

FOREIGN DIRECT INVESTMENT- ECONOMIC GROWTH NEXUS IN UGANDA

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DECLARATION

I, AKWEISE MOREEN, state that the research study “Foreign Direct Investment -Economic Growth Nexus in Uganda” is my original work.

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APPROVAL

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ABSTRACT

The research examined the causal interaction between Foreign Direct Investment (FDI) and Economic Growth using annual time series data spanning from 1983 to 2021. Data was obtained from the Ministry of Finance Planning and Economic Development (MoFPED), Bank of Uganda (BoU), Uganda Revenue Authority (URA), and the World Bank. The research employed a VAR test, where FDI causes economic growth in Uganda.

Furthermore, ARDL approach was used to investigate the factors influencing economic growth in Uganda. In the long-run, inflation and trade openness have a positive and statistically significant effect on GDP at 5% level of significance. In addition, the lending interest rate and exchange rate were found to have a negative and statistically significant effect on GDP. In the short run, economic growth is positively influenced by FDI and the exchange rate at 5% level of significance, while it is negatively influenced by inflation and the lending interest rate.

The study recommends the need to channel foreign direct investments in strategic economic sectors like energy, oil and gas and transportation that have stronger economic growth multipliers by offering a range of tax incentives, holidays/ concessions and breaks, the need for Bank of Uganda to control the high lending interest rates offered by commercial banks, and the need to promote trade openness by reducing barriers to trade such as quotas, tariffs and non-tariff barriers to create a more open and predictable trade environment.

CHAPTER ONE: INTRODUCTION

The chapter centers around several key aspects, including the background to the study, the statement of the problem, identified objectives, corresponding research questions and hypotheses.

1.1 Background to the Study

According to Kerner (2014), investments made in the economy of another country by a foreign corporation or individual are referred to as Foreign Direct Investment (FDI).

Foreign Direct Investment (FDI), which transfers technology and information across participating nations, has evolved over the last three decades as one of the most significant foundations of globalisation and a key engine for economic growth. It provides the gaining nation or the foreign company/organisation that receives the investment with access to organisational technology, products, new technologies, processes, capital and cutting-edge administration approaches. All of these are regarded as having an impact on an economy's development and growth.

Economic development and growth are gradual rise in a nation's output of goods, both internal and external services, over time and is attained once an economy is able to produce more output in one period of time compared to the former period of time. The foremost goal of many micro and macroeconomic policies is the need to promote the growth of the economy's goods and services, which is frequently regarded as a crucial measure of a nation's wealth. The world's economy has seen steady growth in the recent years. World Bank states that the global GDP has grown by an average of 2.7% annually since 1990.

According to UNCTAD (2021), worldwide FDI inflow decreased by 35% in 2020, reaching \$1 trillion, due to the corona virus pandemic's effects on the global economy and for the same reason, FDI inflows to East Africa also decreased by 17%, reaching \$6.6 billion.

The trends on the FDI and growth in Gross Domestic Product (GDP) relationship in the Ugandan economy is rooted in the country's recent economic history.

During 2022, FDI in Uganda grew to \$474.8 million (about Shs1.769 trillion), up 35% from the third quarter, according to a report from Pan Finance. The expansion was brought on by increased activity in the oil industry. A recovery of investor confidence was also indicated by the bank's reporting of an 18% reduction in capital withdrawals, totaling \$227.6 million (about Shs845.8 billion).

The World Bank estimates that Uganda's GDP has increased by 6.1% yearly on average since 1990 with a GDP growth of 6.5% in 2019. The poverty rate in Uganda has significantly decreased during the past few years, dropping from 56% in 2006 to 21% in 2016.

Foreign Direct Investment for some time has been recognised to be a potential catalyst for the economic growth of Uganda's economy. To attract foreign investors, the government has implemented various policies such as tax incentives, simplified investment procedures, and initiatives to enhance infrastructure. However, the association between FDI and the growth of Uganda's economy is not adequately comprehended.

Since the early 1990s, Uganda has undergone a sequence of economic events with the aim of liberalisation of the economy, attracting foreign or external investors, and promoting private sector-led growth. Significant influxes of Foreign Direct Investment into Uganda due to these reforms have been seen, particularly in the manufacturing, service, and natural resource sectors. It should be noted that with an average yearly Gross Domestic Product growth rate of almost 6% over the previous 10 years, the Uganda economy is one of the fastest growing

countries in terms of the economy in Africa. According to UNCTAD (2021), this growth has been significantly fuelled by FDI. Between 2015 and 2019, Uganda attracted an average of USD 1.3 billion in FDI per year.

Some studies for example those by Semwanga (2011) indicate that the inflows as a result of FDI are an exogenous source of growth in the Ugandan economy, implying that FDI influences economic growth. This is because FDI brings in new technologies, capital, and managerial skills that can enhance productivity, increase efficiency, and stimulate economic growth. Additionally, FDI can create relationships between foreign and domestic firms, leading to the transmission of knowledge, skills plus technology that can foster economic development.

Conversely, some studies (Wabiga and Nakijoba, 2018) suggest that the growth in the economy is an endogenous factor that attracts FDI in Uganda. This view implies that economic growth creates a conducive environment for FDI, characterised by a stable macroeconomic environment, a skilled labor force, developed infrastructure, and favorable investment policies. In this context, economic growth can enhance the profitability of investments and reduce investment risks, enticing more FDI inflows into the economy.

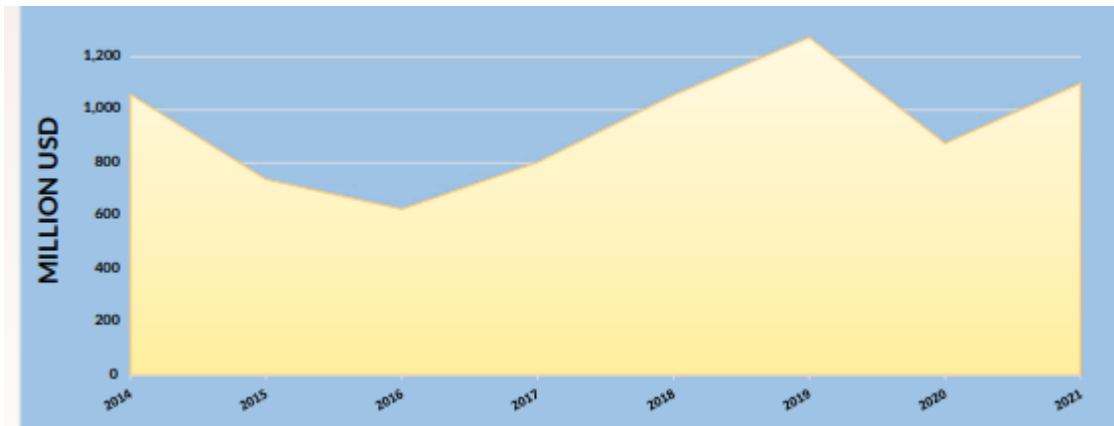
Numerous researchers have examined the connection between Foreign Direct Investment and the growth of the economy in Uganda, with an adverse mixture of results. There are studies that propose a strong positive connection between FDI and the overall growth in the economy, while others highlight the importance of several aspects, such as the aspect of the FDI inflows, institutional quality and human capital. These studies have generally used cross-sectional or time series data and simple regression analysis, which may not capture the dynamic and complex aspect of the linkage in the FDI and Economic growth nexus.

In Uganda, this remains debatable, and both views can hold true depending on the context and specific circumstances. However, it is extensively recognised that FDI and the overall growth in the economy are interdependent, and policies that promote FDI and nation's economic growth can stimulate sustainable development in Uganda.

Despite the increasing inflow of FDI, Uganda's economic growth performance has relatively and unevenly been modest. Between the year 2000 and 2020, the average growth rate in the GDP of the country was 4.8%, which is below the target of 7% set in the country's National Development Plan. Moreover, the advantages of FDI inflows for the development of the economy have not been evenly distributed across sectors and regions, with some sectors and regions benefiting more than others.

