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MAKERERE UNIVERSITY BUSINESS SCHOOL

FOREIGN DIRECT INVESTMENT INFLOWS, VOLATILITY AND ECONOMIC GROWTH IN UGANDA

BY

NATUKUNDA LILLIAN

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PLAN A

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DECLARATION

I, **Natukunda Lillian**, affirm that this work is original and has not been submitted for any other degree award to any other University before.

Signed: ..... Date: 2.10.2023

NATUKUNDA LILLIAN

2019/HD10/21750U

APPROVAL

This is to certify that this dissertation has been submitted with the consent of the subsequent University Supervisors.

Signed: ..... Date: 10/10/2023

Dr. Joyce Abaliwano, Ph.D.

Makerere University Business School

Signed: ..... Date: 13/10/2023

Mr. Alex Mugarura

Makerere University Business School

DEDICATION

This research paper is dedicated to my husband Brian Kanzira and my children Kagaba Kanzira, Siima Kanzira, Karabo Kanzira and Anzeire Kanzira.

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LIST OF ABBREVIATIONS AND ACRONYMS

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criterion
ARCH	Autoregressive Conditionally Heteroscedastic
ARDL	Auto Regressive Distributed Lag
ASEAN	Association of South East Asian Nations
COMESA	Common Markets of Eastern and Southern Africa
EGARCH	Exponential Generalized Autoregressive Conditionally Heteroscedasticity
FDI	Foreign Direct Investment
FLFP	Female Labour Force Participation
GARCH	Generalized Autoregressive Conditionally Heteroscedasticity
GDP	Gross Domestic Product
HQIC	Hannah Quinn information criterion
IMF	International monetary Fund
LDC	Low Developed Country
NDP	National Development Plan
NEPAD	New Partnership for Africa's Development
SBIC	Schwartz Bayesian Information Criterion
SSA	Sub Saharan Africa
TOT	Terms of Trade
UIA	Uganda Investment Authority
UNCTAD	United Nations Conference on Trade and Development

ABSTRACT

This study aimed at examining the effect of FDI inflows and FDI-inflow volatility on economic growth in Uganda. Although Uganda has targeted annual growth of about 8% per year over a thirty year period to become a modern state, GDP growth has annually remained below target. This is despite the liberalised investment climate. The study thus set out to establish how FDI inflows and FDI-inflow volatility affected growth in the country. Time series data for the period 1991-2020 are used in the analysis. The empirical model is estimated by the method of Auto Regressive Distributed Lag (ARDL). Results show that FDI inflows have a positive and significant effect on Uganda's GDP both in the short run and in the long run whereas volatility positively affected GDP in the short run but with a negative long run effect. The study thus recommends broadening of FDI inflows as well as streamlining of the investment code to reduce FDI volatilities.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

The economic growth of any country is largely linked to rising incomes and related increases in consumption, savings, and investment. Investments are often referred to as an engine of economic growth and human development due to their effectiveness in increasing wealth in national economy. Research has described FDI as one of the major drivers for economic growth in the host economies through increasing capital formation, augmenting employment, promoting manufacturing growth, bringing management expertise, establishing brand name, and providing the skilled labour with an access to the international production network (Lashaki & Musa, 2017).The neoclassical theorists argue that FDI inflows provide a solution in filling the saving investment gap; the foreign exchange gap; and the fiscal gap in less developed countries (Kirwa, 2013).

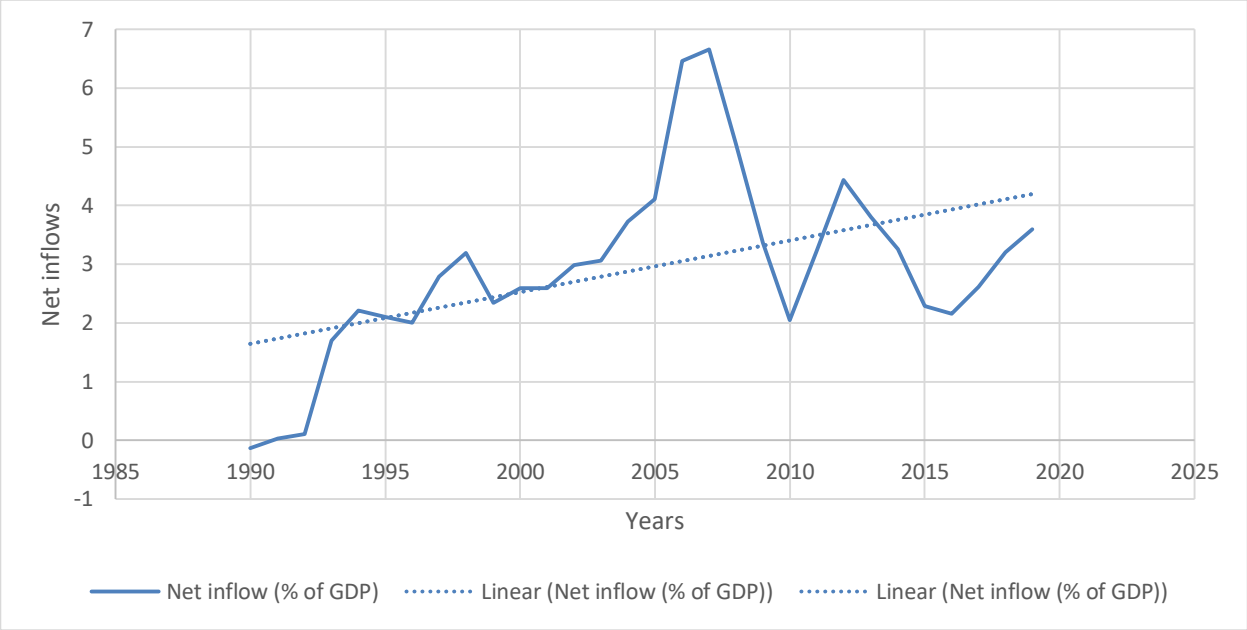
Most developing nations try to attract FDIs on account of globalization as an instrument for accelerated growth and development (Asiedu, 2007). However, (Kirwa and Cyrus, 2014) found that when the factors that attract FDI to the host country like political and economic instability among others are no longer deemed reliable, investors may withdraw or suspend their investments. This makes FDI inflows uncertain, costs of research and development are undefined, which negatively affects incentives to innovate. It may then be the case that volatility of FDI undermines investment by discouraging innovation and technology which is detrimental to economic growth.

