum of 22.8526 billion USD. This implies that the foreign direct investment has been increasing for the period under study in Uganda hence being a reliable indicator.

Interest Rate: Notably, results show that Interest Rate (ln_ IntR) exhibits a relatively moderate coefficient of variation of 59.1% indicating that it is not such a reliable indicator of Economic growth since it contains a negative minimum interest rate at -0.4415 though has a maximum of approximately 29. 031.

Real Exchange rate: The findings above indicate that the real exchange rate (In_ Exch) had a coefficient of variation of 9.7% indicating Real exchange rate is a more reliable predictor of Economic growth other factors remain constant since it still has a minimum Real exchange rate of approximately 4.5189 billion USD and the maximum approximately at 6.2365 billion USD.

Inflation: The findings above indicate that inflation (In_ Infl) had a relatively moderate coefficient of variation of 58% meaning it is not such a reliable indicator to measure Economic growth due to its fluctuations that stretch to a negative minimum of approximately -2.6765% and the maximum at approximately 3.6357%.

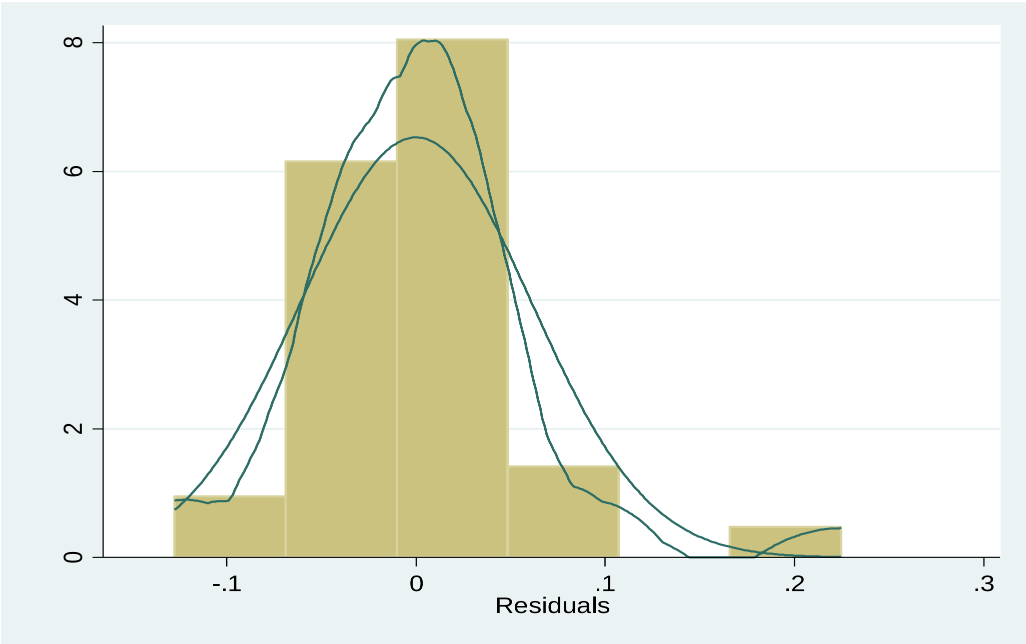
Total Labor force: Statistics in the table above show that the Total Labor force (In_ Tlf) had a lower coefficient of variation of 2.1% indicating Total labour force is a reliable indicator of Economic growth for this study, with a minimum of approximately 15.517 million people and a maximum of approximately 16.6758 million people. This means that the total labor force of Uganda has increased over time within the last 35 years under study.

Capital formation: The findings indicate that Capital formation (In_ gkf) exhibited a lower coefficient of variation of 5.3% indicating that it's a reliable predictor of Economic growth, with a minimum of approximately 19.6188 billion USD and a maximum of approximately 23.0013. This further indicates that Capital formation in Uganda has increased over time within the thirty- five years under study.

4.3 Testing for normality for transformed dependent variable.

This presents data on the transformed dependent variable of the study by kernel density. The data shows a normal distribution or skewness to either left or right.

Figure 1 : Normality test on the transformed dependent variable for Uganda from 1986 to 2021 using kernel density.



Source: *Generated by the author based on data on World Bank development indicators.*

A kernel density was used to estimate the smoothness of data under the normal distribution of the dependent variables in the model. The figure above portrays that data is normally distributed and results from the results imply that the transformed gross domestic product in US dollars is greatly performing well.