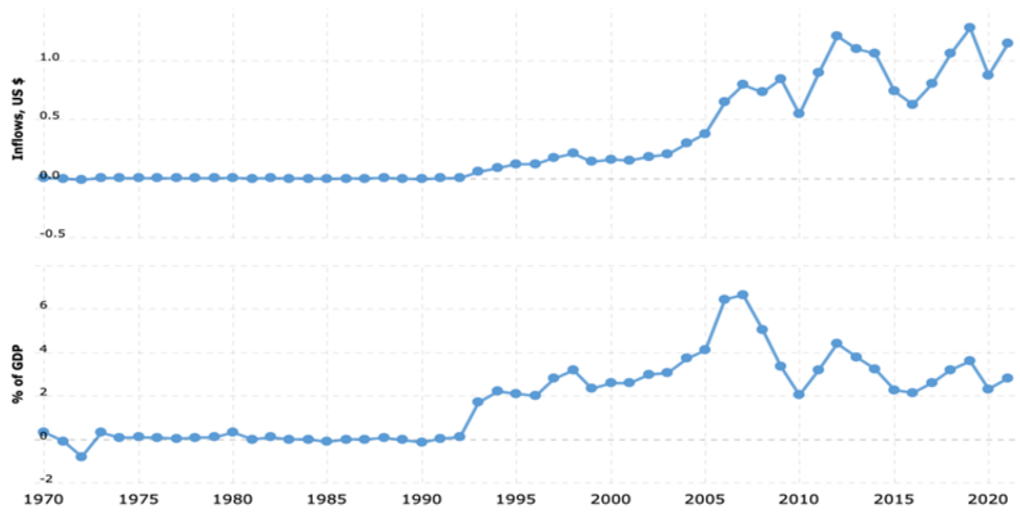
Therefore, there is a need for an extensive and systematic study on the two variables in Uganda, with the use of appropriate econometric methods to assess causality and identify the ways how FDI can contribute to growth. Such a study can deliver understandings into the possible benefits and challenges of FDI for Uganda's economic development and inform policy decisions aimed at attracting and maximising the benefits of FDI inflows.

Figure 1.1: Foreign Direct Investment Performance, 2014 – 2021



Source: BOU, 2022

Figure 1.2: Trends of Uganda’s FDI and the Growth in the Economy from 1970-2020



Source: WB, 2019

1.2 Statement of the Problem

FDI is regarded as a key channel for obtaining the funds necessary for investments, which in turn spurs the growth in the economic activities of an economy. The resources available to Uganda to finance long-term investments are insufficient and it is a hindrance to achieving a sustainable economic growth. Uganda has been actively promoting FDI as a key driver of

growth in the economy, but there exists no observed evidence on the causal association between FDI and the overall growth in the country's economy. While FDI influxes have amplified in current years, there is a need to understand whether these inflows are actually leading to economic growth. More so, there is still the matter of causality despite the conflicting theories regarding the connection amidst FDI influxes and the Economic Growth, that is, does Foreign Direct Investment cause a growth in the economy or does the growth in the economy Granger cause FDI inflows just to meet the needs of foreign firms searching for new market and profit opportunities and therefore, understanding the connection between FDI influxes and the overall growth in Uganda's economy is crucial given the perceived significance of FDI to the overall economic growth and the significant role that the growth in the economy plays in attracting FDI inflows.

1.3 Objectives of the Study

To determine whether changes in Economic Growth cause changes in Foreign Direct Investment or the reverse is true.

The research was also guided by means of specific objectives as stated below;

- (i) To determine the relationship between foreign direct investment (FDI) and economic growth in Uganda.
1. (ii) To establish other macroeconomic factors that affect the growth of Uganda's economy.

1.4 Hypothesis of the Study

(i) There exists a bi-directional causality between Foreign Direct Investment inflows and the overall economic growth in Uganda.

(ii). Exchange Rate, Inflation, Trade Openness, Lending Interest Rates, and Debt Service have no significant effect on Economic Growth in Uganda.

1.5 Significance of the Study

Policies have been created and a lot of money has been spent in an effort to establish an inviting atmosphere for both domestic and foreign investment to promote extreme growth in Ugandan economy. Uganda received \$1.3 billion in FDI in 2020, accounting for 84% of all FDI received worldwide (UNCTAD, 2021). This indicates a significant inflow of foreign capital into Uganda, though it is unfortunate that its effects on economic growth have not been studied for policy purposes. In order to give policymakers useful information they can use to make evidence-based decisions, the findings of the study paint a clear picture of the association. They also offer insights into the specific policy measures that can be implemented to maximise the benefits of FDI for overall growth of the economy and identify as well as address the specific challenges that hinder growth. By identifying the specific ways in which Foreign Direct Investment influences the overall economic growth and vice versa, policymakers leverage this relationship to create more sustainable and inclusive economic growth. This benefits not only the government and businesses but also the citizens of Uganda by attracting more foreign investors which increases investment inflows, creates more employment opportunities, reduces poverty and improves their standard of living.

1.6 Scope of the Study

The research examined the association between FDI and Uganda's growth in the economy from 1983 to 2021.

1.7 Conceptual Framework

The conceptual framework illustrates how Foreign Direct Investment (FDI) influences Uganda's economic growth by acting as a key driver of capital inflows, technological

transfer, and conversely, how a growing economy can attract more FDI by offering better market opportunities and a stable investment climate, creating a mutually reinforcing cycle between FDI and economic growth.

Economic growth is further mediated by various macroeconomic factors such as exchange rates, inflation, and trade openness, lending interest rates, and debt service which together determine the overall impact of FDI on sustainable economic development in Uganda.

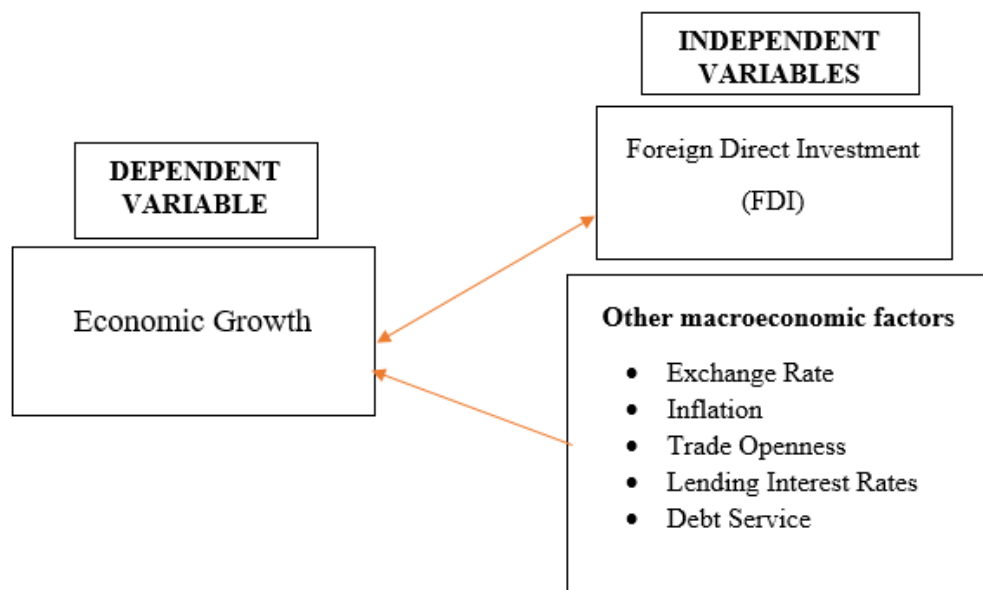


Figure 1.3: Conceptual Framework

CHAPTER TWO: LITERATURE REVIEW

2.0 INTRODUCTION

The chapter gives a summary of empirical and hypothetical research that has been conducted so far to recognise the aspects contributory to the growth of Uganda's economy and the causal link amid FDI and that economic growth.