Whilst much has been done on the level of FDI and economic growth, the issue volatility of FDI and its impact on economic growth has also become important (Qamruzzaman & Karim (2020).

According to Choong and Liew (2009), volatility can have significant effect on the economic growth of a country. They anchored their argument on the fact that the level of investment leads to higher levels of output and thereby greater profit, ceteris paribus. Greater profit improves creditworthiness and intensifies borrowing that in turn results in higher investment, and subsequently FDI flows into the economy to finance this demand or boom. At the same time, an increase in investment level raises the demand for the country-specific factor as well as increases the aggregate price relative to the aggregate output. Increases in input prices, on the other hand, reduces profits and hence, trims down creditworthiness and investment, which will eventually transmit into a fall in aggregate output. Thus, endogenous volatility causes adverse shock to have permanent and persistent negative impacts on economic growth.

Volatility of FDI in recipient countries may be harmful to economic growth since it causes FDI to be less effective. As a result, the sudden fluctuations in the FDI flows may have a destabilizing effect on the economic performance (Lensink and Morrissey, 2006). Uganda like other developing countries has also experienced volatility of FDI inflows in the past two decades. In the late 1990's, the country implemented an economic liberalization programme with reforms targeted at restoring macroeconomic stability and fiscal discipline, while improving the investment climate (IMF, 2003). These were intended to stimulate FDI inflows to provide adequate resources to finance long term investment for job creation and sustainable economic growth. However, FDIs over time have been seen to only increase at a low rate as well as characterized with fluctuations as shown in Figure 1.1 below.

Figure 1.1: Graph showing Net Foreign Direct Investment Inflows (% GDP) to Uganda



Source: World Bank (2021)

Uganda's FDI to GDP ratio is expected to hit 4.15% by the end of NDP111, though Uganda's net FDI inflows (% of GDP) fluctuated substantially in recent years, it tended to increase to meet the objectives of NDP111.

The question that remains is what is the effect of FDI volatility on Uganda's economic growth?

1.2 Problem statement

The issue of capital flow volatility and its impact on emerging market economies, particularly in relation to foreign direct investment (FDI) and economic growth, has been a subject of extensive research in the literature (Calvo, 1998; Eichengreen *et al.*, 2003; Kaminsky *et al.*, 2004). Several studies have investigated the relationship between FDI and economic growth in less developed countries, but the findings have been inconclusive, with some studies suggesting a positive association while others finding no significant relationship (Chee-Keong and Venus Khim-sen, 2009; Obwona, 2001; Ahmed, Ghani, Mohamad & Derus, 2015; De Mello, 1997; Ozturk, 2007).

However, a critical gap exists in the literature regarding the impact of FDI volatility on economic growth, especially in the context of emerging market economies. It is widely argued that the volatility of capital flows, particularly sudden reversals, can lead to significant declines in economic growth, with potentially devastating consequences for these economies (Calvo and Reinhart, 2000; Hutchison and Noy, 2002; Edwards, 2004). The existing theoretical framework for explaining the adverse effect of FDI volatility on economic growth is relatively limited. According to Van Staveren (2011) and Lensink & Morrisey (2001), FDI inflow volatility generates increased uncertainty, which in turn reduces investment due to decreased expected returns.

While some studies have explored the relationship between FDI volatility and economic growth in sub-Saharan Africa, these have generally presented cross-country evidence (Bartels, Alladina and Lederer, 2009; Osei *et al*., 2002). In this context, it is important to note that Uganda, despite implementing economic liberalization programs aimed at attracting FDI inflows, has experienced notable volatility in net inflows. However, the empirical impact of this FDI volatility on Uganda's economic growth remains unestablished.

This study aims to contribute to the existing literature by investigating the relationship between FDI inflows, their volatility, and economic growth specifically within the context of Uganda. By doing so, it seeks to shed light on the extent to which FDI inflow volatility influences Uganda's economic growth, thereby addressing a critical gap in the current academic discourse on this subject.

1.3 Objectives of the Study

The specific objectives of the study were to:

1. Examine the long- and short-term effect of foreign direct investment inflows on economic growth.
2. Investigate the long- and short-term effect of foreign direct investment volatility on economic growth.

1.4 Hypotheses

To achieve the above objectives, the following hypotheses were tested:

1. There is no significant short run effect of FDI inflows on economic growth.
2. There is no significant long run effect of FDI inflows on economic growth.
3. There is no significant short run effect of FDI volatility on economic growth.
4. There is no significant long run effect of FDI volatility on economic growth.