4.4 Unit root test for all model variables

The study deployed the Augmented Dicker fuller Unit root test to investigate whether variables are stationary at levels or first difference and the results are given in the table below. The Augmented-Dickey Fuller (ADF) test maintains the general decision rule that the null hypothesis of non-stationarity is rejected against the one-sided alternative. If the t-statistic is less than (lies to the left of) the critical value that is if the test statistic is less (more negative) than the critical value, or when the p-value statistic is less than 0.05 then the null hypothesis is rejected and concludes that the respective series of the study variables are stationary which is desirable for all series in this study.

Table 3: The Unit root test results on all model variables

Variable	**ADF (Variable in levels)**	**ADF (Variable in first difference)**	**Order of Integration**
In_ gdp	-0.134 (0.9459)	-3.332*** (0.0135)	I (I)
In_ Open	-3.560*** (0.0066)	___________	I (0)
In_ FDI	-1.911 (0.3268)	-4.529***(0.0002)	I (I)
ln_ IntR	-4.697*** (0.0001)	___________	I (0)
In_ Exch	-2.509 (0.1134)	-3.190***(0.0206)	I (I)
In_ Infl	-4.134***(0.0009)	___________	I (0)
In_ Tlf	4.328 (1.0000)	-1.328 (0.6164)	I (I)
In_ gkf	-0.910 (0.7846)	-3.933***(0.0018)	I (I)

Source: *Compiled by the author based on data on World Bank development indicators*

***** means significance at 1%, and ** means significance at 5%.***

Table 3 above demonstrates the summary of the unit root test results where; Trade Openness (In_Open), Interest rate (ln_ $IntR$), and Inflation (In_Infl) indicated by the "three-starred" values are stationary in levels and integrated of order zero, whereas variables of gross domestic product (In_gdp), Foreign direct investment (In_FDI), Real Exchange rate (In_$Exch$), Total Labor force (In_*Tlf*) *and* capital formation (In_gkf) indicated by the "three-starred" values are stationary at first differences and integrated of order one. Therefore, from the indicated results the series over the study period are integrated with mixed orders of zero for variables starred at levels and order one for the variables indicated at first difference.

Table 4: Test for Serial/Autocorrelation

Durbin's alternative test for autocorrelation

lags(p)	**F**	**df**	**Prob > F**
1	0.278	(1, 27)	0.6021
2	0.949	(2, 27)	0.4000

H0: no serial correlation

Table 5: Breusch-Godfrey LM test for autocorrelation

lags(p)	F	df	Prob > F
1	0.367	(1, 27)	0.5495
2	1.225	(2, 26)	0.3101

H_0: no serial correlation

While the Durbin-Watson test is aimed at an autocorrelation of 1st order, the Breusch-Godfrey test uncovers autocorrelation of higher orders.

Using the Breusch-Godfrey LM test for autocorrelation, autocorrelation is significant if the corresponding p-value is less than 0.05. The results show that the respective p-values were greater than 0.05, which implied that there was no autocorrelation in the model. The Breusch-Godfrey LM test results agreed with the Durbin-Watson test results. Therefore, the constant term is no longer statistically different from zero at the 5% level.

4.7 Co-integration test results

The study employed the co-integration test on all model variables due to Johansen (1991) and results are summarized in Table 6.

Table 6: Johansen test for Co-integration results

Trend: constant Number of obs =35 Sample: 1986 – 2021 Lags = 2

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	72	197.80817	.	355.9860	156.00
1	87	268.69417	0.98454	214.2140	124.24
2	100	302.7441	0.86506	146.1142	94.15
3	111	326.91028	0.75866	97.7818	68.52
4	120	345.31013	0.66120	60.9821	47.21
5	127	359.858	0.57504	31.8864	29.68
6	132	371.97117	0.50960	7.6600*	15.41
7	135	375.6673	0.19541	0.2678	3.76
8	136	375.80118	0.00784		

Source: Author's computations using data on World Bank development indicators

From Johansen's test for cointegration, the null hypothesis is rejected if the trace statistic is greater than the 5% critical value. The maximum ranks in the test results represent the null hypotheses. At maximum rank (0), the trace statistic of 355.9860 is greater than 156.00. Therefore, the null hypothesis is that, there is no cointegration rejected implying that there is cointegration. The same conclusion of the presence of cointegration is made for maximum ranks 1 up to 5. However, at maximum rank 6, the trace statistic (7.6600) is less than the 5% critical value (15.41) implying that there are six (6) cointegrating equations.