2.1 Theoretical Literature Review

According to Neoclassical Growth Theory, FDI partakes no long-standing influence on economic growth. Since the model views human capital and technical advancement as exogenous, it contends that FDI raises income levels, which may lone have a short-range influence on the growth in the economy if technology does not advance (Solow, 1956). According to Solow, FDI can only be used to create long-term growth if such growth is a result of a rise in technological advancement. This proposes that FDI partakes an auspicious influence on technology.

The Endogenous Growth Model emphasises that Foreign Direct Investment ought to lead to the overall advancement in the economy through technology and capital formation transfers, in dissimilarity to the inadequate input that the neoclassical growth theory endorses to Foreign Direct Investment. It can stimulate growth by enhancing the degree of knowledge through skill development and labor training (Borensztein et al., 1998 and De Mello, 1997). According to the endogenous growth model, Foreign Direct Investment inflows boost home competition in the host country by removing entry embargoes to monopolies already in place. This can further be explained by the AK model, a variant of endogenous growth theory that focuses on the relationship between capital accumulation and technological progress. It differs from traditional neoclassical growth models in its treatment of technological progress and its implications for long-term economic growth. Technological progress is endogenous

and driven by capital accumulation itself. As the level of capital increases through investment, technological progress accelerates, leading to sustained growth in output per capita over time (Romer, 1986).

The hypothetical model of the FDI-Economic growth nexus can be illustrated by the Standard Growth Model (Feldstein *et al.*, 1992).

The economic growth model can be expressed as:

$$y = f(A, K^\alpha, L^\beta) \dots\dots\dots (1)$$

where:

y = output

A = Technological progress

K = Capital

L = Labour

α, β = Returns to scale

In the log form, the above equation can be expressed as:

$$\ln y = \ln A + \alpha \ln K + \beta \ln L \dots\dots\dots (2)$$

Where: \ln denotes growth rates

Equation 2 can be extended to include foreign direct investment that potentially influences productivity of technological progress, capital and labour, hence leading to faster economic growth

$$\ln y = \ln A + \alpha \ln K + \beta \ln L + \theta FDI \dots\dots\dots (3)$$

Where: FDI = Foreign direct investment

Equation (3) can be modified further to comprise of the influences of other macroeconomic factors on the overall growth in the economy:

$$\ln y = \ln A + \alpha \ln K + \beta \ln L + \theta FDI + \delta_i X_i \dots\dots\dots (4)$$

where X

= Matrix of other macroeconomic variables that affect economic growth

(**Exchange Rate, Inflation, Trade Openness, Lending Interest Rates, Debt Service**)

2.2 Empirical Review

2.2.1 Causality between Economic Growth and FDI

The literature on Foreign Direct Investment (FDI) and economic growth in Uganda is complex, reflecting various perspectives and methodologies. One notable aspect of the literature is the diversity in methodologies employed. Some studies utilise macroeconomic data to analyse how FDI affects economic growth overall, while others employ microeconomic approaches, focusing on firm-level data to understand the mechanisms through which FDI affects growth. While this diversity enriches the literature, it can also lead to inconsistencies in findings and challenges in comparing results across studies.

In addition to the above, empirical evidence on the relationship between FDI and economic growth in Uganda is mixed. While some studies find a positive and significant impact of FDI on economic growth, others report insignificant or even negative effects. These discrepancies could stem from differences in time periods studied, sample sizes, econometric techniques, or the specific channels through which FDI influences growth in Uganda.

Despite the mixed empirical findings, the literature offers valuable insights for policymakers in Uganda. Studies often discuss policy implications, such as the importance of creating an attractive investment climate, enhancing infrastructure, improving human capital, and

implementing effective regulatory frameworks to maximise the benefits of FDI for economic growth. However, there may be a gap between policy recommendations and their implementation, highlighting the need for further research on the feasibility and effectiveness of specific policy interventions.

According to Yimer (2023) using SGMM, FDI helps to expedite the growth of receiver countries by boosting external trade and ensuring steadiness of macroeconomic indicators. He also established that, in emerging and upcoming countries that have export-oriented strategies in place, FDI influxes can more efficaciously kindle economic development than home-grown investments.

A VAR model was used in a different study by Moyo et al. (2021) to investigate the dynamic relationships between FDI, economic growth, and financial development in South Africa. The findings demonstrated that financial development supports economic growth, which is stimulated by FDI.

Nguyen (2020) looked into the connections between FDI, economic growth, and institutional quality in Vietnam using a VAR analysis. The study discovered that, subject to institutional quality, FDI fosters economic growth.

Ray (2012) states FDI in India is a significance of growth in India's economy. The results of the causality analysis thus far have indicated an inconclusive trend in the fundamental association amid FDI inflows and the economic development of an economy.

Overall, while the literature on FDI and economic growth in Uganda provides valuable insights, there is still room for further research to deepen our understanding of the underlying

mechanisms, dynamics, and policy implications of FDI in the country's development trajectory.

Whereas FDI may have recompences or shortcomings for macroeconomic boost, emerging states should assume and carry out suitable policies to encourage FDI due to the paybacks that both parties stand to gain.

2.2.2 Other Macroeconomic Determinants of Economic Growth

Inflation and Economic Growth

The global economy has experienced fluctuations in both economic expansion and inflation rates. For a prolonged period, inflation rates have overshadowed growth rates, as noted by Madhukar and Nagarjuna (2011), making the relationship a persistent macroeconomic concern. Using ARDL model, Shahid (2014) established that inflation negatively impacts GDP growth in Pakistan.

Using system generalised method of moments (SGMM), Baharumshah *et al.* (2016) studied the association amid inflation and the overall economic growth in 94 developing and emerging nations. According to the study, inflation boosts GDP and only slows it down in nations where there are no inflation problems. In nations where there is no inflation issue, uncertainty has a more negative impact than it does a positive one. The study also found that when inflation is in intermediate ranges (5.6-15.9%), uncertainty about inflation has a beneficial impact on GDP due to a precautionary drive.

Kasidi and Mwanemela (2013) conducted a study in Tanzania and employed correlation coefficient and co-integration methods. Also, the impact of changes in general price levels on GDP was assessed using the coefficient of elasticity and the growth of Tanzania's economy is negatively impacted by inflation.

Lastly, a number of policy implications for regulating inflation to support economic growth have been discovered by the literature. In order to balance the advantages of low inflation with the costs of high inflation, central banks should seek to keep inflation within a moderate range, such as between 2 and 3 percent annually. Another policy implication is that in order to lessen inflation's detrimental effects on economic growth, nations should concentrate on strengthening their systems and human capital.

Overall, Inflation may have a detrimental effect, depending on the characteristics of the nation in question, the rate of inflation, and the time period at issue. Policymakers can create more effective plans for controlling inflation and fostering economic growth by recognising these aspects.

Trade Openness and Economic Growth

Trade policy in Uganda is a sectorial policy that seeks to facilitate the transformation of the country into a dynamic and competitive economy. The objective is for the trade sector to act as a catalyst, stimulating growth in the productive sectors. The ultimate goal is to trade Uganda out of poverty and usher in a state of wealth and prosperity.

In China's scenario, Tsen (2011) revealed a long-standing association amid exports, domestic demand and economic growth. Granger connection studies also revealed a bidirectional causal association amid domestic demand, openness in trade and economic growth. He contends that for sustainable growth in an economy, both domestic demand and trade openness are essential.

Kong et al. (2021) employed an ARDL Model to observe the association between the openness in trade and economic growth. Their analysis revealed the presence of a long-

standing steady co-integration association. Additionally, the study found that openness in trade significantly enhances the superiority of economic growth in China.

Odhiambo and Malefane (2021) conducted research to establish dynamic association amid trade openness and the growth in Lesotho's economy with the ARDL Model and took into consideration four indicators of trade openness, including an index of trade openness and three trade-based proxies and found out that openness of trade does not significantly affect economic growth in Lesotho.

Brueckner and Lederman (2015) used an influential variables method to examine the relationship amid openness of trade and the expansion of economies in the Sub-Saharan region of Africa. They note that while openness in trade is favorably associated with the growth of economies, the predicted result using contributory variables shows that the growth in economies of nations has a considerable immediate and negative influence on the openness of trade.