1.5 Significance of the Study

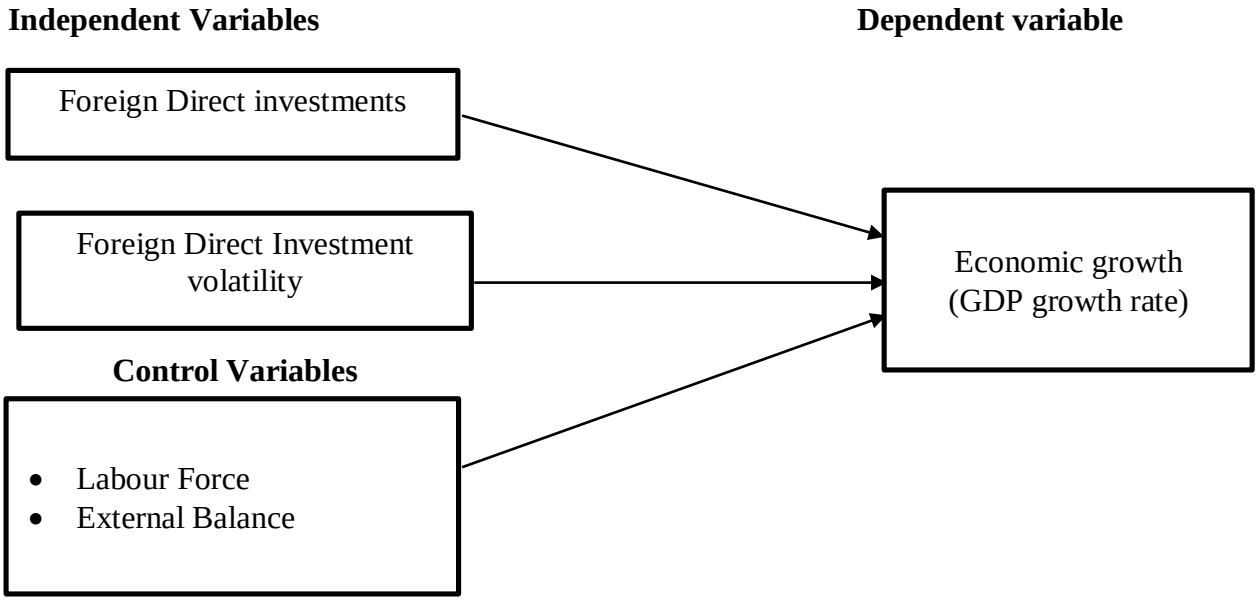
The findings of this research might be of significance to policy makers, investors, communities and academia in Uganda. Policy makers especially in the National Planning Authority and Ministry of Finance, Planning and Economic Development might find the policy implications of this dissertation useful in formulating policies for both domestic and foreign investors. If FDI has a positive impact on economic growth, policy makers should be encouraged to develop relevant and effective policies to attract FDI into strategic industries that have high economic benefit. Effective pro-investment policies would enable Uganda to become a more favourable destination for FDI and accelerate economic.

The policies might benefit both foreign and local investors, as well as communities. Local investors will benefit through entrepreneurial development arising from FDI spill-over effects such as technology transfer, new skills and know-how, which will facilitate the establishment of new projects. The unemployed, especially youths, will either find jobs in FDI-related projects or

in projects established by local entrepreneurs, thus accelerating economic growth and alleviating the unemployment crunch that Uganda faces. In the long-run, income and welfare might increase, thus enabling communities especially the rural and urban poor to move out of poverty. Lastly, this research will add to knowledge through its empirical analysis.

1.6 Conceptual Framework

The study was guided by the concepts of economic growth, Foreign Direct Investment, Foreign Direct Investment volatility, and other macroeconomic variables using Uganda as the case study.



Inflows of FDI improves economic growth by increasing the capital stock. In addition, FDI contribute to imports of more efficient foreign technologies and generate technological spill overs for local firms. Thus, FDI leads to growth via technology spill overs that increase factor productivity. Certain host country conditions are necessary to ensure the spill over effects. Human capital is necessary for new technology and management skills to be absorbed. Besides, volatility of FDI in recipient countries have a destabilizing effect on the economic performance since it causes FDI to be less effective. This discourages higher level of domestic investments

and economic performance. Consequently, FDI volatility is expected to have a negative impact on economic growth. Hence, these factors plus other macroeconomic variables all impact on a country's economic growth.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter was to review the existing literature that explains the effect of FDI volatility on economic growth. This chapter also presents some empirical studies about economic growth.

2.2 Overview of the theoretical literature review

2.2.1 Theoretical framework

Neoclassical growth theory and endogenous growth theory provide the basis for most of the empirical work on FDI and Economic growth.

Solow (1956) developed neoclassical growth model which states that steady economic growth rate is dependent on three factors of production: labour, capital and technology. Using the advanced Cobb Douglas production function, an economy would accomplish an equilibrium state by varying labour and capital. The theory further emphasizes that technological change has a major influence on economic growth ie to produce continuous economic growth, both labour and capital must be varying alongside advances in technology. Thus, the neoclassical theory suggests that long-run economic growth arises from technological progress and labour force growth. Furthermore, the neoclassical theorists assert that FDI inflows are one of the solutions to saving-investment gap, foreign exchange gap, and fiscal gap in host countries. FDI can act as an engine of economic growth in the host economies through increment in capital formation, improved employment rates, promotion of manufacturing, inflow of management expertise, provision of skilled labour with an access to the international production network. However, the neoclassical theorists pointed out the effect of uncertainty in investment decisions whereby, if

investors are uncertain of future returns on their investments, their appetite to invest reduces. According to them, there is a negative relationship between uncertainty and investment. Therefore, this study intends to establish the effect of FDI volatility on Uganda's economic growth by referring to the neoclassical growth model.