In conclusion, the cointegration test results confirm that there is sufficient evidence of the presence of long-run equilibrium relationships between gross domestic product (InGDP) and its determinants.

4.8 Test for multicollinearity among the variables

This portrays whether there is inter-dependency among the explanatory variables as presented in the table below.

Table 7: Multicollinearity among the explanatory variables

Variable	**VIF**	**1/VIF**
Ln_ Exch	4.16	0.2406
Ln_ Open	2.63	0.3798
Ln_ gkf	2.24	0.4467
Ln_ FDI	1.8	0.5555
Ln_ Infl	1.38	0.7254
Mean VIF	2.44	

From Table 7 above, a Variance Inflation Factor was employed to test for multicollinearity. According to Senthilnathan (2019), a Variance inflation factor (VIF) equaling (1) implies that there is no multicollinearity; a value between (1) and (5) represents low-level multicollinearity while a value greater than 5 represents high-level multicollinearity. From the results in Table 7, a VIF value of 2.44 represents low-level multicollinearity, which calls for correction in a regression model. The interest rate and total labour force were dropped by VIF in STATA since their VIF values were out of the tolerance range for multicollinearity. The above variables in Table 7 can only be used in the normal regression model but the dropped variables can be included in the ARDL model, which is not affected by multicollinearity.

4.9 Heteroskedasticity test results

The study deployed Cameron and Trivedi's decomposition of the LM-test to check for the presence of Heteroskedasticity and the results are summarized in table 8 below.

Table 8: Cameron & Trivedi's decomposition of IM-test

LM test for autoregressive conditional Heteroskedasticity (ARCH)

lags(p)	**chi2**	**df**	**Prob>chi2**
1	0.484	1	0.4868
2	0.476	2	0.7882
3	0.811	3	0.8469

H0: no ARCH effects vs. H1: ARCH(p) disturbance

Given the probability value of 0.4868 which is greater than 0.05, we reject the null hypothesis. We therefore conclude that the variance of the error term is constant hence there is homoscedasticity.

4.10 The regression estimates of the Granger Causality Test

The possibility of the presence of reverse causality between the dependent variable and the independent variables prompts the study to estimate the empirical model using Granger causality test estimation techniques, which adjust for the endogeneity bias and correct for omitted variable bias due to time-invariant heterogeneity effect across the gross domestic product variable.

A summary of the results in this regard is shown in table 9 below;

Table 9: The Granger causality Wald tests results

Excluded	chi2	df	Z-bar Tilde Stat.	p-value
"In_ gdp" does not Granger Cause "In_Open"	9.4034	2	3.96***	0.009
"In_Open" does not Granger Cause "In_ gdp"	1.5118	2	2.98	0.470
"In_ gdp" does not Granger Cause "In_FDI"	9.2805	2	2.78***	0.010
"In_FDI" does not Granger Cause "In_ gdp"	0.50641	2	-0.34	0.776
"In_ gdp" does not Granger Cause "ln_ IntR"	7.1241	2	2.42***	0.028
"ln_ IntR" does not Granger Cause "In_ gdp"	1.7001	2	7.79	0.427
"In_ gdp" does not Granger Cause "In_ Exch"	0.32242	2	-0.40	0.851
"In_ Exch" does not Granger Cause "In_ gdp"	6.8708	2	0.03***	0.032
"In_ gdp" does not Granger Cause "In_ Infl"	11.734	2	2.69***	0.003
"In_ Infl" does not Granger Cause "In_ gdp"	43.072	2	1.01***	0.000
"In_ gdp" does not Granger Cause "In_ Tlf"	12.544	2	3.17***	0.002
"In_ Tlf" does not Granger Cause "In_ gdp"	2.8289	2	1.70	0.243
"In_ gdp" does not Granger Cause "In_ gkf"	1.5465	2	-0.27	0.462
"In_ gkf" does not Granger Cause "In_ gdp"	17.34	2	0.03***	0.000

Source: *Compiled by the author based on data on World Bank development indicators*
********* *means that the estimate is statistically significant at 1 percent level of significance.*