Exchange Rate and Economic Growth

The Central Bank of Uganda adopts a more adverse Foreign Exchange Rate Policy (FERP) regime in alignment with a more liberal capital and current account of the Balance of Payments (BoP). The Central Bank's role in the Foreign Exchange market is constraint to interventions that occur occasionally, such as buying or selling foreign currency, in order to mitigate extreme fluctuations in the overall rate at which money is exchanged. The aim of maintaining stable exchange rate movements, whether appreciating or depreciating, is to facilitate effective planning by all participants in the market.

Hussain et al. (2019) undertook a research to examine asymmetric influence of exchange rate changes on GDP in Pakistan. They applied both the Nonlinear Autoregressive Distributed Lag and Linear Autoregressive Distributed Lag models using yearly data from 1972 to 2014. Findings showed that the outcomes obtained from the Linear Autoregressive Distributed Lag model were not satisfactory, whereas the results from the non-linear Autoregressive Distributed Lag model were significantly impactful and provided more comprehensive insights into the issue. The study revealed that a weak currency negatively affects growth in the Gross Domestic Product, whereas a strong currency contributes to economic growth. Additionally, the study confirmed the presence of an unequal effect of foreign exchange rate on Pakistan's Gross Domestic Product.

Musa (2019) examined the influence of exchange rate and crude oil price on economic growth in Nigeria. The study utilised an ARDL model and analysed data from 1982 to 2018. The results revealed that exchange rate obligated a positive and a diverse significant effect on growth of Nigeria's economy.

Debt Service and Economic Growth

The Ministry of Finance, Planning and Economic Development ensures that present value of Uganda's government debt as a proportion of GDP doesn't exceed 50% of the overall GDP by reducing on the issuance of variable rate loans, minimising appetite for commercial borrowing by contracting more semi-concessional/ concessional debt and issuing longer dated securities in line with the Macroeconomic Convergence Criteria on debt under the EAC Monetary Union. The Ministry also ensures the sustainability of Uganda's debt.

In Nigeria, Grace *et al.* (2019) presented proof of the adverse association amid servicing external debt and overall growth of an economy 1981 through 2017. The study was from

1981 to 2017 and essentially examined how foreign loan payments, exchange rates and external debt service payments affected Real Gross Domestic Product (RGDP) using Least Ordinary Squares econometric method and found out that external debt and external debt service payments have a negative impact.

Similar to this, Akanbi et al. (2022) used the ARDL model to assess the association amid servicing foreign debt and development of an economy between 1985 and 2018. Although servicing of debt was discovered to possess a negative influence on the growth of an economy, both the long and short-term effects were statistically insignificant.

Getinet and Ersumo (2020), using data from 1983 to 2018 and the ARDL technique, show that existed a long-term association among the foreign debt service stocks and GDP in Ethiopia. Even though there was a negative relationship and it was noteworthy in the short run, it was insignificant over the long run.

Lending interest rate and Economic Growth

The Central Bank Rate (CBR) in Uganda is utilised to direct the seven-day interbank interest rates. The CBR is determined autonomously by the Bank of Uganda, taking into account its projections of future inflation and other economic factors, such as the estimated growth of real economic activity. Its purpose is to influence the lending practices of commercial banks with the aim of promoting price stability and maintaining a robust financial system.

Giovanni (2012) contends that large nation conditions, specifically high interest and lending rates, possess a concrete impact on the yearly actual GDP development in the national economy and have an impact on small economies. The real Interest Rate is slightly increased by the demand shocks.

Moyo and Le (2018) conducted research on fifteen economies in the SADC region utilising ARDL bounds test to establish the cointegration association in each individual country. Conclusions of the research suggested that interest rate reforms have a positive effect on the overall growth of economies, specifically through the channels of increased savings and investments.

Similarly, Onwumere et al. (2012) utilised a basic linear regression technique in their study and established that the interest rates on lending undesirably influence investment and economic growth in Nigeria. Additionally, they observed a negative influence on savings, although the significance of this effect varied.

Overall, both studies highlight the detrimental influence of interest and lending rates on the growth of Nigeria's economy, suggesting that increased interest rates can result into reduced investment, lower GDP, and potentially lower savings. These results possess insinuations for policymakers and point to the need for careful contemplation of interest rate policies to support sustainable growth of Nigeria's economy.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

This section encompasses data sources, model specifications, data analysis, and variables and their measures.

3.1 Specification of the model

3.1.1 The Vector Autoregressive (VAR) Test

The VAR Test was used to test for causality and identify the relationship amid FDI and Economic Growth (Granger, 1969) and is a system of equations where all factors are endogenous.

The VAR Test Model was specified as:

$$GDP_t = f(FDI_t) \dots\dots\dots (5)$$

$$FDI_t = f(GDP_t) \dots\dots\dots (6)$$

In linear form, equations (1) – (2) can be written as:

$$GDP_t = \alpha_0 + \sum_{j=1}^k \alpha_{1j} GDP_{t-j} + \sum_{j=1}^k \alpha_{2j} FDI_{t-j} + \varepsilon_{1t} \dots\dots\dots (7)$$

$$FDI_t = \gamma_0 + \sum_{j=1}^k \gamma_{1j} FDI_{t-j} + \sum_{j=1}^k \gamma_{2j} GDP_{t-j} + \varepsilon_{2t} \dots\dots\dots (8)$$

Where α_i, γ_i are parameters, j = lags, ε_{1t} and ε_{2t} are error terms;

GDP is illustrated as the economic growth

FDI illustrated as Foreign Direct Investment

3.1.2 ARDL Model Estimation

To establish the factors of economic growth, the Autoregressive Distributed Lag (ARDL) was estimated to establish both the short term and long term effects of the independent variables on economic growth through estimating an ECM and it was specified as follows:

$$\Delta GDP = \varphi + \theta \Delta Z + \sum \delta \Delta X + ECT(-1) + \mu \quad \dots\dots\dots (9)$$

Where:

GDP = Economic growth,

Z = Foreign direct investment,

X = Vector of the other aspects that affect growth of the economy (Exchange Rate, Inflation, Openness of trade, Lending Interest Rates, Debt Service);

Δ = First difference operator

$ECT(-1)$ = Error correction term

φ, θ, δ = parameters;

μ = error term.

The expected signs are summarised as below.

Table 3.1: Variable Definitions and Expected Signs

Variable	Name	Description	Expected sign
GDP	Economic Growth	Increase in the production of goods and services in an economy over a period of time	
FDI	Foreign Direct Investment	Investments made by a firm or individual in one country into business interests located in another country	+
EXRATE	Exchange Rate	Value of one currency expressed in terms of another currency	+
INF	Inflation	Rate at which the general level of prices for goods and services rises, eroding purchasing power over time.	-
TRADE	Trade Openness	The extent to which a country allows trade with other countries, typically measured by the ratio of a country's total trade (exports plus imports) to its gross domestic product (GDP).	+
LRATE	Lending Interest Rate	Rate at which financial institutions such as banks lend money to borrowers.	-
DEBTSER V	Debt Service	The total amount of money required to cover the repayment of interest and principal on a debt for a particular period	-

3.2 Data types and sources

Secondary data that is World Bank Indicators (WDI) data was used in the research.

3.3 Data Analysis Techniques

3.3.1 Unit Root Tests

This research employed a technique to create unit root tests in order to determine the order of the variables' integration: Phillips-Perron (PP) (1979), (1988).

3.4 Diagnostic Tests

The residuals were tested for serial correlation using the Breusch-Godfrey LM test, heteroscedasticity using the Breusch-Pagan-Godfrey heteroscedasticity test and for normality using the Jarque-Bera test statistic.

CHAPTER FOUR: STUDY FINDINGS

4.1 Introduction

The results of the unit root test, descriptive statistics, VAR Test results, and ARDL model results are all covered in this section.

4.2 Unit Root Tests

The Phillips-Perron (PP) test method was used as presented below.