2.2.2 Endogenous growth theory

According to Romer (1986) , there is a strong relationship between long-term economic growth and technological innovation. That long run growth is driven by accumulation of knowledge by forward looking and profit maximizing agents. The theory suggests that FDIs have a long-run positive effect on the growth of output. Lucas, (1990); Mankiw, Romer, & Weil, (1992); Romer, (1987); further explained the role of FDI on long run economic growth by amending the neoclassical growth model by Solow. This was done by including the growth driving factors of human capital and physical capital which partly explain the significance of FDI in developing countries. They modelled FDI as promoting economic growth in the long run through the permanent knowledge transfer. This knowledge transfers accounts for the non-diminishing returns in long run growth. Hence, if growth determinants, including FDI, are made endogenous in the model, long run effects of FDI will follow. Technology spills over from advanced to developing countries is in the form of FDI flow. FDI not only contributes to economic growth through capital formation and technology transfers but also does so through the intensification of the level of knowledge through labour training and skill acquisition.

According to the theory, FDI affects economic growth through three main channels. First, it increases capital accumulation in the host country through introduction of new inputs and technologies. Second, it increases knowledge and skills in the host country through labour and manager training. Third, FDI promotes competition in the host country industry by reducing

entry barriers and market power of existing firms. Endogenous growth theory suggests that FDI has a positive effect on economic growth, whereas the volatility in FDI inflows has a negative effect on economic growth. The theory states that FDI positively affects growth by decreasing the costs of research and development through stimulating innovation. Thus, FDI volatility depresses investment and negatively affects real GDP growth. For economies like Uganda, the effect of FDI volatility on economic growth has not yet been established which this study intends to establish.

2.3 Review of literature from empirical studies

2.3.1 Foreign Direct Investment inflows and Economic Growth

Foreign direct investments (FDI) are composed of capital inflow, expertise and technology by a foreign investor into the host country. According to International Monetary Fund (IMF) (1993), such investments are intended to have long-lasting impact in the host country. UNCTAD (2005) defined FDI as business enterprises carried out in destination countries with the intention of producing goods and services for exportation or to be sold domestically.

Wakyereza (2017)'s study on the impact of FDI on Uganda's economic growth, employment and poverty reduction for the period 1985- 2014 found that FDI contributed to Uganda's economic growth, employment and poverty reduction. However, though FDI contributed to economic growth, the coefficient was negative. This was partly attributed to Total Factor Productivity (TFP), as explained by the Solow-Swan Model and the absorption capacity of Uganda being a least-developed country. This situation was worrisome for the nation because a further review of the impulse response function indicated that FDI negatively contributed to economic growth both in the short-run and long-run. This study only focused on the impact of FDI on economic growth in Uganda and ignored the impact of FDI volatility on economic growth when FDI volatility has

an adverse impact on economic growth by discouraging innovation and technology adaption which are harmful to economic growth.

In addition, Obwona (2001) conducted a study on the determinants of FDI and their impact on economic growth in Uganda by using time series data for the period 1981-1995. The empirical results indicated that FDI had a positive impact on GDP growth in Uganda. It was also observed that foreign aid and other capital inflows significantly influenced growth through public sector investment. However, this study only focused on the impact of FDI on economic growth in Uganda and ignored the impact of FDI volatility on economic growth which this study established.

2.3.2 Foreign direct investment volatility on economic growth

Ngeny and Mutuku (2014) examined the impact of volatility of foreign direct investment of Kenya on its economic growth for the period 1970 to 2011. He used an endogenous growth model through least squares approach to establish the association between volatility of foreign direct investments and economic growth. It was established that FDI had a significant positive relationship with economic growth whereas FDI volatility had a negative relationship. Furthermore, a significant negative relationship was also established between FDI volatility and economic growth for Czech Republic and Hungary by Alpaslan (2011). He studied the period of 1990 to 2007 using the EGARCH model. The same results were obtained by Choong, Liew, Chan and Ch'ng (2011) in ASEAN countries for the period 1974 to 2005. However, for this study the autoregressive distributed lag approach (ARDL) was used to establish the effect of FDI volatility on Uganda's economic growth.

In addition, Duasa (2007) used ARCH model to test the effect of FDI volatility on economic growth in Malaysia for the period of 1990-2002. The findings of the study were that FDI

volatility had negative impacts on economic growth. The policy implication was that the improvement of FDI was to be emphasized to ensure stability of FDI inflow henceforth improved economic growth. This study used the EGARCH model to estimate FDI volatility and thereafter used the ARDL approach to establish the effect of FDI volatility on economic growth.

2.3.3 Other macroeconomic variables

Kargi (2014) assessed labour force participation rate and economic growth: observations for Turkey. It was found out that Turkey's economy had a high average growth rate in the studied period. A trend analysis was employed which revealed that a high growth rate did not create any employment. This was an explanation to the concept of the "jobless growth" through labour force participation rate, even though the population increased in a linear trend (approximately), labour force participation rate remained too low. Though the effect of labour force participation rate on economic growth has been established in Turkey, the case for Uganda is still unknown. This study bridged this gap.

In addition, studies by Tsani, Paroussos, Fragiadakis, Charalambidis, and Capros (2013) in South Mediterranean Countries, Sarwar and Abbasi (2013) and Mujahid and uz Zafar (2012) in Pakistan established that the participation of female's in the labour force both positive and negative effect on economic growth depending on whether they were employed in the formal or informal sector. In addition, Hicks, Basu and Sappey (2010) revealed that china's higher growth lately resulted from higher per capita. However, this study used population growth rate as a proxy for labour force.