Interpreting the estimated results of the Granger Causality test, the initial observation was that there is a causal relationship between Gross Domestic Product and Trade Openness at a 1 % level of significance by 3.96 meaning GDP causes a change in trade openness. There is a causal relationship between Gross Domestic Product and Foreign Direct investment at a 1% level of significance by 2.78, which implies GDP causes a change in FDI; there is a causal relationship between Gross Domestic Product and Interest rate at a 1 % level of significance by 2.42 meaning GDP causes a change in interest rate. There is a further causal relationship between the Real Exchange rate and GDP at a 1% level of significance by 0.03, which means that the Real Exchange Rate causes a change in GDP. There is a causal relationship between GDP and the total labour force at a 1% level of significance by 3.17, which implies that GDP causes a change in the total labour force. There is a causal relationship between capital formation and Gross Domestic Product at a 1% level of significance by 0.03, which implies that Capital formation causes a change in GDP. On the other hand, a causal relationship between GDP and inflation and a causal relationship between inflation and GDP is realized at a 1% level of significance, which implies that Inflation and GDP cause each other.

4.11 Correlation analysis

Correlation analysis displays the coefficients and association between the different variables one at a time. The presented correlation matrix reveals the relationships between the study variables: GDP growth, Trade openness, Foreign Direct Investment, Real Interest Rate, and Inflation as indicated in table 10 below.

Table 10: Correlation between dependent and independents variables

Variables	**1**	**2**	**3**	**4**	**5**	**6**
In_gdp	1.000					
In_ Open	0.276	1.000				
In_FDI	0.617**	0.212	1.000			
In_ Exch	-0.530**	-0.759**	-0.500**	1.000		
In_Infl	-0.321***	-0.409***	-0.346***	0.509**	1.000	
In_ gkf	0.984**	0.387***	0.625**	-0.656**	-0.365***	1.000

*****. Correlation is significant at the 0.01 level (2-tailed).***
****. Correlation is significant at the 0.05 level (2-tailed).***

The correlation matrix reveals that there is a 5% significant strong positive association between Gross Domestic Product and Foreign Direct investment because the coefficient 0.617 is greater than 0.5. Notably, Capital formation has a 5% significant strong positive association with GDP because the correlation coefficient of 0.984 is much closer to one (1). In addition, Trade openness has a weak positive association (0.276< 0.5) with GDP but the relationship is not significant at a 5% level of significance.

However, the Real exchange rate and GDP are moderately negatively associated with a correlation of -0.53 and this association is significant at a 5% level of significance. Similarly, Inflation has a weak negative association (0.321<0.5) with GDP but the relationship is not significant at a 5% level of significance. Although correlation coefficients can provide insights into potential associations, causation cannot be inferred solely from these correlations. Therefore, a further analysis is required to correctly make conclusions.

4.12 The Autoregressive Distributed Lag (ARDL) model

According to Engle (1987), the ARDL has advantages over other estimation methods and the major advantage is that it avoids problems of serial correlation and endogeneity. Therefore, under the ARDL model, the dependent variable (gross domestic product) was regressed against the independent variables. The results of the ARDL model are summarised in table 11 below;

Table 11: Results of the estimated ARDL model.

Variables	**Coef.**	**Std. Err.**	**p>|t|**	**[95% Conf. Interval]**	
D.Ln_GDP					
ADJ					
Ln_GDP					
L1.	-1.0602	0.2730	0.001	-1.6315	-0.4888
Long run					
In_Open	0.0074	0.0626	0.908	-0.1236	0.1384
In_FDI	0.0313	0.0359	0.395	-0.0439	0.1065
ln_ IntR	-0.0083	0.0206	**0.002**	-0.0515	0.0349
In_ Exch	0.4739	0.1743	**0.014**	0.1091	0.8387
In_ Infl	0.0191	0.0267	0.484	-0.0369	0.0751
In_ Tlf	0.5678	0.4935	**0.005**	-0.4652	1.6008
In_ gkf	0.7397	0.0901	**0.000**	0.5510	0.9284
Short run					
In_Open					
D1.	-0.0059	0.0273	0.831	-0.0631	0.0513
In_FDI					
D1.	0.0022	0.0279	0.938	-0.0561	0.0605
ln_ IntR					
D1.	-0.1061	0.1311	**0.004**	-0.3805	0.1683
In_ Exch					
D1.	-0.1776	0.2781	**0.031**	-0.7598	0.4045
In_ Infl					
D1.	-0.0159	0.0164	0.345	-0.0503	0.0185
In_ Tlf					
D1.	-2.6022	5.2017	0.623	-13.4894	8.2850
In_ gkf					
D1.	-0.1528	0.1910	**0.034**	-0.5526	0.2471
Cons	-4.8214	8.2981	0.568	-22.1895	12.5468
R-squared = 0.8870; Prob>F= 0.0000					