Table 4.1: Unit Root Test, Phillips Perron Method

VARIABLE NAME	LEVELS		FIRST DIFFERENCE	
	PP t-stat	prob	PP t-stat	prob
GDP	-3.53111	0.0124	-10.60912	0.0000
FDI	-1.59335	0.4761	-5.324929	0.0001
EXRATE	-0.22551	0.9264	-4.411031	0.0012
INF	-1.94211	0.3103	-6.069392	0.0000
LRATE	-2.30854	0.1746	-6.003272	0.0000
DEBTSERV	-1.93431	0.3137	-10.46767	0.0000
TRADE	-2.16414	0.2221	-12.07374	0.0000

Test done at 95% CI

Source: E-views 13 Output (2023)

In the event that the variable was stationary in levels, no further test was done in first difference. It is only the variables that were nonstationary in levels [i.e. I(1)] for which stationarity was tested in first difference. Only GDP is stationary in levels I(0) and other variables are first difference stationary I(1)

4.3 Descriptive Statistics

Table 4.2: Descriptive Statistics

	GDP	FDI	EXRATE	INF	LRATE	DEBTSERV	TRADE
Mean	5.671157	2.372131	1695.393	30.35603	23.79115	2.068498	35.06186
Median	5.744558	2.593888	1723.492	6.848498	21.37083	2.073879	35.46009
Maximum	11.52324	6.656597	3727.069	189.9751	40.00000	4.511446	56.25827
Minimum	-3.306380	-0.137301	1.538625	-3.169556	16.16667	0.231874	22.30323
Std. Dev.	2.926192	1.758118	1173.410	50.33468	6.366083	1.420752	7.071554
Skewness	-0.666789	0.271778	0.239827	2.041106	1.470926	0.289781	0.603811
Kurtosis	4.181471	2.908511	2.118946	6.035314	3.824796	1.782561	3.536009
Jarque-Bera	5.158245	0.493713	1.635278	42.05106	15.16901	2.954332	2.836693
Probability	0.075841	0.781253	0.441473	0.000000	0.000508	0.228284	0.242114
Sum	221.1751	92.51310	66120.34	1183.885	927.8547	80.67142	1367.412
Sum Sq. Dev.	325.3788	117.4572	52321816	96276.05	1540.026	76.70438	1900.261

Source: E-views 13 Output (2023)

The mean of GDP growth rate for the period 1983 to 2021 was 5.67%, while the mean FDI (% of GDP) was 2.37%. The exchange rate was on average 1695.39 Ushs, whereas the debt service % GNI stood at 2.07%. Inflation within the year was 30.35%. The Lending Interest Rate was 23.79% and Exports plus Imports (trade openness) % GDP was 35.06%.

The Jarque-Bera statistic examines the series' normal distribution and showed that Foreign Direct Investment, Exchange Rates, Debt Service, and Trade Openness, are normally distributed.

4.4 Correlation Coefficients

Table 4.3: Correlation Coefficients

VARIABLE	GDP	FDI	EXRATE	INF	LRATE	DEBTSERV	TRADE
GDP	1.000000	0.437785	0.086905	-0.266333	-0.193990	-0.302605	0.289809
FDI	0.437785	1.000000	0.573954	-0.604138	-0.631965	-0.757301	0.830944
EXRATE	0.086905	0.573954	1.000000	-0.607466	-0.484100	-0.659502	0.594498
INF	-0.266333	-0.604138	-0.607466	1.000000	0.652030	0.457002	-0.480514
LRATE	-0.193990	-0.631965	-0.484100	0.652030	1.000000	0.501333	-0.465512
DEBTSERV	-0.302605	-0.757301	-0.659502	0.457002	0.501333	1.000000	-0.781869
TRADE	0.289809	0.830944	0.594498	-0.480514	-0.465512	-0.781869	1.000000

Source: E-views 13 Output (2023)

When correlation coefficients are greater than 0.8, it means that the variables are highly correlated (which may result in a multicollinearity problem). From the above results, only trade openness and foreign director investment are highly collinear with a correlation coefficient of 0.83. Other variables are not highly collinear as their correlation coefficients are below 0.8.

Debt Service as expected negatively affects GDP. As seen from the results above, the correlation value of -0.30 indicates a negative growth. Uganda relies majorly on borrowing to finance its budget. Uganda's current debt burden stood at UGX 69.5 trillion (47 % of GDP) in FY2020/21 (IMF, 2021).

The negative implications for inflation were anticipated since inflation reduces economic growth (correlation coefficient= -0.27) by reducing the purchasing power of consumers, creating uncertainty and instability, increasing interest rates, reducing international competitiveness, and leading to a redistribution of wealth.

In cases where the lending rates are high, borrowing becomes more expensive, leading to decreased borrowing by businesses and consumers. When borrowing is expensive, businesses may be less willing to take out loans to fund investment projects or expand their operations.

Similarly, consumers may be less willing to take out loans for big-ticket purchases, like homes or cars. This reduction in borrowing declines investment, consumption and economic growth.

4.5 Granger Causality of Foreign Direct Investment and Economic Growth

The VAR Test was employed to examine the causal relationship between Foreign Direct Investment and Economic Growth

Table 4.4: Granger Causality of FDI and Economic Growth using the VAR Test

Vector Autoregression Estimates
 Sample (adjusted): 1988 2021
 Included observations: 34 after adjustments
 Standard errors in (.) & t-statistics in []

	GDP	D(FDI)
GDP(-1)	0.316097 (0.19892) [1.58905]	0.001520 (0.07910) [0.01921]
GDP(-2)	-0.346562 (0.20067) [-1.72706]	-0.048064 (0.07979) [-0.60238]
GDP(-3)	0.173003 (0.16835) [1.02763]	0.048918 (0.06694) [0.73077]
GDP(-4)	-0.061301 (0.14410) [-0.42540]	-0.031285 (0.05730) [-0.54600]
D(FDI(-1))	0.052294 (0.55644) [0.09398]	0.238171 (0.22125) [1.07646]
D(FDI(-2))	1.576365 (0.57882) [2.72339]	-0.202440 (0.23016) [-0.87958]
D(FDI(-3))	-1.102760 (0.62124) [-1.77509]	-0.366444 (0.24702) [-1.48345]
D(FDI(-4))	1.424513	0.034047

	(0.60729)	(0.24147)
	[2.34569]	[0.14100]
C	5.622502	0.300267
	(1.54366)	(0.61380)
	[3.64233]	[0.48920]
R-squared	0.311263	0.280741
Adj. R-squared	0.090867	0.050579
F-statistic	1.412288	1.219751

Source: E-views 13 Output (2023)

In the VAR estimation, Foreign Direct Investment granger causes economic growth if the absolute t-values of the estimated coefficients are greater than 2. Similarly, economic growth granger causes Foreign Direct Investment if absolute t-values of the estimated coefficients are greater than 2.

From empirical results, all the coefficients of the 2nd and 4th lag (2.72339 and 2.34569 respectively) of Foreign Direct Investment have a positive and significant effect on economic growth that is; there is a direction of causality from Foreign Direct Investment to economic growth.

All coefficients of the lagged economic growth variables are statistically insignificant (with absolute t-values less than 2) meaning that economic growth does not granger cause FDI.

The conclusion is there is a uni-directional causality running from Foreign Direct Investment to economic growth.

4.6 Determinants of Economic Growth

The ARDL model results for determinants of economic growth are presented in **Table 7**.

In order to get the best ARDL model, the variable Debt Service was dropped because it was highly insignificant.

4.6.1 ARDL Bounds Test for the Long-Run Relationships

Table 1: 4.5 ARDL Bounds Test

Test Statistic	Value	Significance	Bound	
			I(0)	I(1)
F-Statistic	15.674814	10%	2.460	3.460
		5%	2.947	4.088
		1%	4.093	5.532

Source: E-views 13 Output (2023)

There is a significant long-run relationship between the predicted and explanatory variables.