Bader and Hamdan (2016) analysed the effect of exports and imports on economic growth in the Arab countries during the period 1995 to 2013. The study used panel data approach in 17 countries: (Jordan, United Arab Emirates, Bahrain, Tunisia, Algeria, Saudi Arabia, Sudan,

Oman, Qatar, Kuwait, Lebanon, Egypt, Djibouti, Mauritania, Morocco, Yemen and Palestine). The results indicated that exports and imports had a positive effect of economic growth. In addition, Hussain and Saaed (2014) examined the nexus of exports, imports and economic growth in Saudi Arabia, using annual data for the period 1990- 2011. Granger Causality and Cointegration test were employed in the empirical analysis. Both Trace and Maximum Eigenvalue indicated cointegration at 5 percent level of significance pointing to the fact that the variables have a long-run relationship. Also, economic growth was found to Granger Cause import. Thus, both exports and imports of goods and services were used as control variables in this study.

Ullah, Bedi-uz-Zaman, Farooq and Javid (2009) investigated export-led-growth by time series econometric techniques (Unit root test, Co-integration and Granger causality through Vector Error Correction Model) over the period of 1970 to 2008 for Pakistan. In their study, the results revealed that export expansion led to economic growth. They also checked whether there was unidirectional or bidirectional causality between economic growth, real exports, real imports, real gross fixed capital formation and real per capita income. The traditional Granger causality test suggested that there was unidirectional causality between economic growth, exports and imports. However, in this study exports were found not to be influencing economic growth statistically.

Furthermore, Romas (2002) investigated the Granger-causality between exports, imports, and economic growth in Portugal over the period 1865-1998. The role of the import variable in the investigation of exports output causality was emphasized, enabling one to test for the cases direct causality, indirect causality, and spurious causality between export growth and output growth. There was a feedback effect between exports output growth and imports output growth. More

interestingly, there was no kind of significant causality between import export growths. This study only established the short and long run relationship but not the causal relationships.

2.4 Summary

From the literature reviewed on FDI and growth nexus in both advanced and emerging nations, no study in Uganda assessed the impact of FDI volatility on Uganda's economic growth. Hence, this study assessed the effect Uganda's foreign direct investment and its volatility on economic growth.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter provides the methods and techniques that were adopted to achieve the objectives of the study. It presents the research design, scope of the study, data sources, description of variables, model specification and estimation procedure and data processing.

3.1 Research design

The study employed quantitative research design with use of time series data to investigate the causal and long-term relationship between variables. This is because time series data gives a long term and historical view of the variables. The use of time series ensures that the model used explains data to facilitate prediction, monitoring and control. This means econometric methods are to be employed in data analysis to test the relationships between the variables.

3.2 Data Type and Scope

Time series quarterly data for all the variables was used in this study. Annual time series data covering a period of 30 years, (1991-2020) was used. This period was chosen due to data availability.

3.3 Description of Variables

Table 3.1 presents variables and their measurements.

Table 3.1: Variables and their measurements

Variable	Definition	Measurement
Real GDP (GDP)	Sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.	Data are in constant 2015 prices, expressed in U.S. dollars.
Foreign Direct Investment inflow (FDI)	Foreign direct investment refers to direct investment equity flows in the reporting economy. It is the sum of equity capital, reinvestment of earnings, and other capital.	Annual amount inflows of FDI in US dollars
Foreign Direct Investment volatility (FDI)	Amount of uncertainty regarding the degree and size of changes in the value of foreign direct investment inflow	Standard deviation of residual term of EGARCH model
Labour Force (LBF)	Labor force participation rate is the proportion of the population ages 15-64 that is economically active	In percentage
External Balance ($EXTB$)	External balance on goods and services equals exports of goods and services minus imports of goods and services	Data are in constant 2010 U.S. dollars.

3.4 Data Sources

Data was extracted from the World Bank database, The World Bank Development Indicators

3.5 Model specification and Estimation

This study adopted a model from Numbu and Belyaeva (2021). This was modified for the purpose of this study. The augmented model was as follows.

GDP = f (FDI, VOLA, LBF, EXTB) ……. (i)

The econometric model of the study was;

$$\text{GDPt} = \beta_0 + \beta_1\text{FDI} + \beta_2\text{VOLA} + \beta_3\text{LBF} + \beta_4\text{EXTB} + \mu_t \text{ ……. (ii)}$$

Where GDP is Gross Domestic Product, FDI is Foreign Direct Investment, VOLA is FDI volatility, LBF is Labour Force, EXTB is External Balance, β parameters to be estimated and μ is white noise. The model included other independent variables other than FDI and Volatility to increase reliability of coefficients, for instance, the Labour force and external balance variables were included in the model as some of the endogenous variables theoretically pointed out to have an influence on economic growth and could also influence FDI and its volatility. Therefore, their inclusion in the model reduces the specification error.

FDI volatility is not a directly visible variable and therefore has to be derived. One of the most used measures of volatility is the EGARCH model. This study employed this method following Vieira and MacDonald (2016). The mathematical expression is as below.

EGARCH approach was used as shown in equation 3.2 below.

$$FDI_t = \vartheta + \delta FDI_{t-1} + \varepsilon_t + \varphi\varepsilon_{t-1} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.2$$

Where ε_t is the residual term which is independent and identically distributed ϑ is the intercept term, δ and φ denote the magnitude of the autoregressive term and moving average terms respectively and;

$$\log \sigma_t^2 = \omega + \alpha \left| \frac{\varepsilon_t\text{-}1}{\sqrt{\delta_t\text{-}1}} \right| + \gamma \left| \frac{\varepsilon_t\text{-}1}{\sqrt{\delta_t\text{-}1}} \right| + \beta_0 \log \delta_{t-1}^2 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.3$$

Where σ_t^2 denotes conditional variance of ε_t α, β_0 and γ are the parameters of ARCH, GARCH and EGARCH (leverage parameters) respectively. Therefore, the log transformation of the variance ruled out the negative variances. Hence, no restriction was required on the variance equation to ensure a positive volatility process as in the GARCH model.