D1 = Means the first difference of the variable in the respective brackets as indicated above.
Source: *Author's computations using data on World Bank development indicators*

Using the ARDL model, the results above show that model fits Prob>F= 0.0000 and the coefficient of determination (R-squared) is 0.8870. This means that 88.70% of variations in gross domestic product are explained by independent variables in the model. However, there is 11.3%, which is explained by other factors. The coefficient of the error correction term was found to be negative (-1.0602) and significant at a 5% level of significance. The coefficient of the error correction term represents the speed of adjustment toward long-run equilibrium from any short-run shock in the independent variables (Qamruzzaman and Jianguo, 2018). Thus, the coefficient of the error correction term in the table above indicates that the speed of return to equilibrium from short-run disequilibrium is about 106%.

The Short Run cause effect

In the short run, the ARDL model results in Table 11 above show that Interest rate, Real exchange rate, and Capital formation are statistically significant since their p-values are less than the 0.05 level of significance. This implies that holding other factors constant, the elasticity of GDP with respect to interest rate is -0.1061 suggesting that, if the interest rate increases by one unit, on average, GDP will reduce by 0.1061times which implies that for GDP to increase, the interest rate has to reduce. Such findings are realistic and this can be done through use of the central bank rate to influence interest rate; the elasticity of GDP with respect to the Real exchange rate is -0.1776 suggesting that, if Real exchange rate increases by one unit, on average, the GDP will reduce by 0.1776 times which means that, for GDP to increase, the real exchange rate in the economy has to be in favorable for the economy. The results appear like that in the short run because of fluctuations of some foreign currencies against the local currency; the elasticity of GDP with respect to capital formation is -0.1528 suggesting that, if capital formation increases by one unit, on average, GDP will reduce by 0.1528 times which means, for GDP to increase, the capital formation in the economy needs to be boosted.
On the contrary, Trade openness, FDI, Inflation and Total labour force are statistically insignificant since their p-values are greater than the 0.05 level of significance thus, the country's GDP is not much responsive to changes in; Trade openness, FDI, Inflation, Total labour force respectively. Trade openness was found insignificant with GDP growth in the short run due to unreliable economic activities carried out like agricultural production which largely depend on natural factors like rain among others since it is the main back born of Uganda's economic activity.

Long Run cause effect

In the long run, results from Table 11 above indicate that interest rate, real exchange rate, total labour force, and capital formation are statistically significant since their p-values are less than the 0.05 level of significance. This implies that holding other factors constant, the elasticity of GDP with respect to interest rate is -0.0083, suggesting that, if interest rate increases by one unit on average, GDP will decrease by 0.0083 times meaning, for GDP to increase, interest rate has to be reduced by use of the central bank rate, the elasticity of GDP with respect to Real exchange rate is 0.4739 suggesting that, if Real exchange rate increases by one unit on average, GDP will increase by 0.4739 times which means GDP is very responsive to changes in real exchange rate in long run. The elasticity of GDP with respect to Total labour force is 0.5678 suggesting that, if total labour force increases by one unit on average, GDP will increase by 0.5678 times, which implies that GDP growth is very responsive to changes in Total labour force, the elasticity of GDP with respect to Capital formation is 0.7397 suggesting that, if Capital formation increases by one unit on average, GDP will increase by 0.7397 times meaning, GDP growth is very much responsive to changes in Capital formation. This follows basic growth theories, which stipulate that an increase in capital leads to an appreciation in the rate of gross domestic product as savings is required for economic growth (Solow 1956).

On the contrary, Trade openness, FDI, and Inflation are statistically insignificant since their p-values are greater than the 0.05 level of significance thus, the country's GDP is not much responsive to changes in; Trade openness, FDI, and Inflation respectively.