This is evidenced by the F-statistic value (15.674814) being greater than the critical values of the upper Bound Level I (1) at a significance level of 5%.

4.6.2 ARDL Model

Table 4.6: ARDL Model of Determinants of Economic Growth

Dependent Variable: D(GDP)

Method: ARDL

Sample: 1987 2021

Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)*	-1.695287	0.267735	-6.331958	0.0000
FDI(-1)	0.281788	0.556704	0.506171	0.6212
EXRATE(-1)	-0.001756	0.000437	-4.018417	0.0015
INF(-1)	0.102928	0.020768	4.955997	0.0003
LRATE(-1)	-0.751558	0.159948	-4.698778	0.0004
C	16.77924	3.725274	4.504163	0.0006
D(GDP(-1))	0.226330	0.202921	1.115363	0.2849
D(GDP(-2))	0.075527	0.155415	0.485969	0.6351

D(GDP(-3))	0.169770	0.111697	1.519920	0.1525
D(FDI)	1.055681	0.375531	2.811171	0.0147
D(FDI(-1))	0.530708	0.437591	1.212793	0.2468
D(FDI(-2))	1.193132	0.437502	2.727148	0.0173
D(EXRATE)	0.008069	0.002045	3.946737	0.0017
D(EXRATE(-1))	0.008188	0.002191	3.737432	0.0025
D(INF)	0.007205	0.010721	0.672064	0.5133
D(INF(-1))	-0.058203	0.013911	-4.183823	0.0011
D(INF(-2))	-0.022670	0.010797	-2.099665	0.0558
D(LRATE)	-0.598330	0.121549	-4.922546	0.0003
D(LRATE(-1))	-0.238575	0.077066	-3.095700	0.0085
D(LRATE(-2))	-0.331787	0.079288	-4.184606	0.0011
D(LRATE(-3))	-0.159600	0.089451	-1.784219	0.0977
TRADE	0.249236	0.086386	2.885136	0.0128
<hr/>				
R-squared	0.948036			
Adjusted R-squared	0.864094			
F-statistic	11.29393	Durbin-Watson stat	2.318226	
Prob(F-statistic)	0.000029			
<hr/>				

Source: E-views 13 (2023)

4.7 Residual Diagnostic Tests

To estimate the determinants of economic growth, the Autoregressive Distributed Lag (ARDL) approach was employed, as shown in **Equation 9**. The model successfully passed all three residual diagnostic tests, suggesting that the model is a good one.

4.7.1 Serial Correlation

Ho: No serial correlation

Ha: Serial correlation

Table 4.7: The Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.120917	Prob. F(2,11)	0.3605
Obs*R-squared	5.925479	Prob. Chi-Square(2)	0.0517

Source: E-views 13

Since (Prob. Chi-square), $0.052 > 0.05$, we fail to reject the null hypothesis (H_0) hence no serial correlation detected.

4.7.2 Heteroscedasticity

H_0 : Homoscedasticity

H_a : Heteroscedasticity

Table 4.8: The Breusch-Pagan-Godfrey Heteroscedasticity Test

F-statistic	0.600145	Prob. F(21,13)	0.8559
Obs*R-squared	17.22868	Prob. Chi-Square(21)	0.6972
Scaled explained SS	2.16155	Prob. Chi-Square(21)	1

Source: E-views 13 Output (2023)

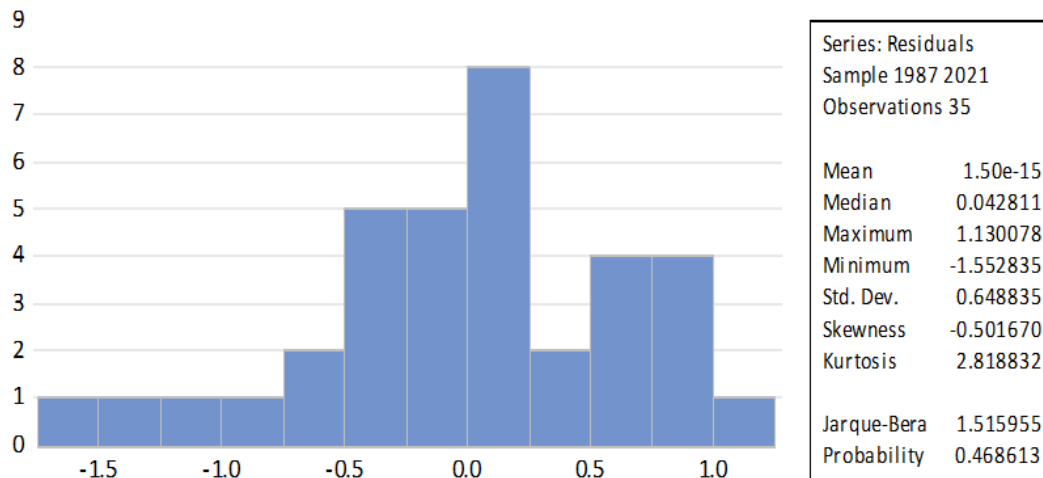
The results suggested that the residuals are homoscedastic (Prob Chi-Square = 0.6972) at 5%, hence providing an indication that this is a good model.

4.7.3 Normality Test

H_0 : Normally distributed

H_a : Not normally distributed

Figure 4.1: Normality Test Using the Jarque-Bera Statistic



Source: E-views 13 Output (2023)

Since the prob, $0.4686 > 0.05$, residuals follow a normal distribution.

4.7.4 The Ramsey RESET Test

Ho: The model is correctly specified

Ha: Misspecification.

Table 4.9: Ramsey RESET Test

	Value	df	Probability
t-statistic	0.927863	12	0.3718
F-statistic	0.860929	(1, 12)	0.3718
Likelihood ratio	2.425056	1	0.1194

Source: E-views 13 Output (2023)

Based on results obtained, since the probabilities $0.3718 > 0.05$, the model is correctly specified.

From the ARDL results in **table 7** above, we conclude as follows;

The R^2 is 0.948 implying that the variation in the independent variables explain approximately 94.8 % of the variation in the dependent variable. The explanatory variables are jointly significant at 5% with the F-Statistic (P-Value) of 11.2939 (0.0000) and since the coefficients are not jointly equal to zero, it's an indication of a good model. The Durbin-Watson stat is 2.318 which gives evidence of no autocorrelation.

Long Run Coefficients

At a significance level of 5%, inflation has a significant positive effect on GDP as suggested by Baharumshah *et al.* (2016) who found out that inflation has a beneficial impact on GDP due to a precautionary drive.

The results can be explained by the moderate inflation in Uganda because of its policy framework on inflation. Bank of Uganda is undertaking inflation targeting-lite policy framework which has created stability of the economy.

This means that inflation comes in as a surprise to economic agents. This affects economic growth via the real wage in the equation below:

$$RW = \frac{W}{P} \dots \dots \dots (10)$$

Where RW is the real wage, W is the nominal wage and P is the price level.

If inflation increases, the price level also increases and nominal wage falls, demand for labour via the production function $[y = f(L, K)]$ increase which also increases output leading to a faster rate in economic growth hence the positive sign (0.102928).

Trade openness positively and significantly affects GDP at a 5% level of significance which is in agreement with Kong *et al.* (2021).

Trade openness provides Ugandan businesses with access to larger markets beyond the domestic economy for example the East African Community, European Union etc. By exporting goods and services to other countries, businesses expand their customer base and increase sales. This leads to higher production levels, economies of scale, and enhanced competitiveness. Increased exports contribute to GDP growth by generating revenue and creating employment opportunities.

At a 5% level of significance, exchange rate has a statistically significant negative impact on GDP. In cases where there is a depreciation in the exchange rate of the local currency of Uganda, prices of imports tend to increase of which some imports are used as inputs in the production process for example pharmaceutical products, petroleum products, machinery and equipment for industries (manufacturing, agriculture, construction, and infrastructure development). When prices of these imported inputs increase, demand for them falls which also reduces production leading to a fall in economic growth hence the negative sign (-0.001756).