After establishing the magnitude of volatility, the effect of foreign direct investment volatility on economic growth with the aid of the ARDL approach which was proposed by Pesaran *et al*., (2001) as an alternative procedure to the standard cointegration analysis was used. The equation was estimated as:

$$\Delta lnGDP_t = \beta_0 + \alpha_t lnGDP_{t-1} + \infty_2 lnFDI_{t-1} + \boldsymbol{\lambda_3} lnVOLA_{t-1} + \boldsymbol{\lambda_4} lnLBF_{t-1} + \boldsymbol{\lambda_5} lnEXTB_{t-1} + \sum_{t=1}^{P} \beta_i \Delta lnGDP_{t-i} + \sum_{t=0}^{P} \beta_i \Delta lnFDI_{t-i} + \sum_{t=0}^{P} \beta_i \Delta lnVOLA_{t-i} + \sum_{t=0}^{P} \beta_i \Delta lnLBF + \sum_{t=0}^{P} \beta_i \Delta lnEXTB_{t-i} + ECT + \varepsilon_t \quad \text{..... 3.4}$$

Where; t is time, Δ is the difference operator, ln represent natural logarithms, ε_t is the residual term, p is a lag to be estimated.

The bounds test was used to test for the existence of a long run relationship among the variables using Wald or F-statistics. Its null hypothesis is non-existence of long-run relationship while the alternative is existence of long-run relationship. The calculated F-statistics value was compared with two sets of critical values given by Pesaran *et al*., (2001) for the given level of significance. If the calculated F-statistics exceeds the upper critical value, then null hypothesis of no co-integration was rejected which implied that there exists co-integration. Therefore, the study used ARDL approach to estimate equation (3.4) that runs both long and short run effects FDI and FDI volatility plus other control variables thereby addressing all the four hypotheses of the study.

3.6 Data processing

Data was processed and analysed using E-views software. E-views version 10 was used because it has an inbuilt ARDL model and robust diagnostic model test checks.

3.6.1 Stationarity test

Stationarity means that the statistical properties of a time series do not change over time. Stationarity is important because many useful analytical tools and statistical tests and models

rely on it. As such, the ability to determine whether a time series is stationary is important. Therefore, to test for stationarity in this study, the Augmented Dickey Fuller (ADF) unit root test was used.

The ADF specification was of the following form:

$$\Delta Z_t = C_0 + C_2 t + \gamma Z_{t-1} + \sum_{i=1}^{\rho} \delta_i + \varepsilon_t \quad \text{………………………………………….. 3.5}$$

Where, C_0 is the intercept term, C_2 and γ are coefficients of time trend and level of lagged dependent variable respectively, Δ is the first difference operator and ε_t are white noise residuals. ρ is the lag- length introduced to account for autocorrelation, which was chosen based on the minimum of the information criteria. The null hypothesis was that there was a unit root. The null hypothesis was rejected when the absolute value of ADF statistic exceeded the critical values at 5%.

3.6.2 Pre-estimation test

To ensure data integrity of the data, several tests were carried out; to assess the degree of linear relationships among these variables, pairwise correlation analysis was be done among the independent variables in the empirical model and Variance Inflation Factors (VIFs) were used to determine level of multicollinearity as a confirmatory test. Due to mixed orders of integration of the model variables, the study implemented Pesaran *et al.* (2001) ARDL bounds cointegration test procedure to assess existence of cointegrating relationships in the empirical model

3.6.3 Residual diagnostics

To assess the goodness of fit of the model, wide ranges of testing procedures were conducted. These tests were applied to ensure that the findings adequately represent the data. The tests include but not limited to; for testing normality of the residuals, Breusch-Godfrey Lagrange

Multiplier for testing serial correlation of the residual and Breusch-Pagan Lagrange Multiplier test for testing heteroscedasticity of the residuals.

CHAPTER FOUR

PRESENTATION AND INTERPRETATION OF FINDINGS

4.0 Introduction

This chapter presents the results of study and their interpretations. Descriptive as well as inferential analyses are presented following the objectives of the study as earlier stated.

4.1 Descriptive evidence of the study

The descriptive evidence of the study variables summarizes the characteristics of the study variables over the period under study.

4.1.1 Summary statistics of study variables

The summary statistics of the study variables are presented in table 4.1 below outlining the mean, maximum values, minimum values and the standard deviations.

Table 4. 1: Descriptive statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
GDP	16,300,000,000	12,300,000,000	2,860,000,000	37,600,000,000
FDI	515,000,000	405,000,000	1,000,000	1,270,000,000
VOLA	5.729331	3.321944	1.330564	10.17125
LBF	10,500,000	3,131,619	6,433,435	16,500,000
EXTB	1,482,306,339.57	1,064,729,397.54	413,340,605.14	3,914,243,123.28

No. of observations: 30. Source: Author's computation based World Bank annual data 2022.

The main purpose of the descriptive analysis was to establish the goodness of fit of the observed data. The results show that the study variables have smaller standard deviations compared to their mean values. This implies that the observed data converges around the means. On

individual merit, there is high variability within the variables. This point to the reality that the macroeconomic environment surrounding economic growth for Uganda is volatile. However, since the study used a short dataset of just 30 observations, this could as well be the reason for the large standard deviations. Nevertheless, the study transformed the variables to log form to partially deal with the observed variability.

4.2 Results from the diagnostic tests prior to model estimation

4.2.1 Investigation of multicollinearity among the independent variables

The study first run a pairwise correlation analysis among the independent variables in the empirical model to assess the degree of linear relationships among these variables. The independent variables considered in the correlation analysis are the ones indicated in the transformed model, which is specified for estimation.