Table 12: Showing ARDL Regression

Variables	**Coefficient.**	**Robust Std. Err.**	**p>|t|**	**[95% Conf. Interval]**	
In_Open	0.00562	0.01693	0.743	-0.02907	0.04030
In_FDI	0.01314	0.00666	0.058	-0.00050	0.02678
ln_ IntR	-0.01046	0.01317	0.434	-0.03744	0.01652
In_ Exch	0.45673	0.07364	**0.000**	0.30588	0.60758
In_Infl	-0.00551	0.01205	0.651	-0.03020	0.01918
In_ Tlf	0.78288	0.21229	**0.001**	0.34803	1.21773
In_ gkf	0.71752	0.06121	**0.000**	0.59214	0.84290
Cons	-7.18119	3.57432	0.054	-14.50285	0.14048

Table 12 above shows robust standard errors, which are different from standard errors in Table 11. The robust standard error implies that the standard errors are unbiased and hence give results that are more reliable.

Based on Table 12 above, the regression equation is therefore fitted as; GDP=-7.18119+0.0562Open+0.0131FDI-0.0105 $IntR$+0.4567$Exch$-0.0055Infl+0.7829 Tlf +0.7175 gkf,

Table 12 above further indicates that the Real exchange rate, Total labour force, and Capital formation are statistically significant since their p-values are less than the 0.05 level of significance. This, therefore, means that holding other factors constant; the elasticity of GDP with respect to Real exchange rate is 0.45673 suggesting that, if Real exchange rate increases by one unit on average, GDP will increase by 0.45673 times thus, the country's GDP is very responsive to changes in Real exchange rate, the elasticity of GDP with respect to Total labour force is 0.78288 suggesting that, if total labour force increases by one unit on average,GDP will increases by 0.78288 times which means total labour force contributes positively to the country's GDP growth; and finally, the elasticity of GDP with respect to Capital formation is 0.71752 suggesting that, if Capital formation increases by one unit on average, GDP will increase by 0.71752 times which means Capital formation affects GDP growth Positively.

On the contrary, Trade openness, FDI, interest rate, and inflation are statistically insignificant since their p-values are greater than the 0.05 level of significance thus, the country's GDP is not much responsive to changes in; Trade openness, FDI, interest rate, and inflation respectively.

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CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the discussion of the findings, conclusion, and recommendation of the study.

5.2 Discussion of the findings

The discussion of the findings is based on the main objectives of the study as follows;

To examine the short run effects of trade openness on the economic growth of Uganda.

The findings demonstrate that in the short run, trade openness has no significant effect on the Uganda's Gross Domestic Product during the period from 1986 to 2021. This is in line with the findings by Stephen, E. (2021) in the long-run, using exports to proxy for trade openness in Uganda. The results however contradict with Krugman theory (1979) which talks about the economies of scale brought about due to mutually trade relationships among economies. The results could be due to the disturbances in trade with other countries as a result of quality issues in short run in the period under study.

To examine the long-run effects of trade openness on the economic growth of Uganda.

In the long run, the results of the ARDL model indicate that trade openness has no significant effect on the Uganda's Gross Domestic Product during the period 1986 to 2021. Such results do not match with Stephen, E. (2021) when openness index and imports are used as proxy for trade openness. This was due to different approaches used in the methodology where this study used one equation with many control variables and there other used three equations.

To establish the contribution of Foreign Direct Investment on the economic growth of Uganda.

Results from this study show that, there is a statistically insignificant effect of Foreign Direct Investment and Gross Domestic Product in the period of 1986 to 2021 in the short and long run as well as in the final fitted model. The result contradicts with empirical results (Das & Sethi (2020), Noordzy *et al* (2016). The results still contradict with the growth theory. This was a result of profit repatriation by foreign investors hence contributing less to growth of the economy.

To examine the impact of interest rates on the economic growth of Uganda.

The findings revealed that interest rate exhibited a statistically significant negative effect on Uganda's GDP both in the short and long run since its p-values were less than the level of significance. This implies that a rise in Interest rate leads to a reduction in the country's GDP growth in both the short, and long run. Such a result is in line with the neoclassical growth theory, which assumes that Government policies can affect the rate of economic growth by influencing the amount of savings and investment (Solow and Swan, 1956). The interest rate affects savings and investments in a way that when the central bank rate is increased, it discourages investors from going for loans to invest and when people do not invest, they save less as the little left may be consumed.

However, the cost of capital also rises with an increase in interest rates, which reduces investment in the economy (Joof & Jallow, 2020). Because lower financing costs can encourage borrowing and investing, economies lower interest rates to boost economic growth. Raising interest rates, on the other hand, might encourage excessive growth and consequent inflation when they are too low, which would lower buying power and jeopardize the sustainability of economic development (Fekrazad, 2020). On the contrary, the ARDL Regression, which includes robust standard errors, indicated an insignificant effect of interest rate on GDP growth.