At a 5% level of significance, the lending interest rate has a negative and statistically significant impact on GDP just like suggested by Adekunle et al. (2018), who found that interest rates negatively affect economic growth in Nigeria both in the short and long terms.

High lending rates make borrowing more expensive for individuals and businesses. This leads to a decrease in investment and production in form of capital, as businesses and individuals are discouraged from taking loans for expansion, capital investment, or entrepreneurial ventures. This reduction in borrowing and investment limits the resources available for productive activities and reduces capital thus hindering economic growth as indicated by the negative sign (-0.751558).

Short Run Coefficients

The short run relationship indicates that economic growth at 5% level of significance is positively influenced by FDI (first difference and second lag), Exchange rate (first difference and first lag) and negatively influenced by Inflation (first lag) and Lending (first difference, first and second lag).

4.8 Model Stability

The cumulative sum and cumulative sum of squares tests were used to test for model stability. The findings indicate that the mode is stable since all the plotted points fall within the control process mean (*see appendix I*) at 5%, implying that the model is a good model.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This section presents the brief summary of the research results of the estimated model, conclusions and policy recommendations.

5.1 Summary of Results

The Phillips-Perron (PP) test method was used for unit root tests and the order of integration of the variables. GDP was found to be stationary in levels while all the other variables were non-stationary in levels and thus differenced to become stationary at first difference. The VAR test was used to determine the direction of causality between Foreign Direct Investment and Economic Growth and the findings suggest that there is a uni-directional causality running from Foreign Direct Investment to economic growth but economic growth does not granger cause FDI.

The ARDL model was used on the study to establish the long run and short run effects of the explanatory variables on the dependent variable. In the long-run, Inflation (INF), Trade openness (TRADE) had a positive and statistically significant effect on GDP at 5% level of significance while Exchange Rate (EXRATE), and Lending Interest Rate (LRATE) have a negative and statistically significant effect on GDP. In the short run, economic growth at 5% level of significance is positively influenced by FDI and Exchange rate while and negatively influenced by Inflation and Lending Interest Rate.

5.2 Conclusions

This study aimed to investigate the causal relationship between Foreign Direct Investment (FDI) and Economic Growth in Uganda. Time series data from various sources, including Ministry of Finance Planning and Economic Development, Bank of Uganda, World Bank and

Uganda Revenue Authority, were utilised for the period spanning from 1983 to 2021. By employing modern econometric techniques such as VAR and Autoregressive Distributed Lag (ARDL) tests, the study examined the direction of causality between FDI and economic growth.

The findings of the study indicated that there is a causal relationship running from FDI to economic growth in Uganda. In other words, increases in foreign direct investment are associated with subsequent economic growth in the country. These findings suggest that FDI plays a significant role as a driver of economic development in Uganda, contributing to its overall growth and prosperity.

FDI can be regarded as the force behind economic development and growth. In Uganda's scenario, FDI can be utilised as a tool to restructure the economy from one that is currently weak and undiversified to one that is more robust and diverse through investment, income production, employment, and other means. To make this a reality, the central government and various state institutions must prioritise enhancing the business climate by proactively building the social and economic infrastructures required to reduce manufacturing costs and draw FDI to the nation. The necessity to address the issue of bribery and corruption by assisting the anti-graft organisations is a connected concern about the corporate environment. In addition, the government should promote domestic investment by giving local entrepreneurs the necessary incentives. Security is also necessary to prevent terrorist attacks and clear the path for more foreign investment.

5.3 Recommendations

From the analysis above, this paper provides policy recommendations that will enable Uganda attain its goal of economic growth with the variables analysed.

Empirical evidence suggests that FDI inflows positively and significantly cause economic growth in the short run. The policy recommendation is that there is need to direct foreign direct investments in strategic economic sectors like energy, oil and gas and transportation that have stronger economic growth multipliers. Government can achieve this by offering a range of tax incentives, holidays/ concessions and breaks.

Empirical findings suggest that lending interest rate has a negative and significant effect on economic growth. The policy recommendation is that there is need for Bank of Uganda to control the high lending interest rates offered by commercial banks in order to promote economic growth. This can be achieved through controlling supply side constraints such as government domestic borrowing. This will reduce on the competition for loans between the public and private sectors thus lowering the lending interest rates to enable the private sector fund economic activities through loans at a lower interest rate.

Empirical findings suggest that trade openness has a positive and significant effect on economic growth. Therefore, there is need to promote trade openness. This can be achieved through reducing barriers to trade such as quotas, tariffs and non-tariff barriers to create a more open and predictable trade environment. Furthermore, policy makers can expand on bilateral or multilateral trade agreements, regional integration initiatives and unilateral tariff reductions.

5.4 Limitations

Data inaccessibility has long been a serious issue, especially prior to 1983. The study's analysis was to be based on the years 1962 through 2022. In the need to deliver a more comprehensive picture of the link between the factors that have been of interest in the study,

it was intended to take into account the dynamics the economy has undergone since independence.

5.5 Areas for further Study

The area of further research would be to undertake a comparative panel data of how FDI and other macro-economic variables have either encouraged or discouraged economic growth in other neighboring states for example the East African Community. Furthermore, this research can be extended in the future by adding some other periods and macroeconomic variables to document more comprehensive results.

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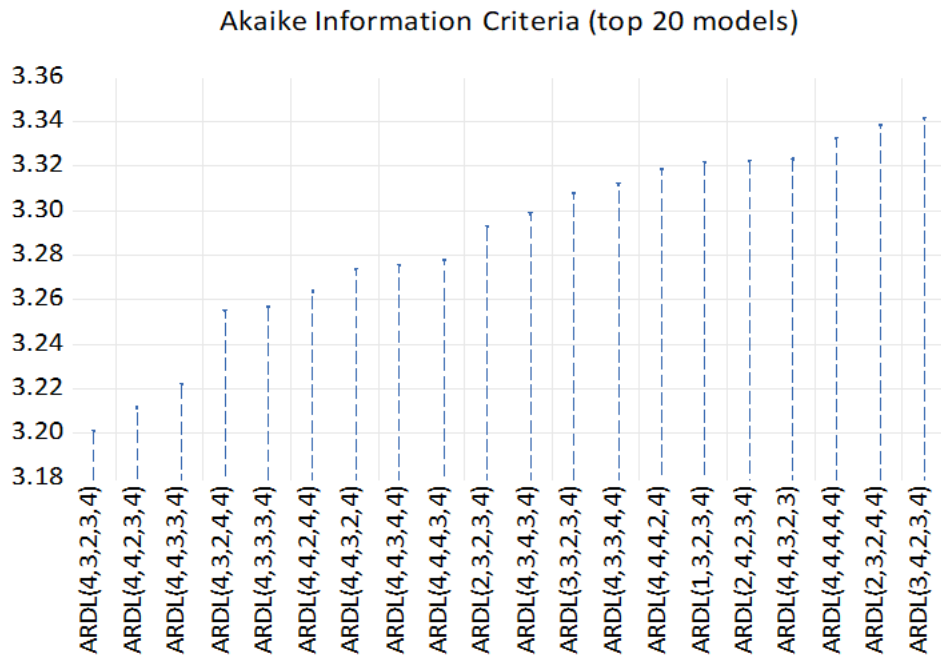
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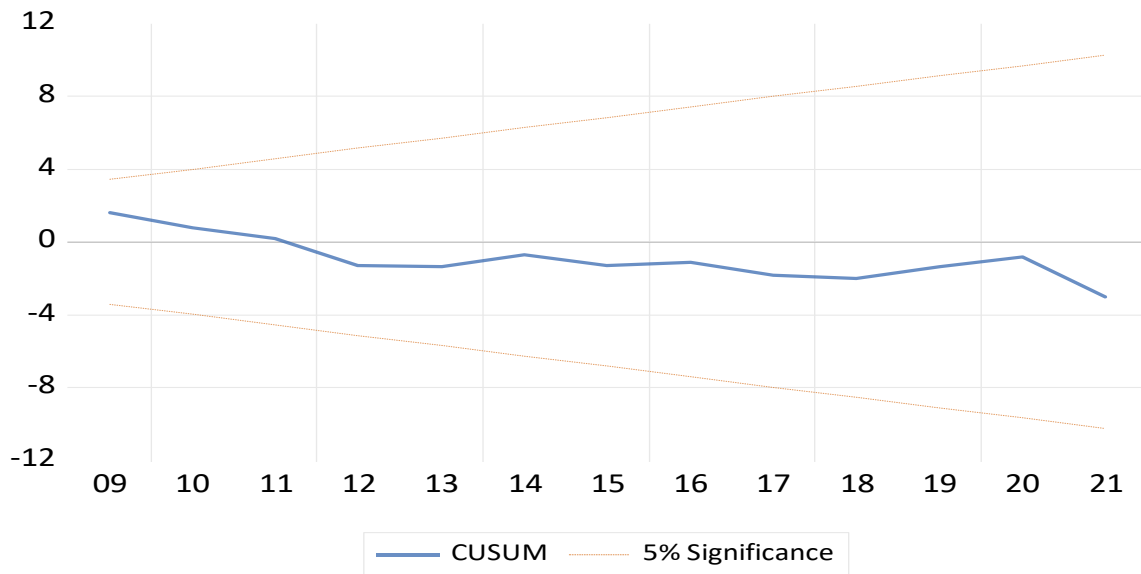
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APPENDIX I: MODEL STABILITY