Table 4. 2: Pairwise correlation analysis results among independent variables

	LogGDP	**LogFDI**	**VOLA**	**LogLBF**	**logEXTB**
LogGDP	1.0000				
LogFDI	0.7129* (0.0000)	1.0000			
VOLA	0.0518 (0.7858)	0.7621* (0.0000)	1.0000		
LogLBF	**0.9647*** **(0.0000)**	0.5397* (0.0000)	0.0714 (0.7076)	1.0000	
logEXTB	**-0.8140*** **(0.0000)**	-0.7428* (0.0000)	-0.0320 (0.8668)	**-0.8458*** **(0.0000)**	1.0000

Note: * represents significance at 0.05. Source: Author's computation based World Bank annual data 2022

The results of the pairwise correlation analysis indicate that correlations among independent variables are generally low and significant. However, the results further reveal existence of high correlation coefficients between LBF and GDP, EXTB and GDP as well as EXTB and LBF.

Gujarati and Porter (2009) suggest that high correlation coefficients in excess of 0.8 are possible indicators of multicollinearity. Thus, due to the observation of high correlation coefficients among some of the independent variables, the study proceeded to assess whether inclusion of highly correlated independent variables would not result into severe multicollinearity. To do this, the study estimated the Variance Inflation Factors (VIFs) associated with each of the independent variables, as well as the mean VIF.

Table 4. 3: VIF results of independent variables include in the model

Variable	**VIF**	**1/VIF**
LogLBF	4.47	0.223818
logEXTB	3.71	0.269541
LogFDI	2.83	0.353055
logEXTB	2.10	0.476089
VOLA	1.01	0.990613
Mean VIF	**2.82**	

Source: Author's computation based World Bank annual data 2022

From the results, it is evident that the VIFs associated with each of the independent variables fall well below the threshold level of 10, above which severe multicollinearity would be a threat in the model according to Irshad *et al.* (2022). On account of the low individual VIFs and the low mean VIF, the study retained all the variables in the estimated model.

4.2.2 Unit Root tests on model variables

Unit root tests are the investigations that are made to establish whether times series variables are stationary over time or not. Series are considered to be stationary if a shift in time does not cause a change in the shape of their distribution (Granger & Engle, 1987). Authentic time series

analysis assumes stationarity of variables hence the need to ensure that there is no non-stationarity. Unit roots are some of the causes of non-stationarity in time series data hence the reason to examine their presence (Joo *et al.*, 2022). One of the most common unit root tests in economic literature is the Augmented Dickey Fuller (ADF) test and it is the one that was employed for this study as well. The ADF test tests the null hypothesis of non-stationarity. The decision criteria for the test is such that, if the test-statistic (t-statistic) falls short of the associated critical value (at 5% significance level), then the null hypothesis (no-stationarity) cannot be rejected (and vice versa). Unit roots were examined at both the variables' levels and first differences as presented below.

Table 4. 4: Unit root test results on all model variables

	ADF				
Variables	**Levels**		**First difference**		**Integration**
	z-statistic	**Critical value**	**z-statistic**	**Critical value**	
LogGDP	-1.429	-2.952	-5.276**	-2.952	I(1)
LogFDI	-0.576	-2.952	-6.213**	-2.952	I(1)
VOLA	-6.251**	-2.952	-	-	I(0)
LogLBF	-0.336	-2.952	0.743**	-4.464	I(1)
logEXTB	-6.433**	-2.952	-	-	I(0)

Note: Critical values are at 5% significance level. ** indicates significance at 5% level. Source: Author's computation based World Bank annual data 2022

Under the null hypothesis of presence of a unit root test (non-stationarity of a variable), the minimum z-statistic from the ADF unit root test, as indicated above, does not reject this null hypothesis for variables: LogGDP, LogFDI and LogLBF in levels but rejects the null hypothesis when these variables are first differenced. On the other hand, the minimum z-statistic from the ADF unit root test rejects the null hypothesis for variables: VOLA and logEXTB in levels. The implication of these unit root results is that while variables: LogGDP, LogFDI and LogLBF are

integrated of order one, I (1), the variables: VOLA and logEXTB are integrated of order zero, I (0). The unit root test results therefore show mixed orders of integration of the model variables.

4.2.3 Cointegration test results

Due to mixed orders of integration of the model variables, the study implemented Pesaran *et al.* (2001) ARDL bounds cointegration test procedure to assess existence of cointegrating relationships in the empirical model. The summary of cointegration results among the I (0) and I(I) variables are summarized below.

Table 4.5: Cointegration test results

Wald F-statistic = 13.723* **	**t = -7.343**	**k = 3, n = 28**
	Critical Value: Narayan (2005)	
Level of Significance	**Lower Bound**	**Upper Bound**
1%	**4.29**	**5.61**
5%	**3.23**	**4.35**
10%	**2.72**	**3.77**

Source: Author's computation based World Bank annual data 2022

The results in table 4.5 show that the F-statistic (13.723) exceeds the upper bound critical value of 5.61 at the 1% level of significance. The study thus rejected the bounds test null hypothesis of no cointegration. This results therefore affirms the existence of a long run relationship among the study variables.

4.3 Model estimates

4.3.1 The regression estimates of the model specified in the ARDL framework.

Given the mixed nature of stationarity of the model variables and the short time series that this study used, the ARDL model was identified as the best estimation technique because it is very prominent in setups of small samples where data is characteristic of mixed orders of integration.

According to McNown (2023), the major advantage of the ARDL method is that, if properly augmented, it avoids problems of serial correlation and of endogeneity. The optimal lag length for the model was 2 lags for all model variables. This was established following the Schwarz Bayesian information criteria (SBIC) via the ARDL framework, as a step before generating the error correction form of the final ARDL model. The results of the ARDL model in error correction form are presented in table below.