To examine the influence of the exchange rate on the economic growth of Uganda

Findings have indicated that there is a statistically significant positive effect of Real exchange rate on Uganda's Gross Domestic Product both in the long run and in the final fitted ARDL model. This implies that the real exchange rate leads to the country's GDP growth in the period under study. A stronger domestic currency would require more of the local currency by the foreign buyer, which makes the local product more expensive thus reducing demand for local products by the international market. These findings are in support of Olanrewaju, (2019) who examined the issues regarding the effects of inflation and real exchange rate on unemployment in Nigeria, his findings showed that real exchange rate depreciation have a positive impact on the economic growth.

More so, the real exchange rate has an impact on the economy by affecting important economic indicators including employment, inflation, and most notably economic growth. Because of increasing exports or imports, changes in the actual exchange rate have an impact on the growth of the trade balance (Baker *et al*, 2023). This is in line with the new trade theory, which talks about the increasing returns to scale, and brings about the country's GDP growth because of the positive effect of exchange rate.

However, according to Eunice Adjei, 2019 who analysed the relationship between exchange rate volatility and economic growth in Ghana, findings indicate that the estimation results concluded that exchange rate volatility exerted significant negative effect on economic growth during the period both in the short and long run.

5.3 Conclusion

The purpose of the study was to examine the effect of Trade Openness on economic growth in Uganda for the period from 1986 to 2021. The conclusion was Based on the study objectives below;

On the objective of examining the short and run effects of trade openness on the economic growth of Uganda; the findings demonstrate that both in the short run and long run, trade openness has no significant effect on the Uganda's Gross Domestic Product during the period from 1986 to 2021.

On the objective of establishing the contribution of Foreign Direct Investment on the economic growth of Uganda; results from this study show that, there is a statistically insignificant effect of Foreign Direct Investment and Gross Domestic Product in the period of 1986 to 2021 in the short and long run.

On the next objective of examining the impact of interest rates on the economic growth of Uganda; the findings revealed that interest rate exhibited a statistically significant negative effect on Uganda's GDP both in the short and long run since its p-values were less than the level of significance which implies that a rise in Interest rate leads to a reduction in the country's GDP growth in both the short, and long run.

However, the cost of capital also rises with an increase in interest rates, which reduces investment in the economy (Joof & Jallow, 2020).

On the last objective of examining the influence of the exchange rate on the economic growth of Uganda; findings indicated a statistically significant positive effect of Real exchange rate on Uganda's Gross Domestic Product in the long run. More so, the real exchange rate has an impact on the economy by affecting important economic indicators including employment, inflation, and most notably economic growth. Because of increasing exports or imports, changes in the actual exchange rate have an impact on the growth of the trade balance (Baker et al, 2023).

5.4 Recommendation

Exchange Rate Stability: While the direct influence of the real effective exchange rate on GDP growth is very significant, policymakers should focus on measures to enforce exchange rate stability. Exchange rate fluctuations can impact competitiveness, indirectly affecting economic growth. Efforts to manage exchange rate volatility and improving export competitiveness, should remain integral to economic policies.

Emphasis on stabilizing interest rate. Policy makers should strengthen on use of the central bank rate promptly since it affects savings and investments through controlling interest rate hence affecting economic growth of the economy.

5.5 Limitations of the study

The results of the ARDL model may be subject to endogeneity, where the relationships between the dependent and independent variables might be influenced by unobserved factors. Omitted variable bias could also affect the estimated coefficients, particularly if relevant variables are not included in the model. Future research should consider conducting additional tests for endogeneity and exploring potential omitted variables to ensure the robustness of the findings. The researcher encountered a challenge while extracting data from World Bank development indicators. This manifested in some variables with minimal data gaps not recorded in some years. This was rectified using recommended statistical approaches to minimise data gaps that enabled the researcher to carry out the study within the recommended minimum period coverage for a time series study.

Finally, the other limitation was insufficient information about the study. This has been much at the forefront when looking for enough literature about the study. There has been limited literature about trade openness and economic growth in Uganda to refer to.

5.6 Area of further studies

Future studies can focus on the effects of free trade on sectoral-level economic growth as disaggregated data would provide more information at the sectoral level. Moreover, different indicators of development can be used to test the effects of trade openness on economic development.

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