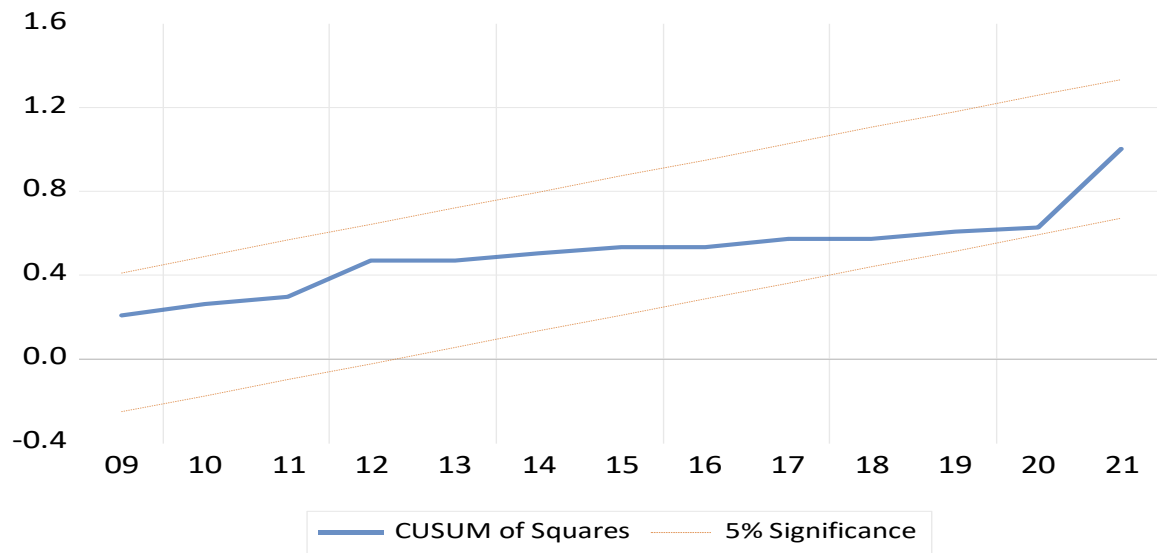
MODEL SELECTION SUMMARY



CUSUMS



CUSUMS SS



Source: E-views 13 Output (2023)

APPENDIX II: DATA USED FOR ANALYSIS

YEAR	FDI	DEBTSERV	LRATE	GDP	INF	EXRATE	TRADE
1983	0	3.92091682	16.1666667	5.74455771	45.9444926	1.538625	22.3032287
1984	0	3.60527411	21.9166667	-0.3446767	25.2768096	3.597025	27.0175795
1985	-0.1136471	4.47704268	24	-3.30638	120.335947	6.7202	28.7468564
1986	0	4.42392369	33.3333333	0.39008694	137.280875	14	28.0483921
1987	0	2.56963688	34.6666667	3.96190279	180.988012	42.8412667	26.2903906
1988	0.07220847	3.12381136	35	8.26707355	189.975115	106.135833	25.3500383
1989	-0.0333556	3.60446814	40	6.36194124	115.446731	223.091606	26.0476285
1990	-0.1373014	3.42192282	38.6666667	6.47414015	44.3800897	428.854667	26.6095438
1991	0.0301048	4.51144567	34.4166667	5.5540955	26.0193367	734.009917	29.4022019
1992	0.10498842	4.08700609	39.1111111	3.41835689	45.0680291	1133.83433	33.0521441
1993	1.695421	4.35224736	24.3	8.32629252	30.1368714	1195.01675	28.2398345
1994	2.21028787	3.78536397	20.7622222	6.40363574	6.84849755	979.445417	27.8393599
1995	2.10569514	2.3743823	20.1625	11.5232438	9.37643764	968.916667	32.6231459
1996	2.00179158	2.46908379	20.2941667	9.07211458	4.57248128	1046.08475	35.3854869
1997	2.79136539	2.57350603	21.3708333	5.10000186	3.09526852	1083.00867	34.158567
1998	3.18915525	2.33128169	20.8616667	4.90526548	8.78570685	1240.30583	30.0439219
1999	2.33722633	2.21191117	21.5491667	8.05394838	-0.1131305	1454.82717	36.0247102

2000	2.59476175	1.24319492	22.9197575	3.14190734	11.1173059	1644.47533	32.7490333
2001	2.59388837	0.90018518	22.655	5.18366113	4.53447581	1755.65875	35.3299768
2002	2.98852729	1.17871152	19.0971782	8.73268576	-3.1695563	1797.5505	36.2777942
2003	3.06033195	1.40445502	18.9421409	6.47325867	7.80674087	1963.72008	36.5857265
2004	3.72085076	1.33872611	20.6031757	6.80723334	15.58755	1810.30471	35.4600862
2005	4.11082607	1.91546426	19.6453884	6.33256512	-1.7411853	1780.54026	38.9942855
2006	6.45705805	1.02636734	18.6973348	10.7847444	2.40562022	1831.45185	43.6332858
2007	6.6565973	0.57067779	19.1057895	8.41242597	7.32124732	1723.49159	46.7774167
2008	5.04737194	0.52334425	20.4500661	8.7087519	6.36427655	1720.44388	56.2582682
2009	3.34916155	0.2905266	20.9551658	6.80151735	85.3532752	2030.48807	47.0638781
2010	2.03900469	0.24204307	20.1746301	5.63761164	5.63761164	2177.55751	38.269249
2011	3.20860604	0.23187414	21.8333143	9.39165549	9.39165549	2522.80203	39.7552256
2012	4.41438587	0.25516916	26.1501302	3.83745561	3.83745561	2504.56308	43.5021371
2013	3.79031703	0.3089158	23.2835727	3.58690583	3.58690583	2586.88957	43.1091549
2014	3.24589608	0.64764783	21.5842269	5.10630732	5.10630732	2599.7882	36.0144011
2015	2.27760507	0.29847789	22.6013573	5.18785986	5.18785986	3240.64542	37.6892983
2016	2.14253048	2.94315451	23.8861326	4.78100029	4.78100029	3420.09801	31.209362
2017	2.61088917	0.62573562	21.2786715	3.13140552	4.64905082	3611.22446	36.8370529
2018	3.20512811	1.72889458	19.8465587	6.30392378	4.44338527	3727.06899	36.6384056

2019	3.60332476	0.93861041	19.9182164	6.43874503	3.00001182	3704.04907	39.361054
2020	2.32389436	2.07387932	19.1143625	2.95130642	2.72148444	3718.24892	37.0006924
2021	2.8182044	2.14214084	18.5342213	3.53658034	2.5451193	3587.05171	41.7136307