Table 4. 6: The ARDL regression estimates for both long run and short run.

Dependent Variable: **Gross Domestic Product**

Independent Variables	**Coefficient.**	**Std. Error**	**P>|t|**
ADJ $LogGDP_{L1}$	-0.3831897**	0.1590809	0.032
	Long Run		
LogFDI	0.623898***	0.3461509	0.002
Volatility	-3.319145***	0.654394	0.006
LogLBF	0.2506001**	0.0977519	0.033
logEXTB	-0.1371345**	0.0244907	0.050
	Short run		
$LogGDP_{t-1}$	0.7142155**	0.2737243	0.022
D(LogFDI)	0.0559638***	0.0153805	0.007
$LogFDI_{t-1}$	-0.1346126	0.0786819	0.111
D(Volatility)	0.8462322**	0.2973854	0.014
$Volatility_{t-1}$	0.2134176**	0.0950617	0.043
D(LogLBF)	-1.952133	2.733874	0.488
$LogLBF_{t-1}$	-23.74657	29.98326	0.443
D(logEXTB)	0.0369603	0.0960895	0.707
$logEXTB_{t-1}$	0.1372604*	0.0749474	0.090
Constant	-4.082657	10.8359	0.712

Notes: D = First difference in variable. ***, **, * Indicate significance at 1%, 5% and 10% levels respectively. ARDL regression (2, 2, 2, 2, 2). R-squared = 0.7667, Adj R-squared = 0.7515, Number of obs =28, Root MSE = 0.092. Source: Author's computation based World Bank annual data 2022

The regression estimates displayed in Table 4.6 are long run and short-run model estimates based on the empirical model which has been specified and estimated in the ARDL framework. The focus variables in this model are Foreign Direct Investment represented LogFDI and FDI inflow-volatility represented by Volatility, as the main determinants of economic growth represented by the dependent variables (Gross Domestic Product).

The regression estimates show that the estimated short-run coefficient on LogFDI is positive and statistically significant at 1% level (Beta = 0.0559638; p = 0.007). This indicates that a percentage increasing in FDI leads to a 0.056 percentage increase in GDP and vice versa. Although FDI influence was expected to extend into a second year, the coefficient on the first lag of FDI was found to be insignificant (Beta = -0.1346126; p = 0.111). In the long run, FDI has a positive and significant effect on economic growth (Beta = 0.623898; p = 0.002).

The estimated short-run coefficient on Volatility is positive and statistically significant at 5% level both in the current period and the previous period. This implies that when FDI inflow volatility increases, GDP also increases and vice versa. Specifically, an increase in volatility leads to a 0.85 percentage increase in GDP in the current period, while for every previous period, the percentage increase is 0.21. In the long run however, the effect of volatility on growth becomes negative and statistically significant at 1% level (Beta = -3.319145; p = 0.006). Therefore, in the long run, an increase in volatility leads to a 3.32 percentage reduction in economic growth. It is also observable that the long run estimated coefficient (-3.319) (in absolute terms) more than doubles the aggregated short run coefficients, indicating that the long run negative effect is larger than the short run positive effects.

The results also indicate that economic growth in the current period is positively and significantly is affected by its previous year level by about 0.7 percent. Further, labour force is

observed to have no significant short run effect on economic growth whereas its long run effect becomes positive and significant, with a percentage increase in labour force leading to a 0.25 percentage increase in economic growth. Similarly, external balance has no significant short run effect on economic growth at 5% level of significance. However, its long run effect is significant and negative with a percentage increase in external balance leading to a 0.14 percentage reduction in economic growth.

The coefficient of the error correction term was found to be negative (-0.3831897) and significant at 5% significance level. The coefficient of the error correction term represents the speed of adjustment toward long-run equilibrium from any short-run shock in the model resulting from the independent variables (Qamruzzaman & Jianguo, 2018). Thus, the coefficient of the error correction term indicates that the speed of return to equilibrium from short run disequilibrium is about 38%. The estimated model is observed to have explanatory power equivalent to 76.7% (R-square = 0.7667), indicating that about 23% of the changes in the dependent variable are explained by other factors not in the model. With a small Mean Squared Error of just 0.092 (MSE = 0.092), the estimated model can be relied upon (Qamruzzaman & Jianguo, 2018).

4.4 Post estimation tests Diagnostic tests on the model

The study proceeded to apply diagnostic tests on the estimated model to confirm that it did not suffer from any econometric problems. The tests that were applied are discussed as below.

4.4.1 Serial correlation tests

The Breusch-Godfrey LM test was carried out to check for serial correlation. The test examines the null of no serial correlation against the alternative hypothesis of serial correlation. The

Decision criteria is such that; if the chi-square value is significant at the 5% significance level, then the null hypothesis cannot be rejected, and vice versa. The results are presented below.

Table 4. 7: Breusch-Godfrey LM test results

lags(p)	Chi(2)	df	Prob.
1	0.373	(1, 12)	0.5526

Ho: no serial correlation. Source: Author's computation based World Bank annual data 2022

The results in table 4.7 indicate that the p-value (0.5526) associated with the chi-square exceeds the 5% level of significance implying that the null hypothesis of no serial correlation cannot be rejected. Hence the model does not suffer from serial correlation.

4.4.2 Heteroscedasticity test

From econometric theory, the variance of the error term of an estimated model is assumed to be constant for the model to retain efficient estimators. Non-stationarity of the variance of the error term results into heteroscedasticity (Greene, 2007). The study carried out the Breusch-Pagan Test to check for Heteroscedasticity in the error term. The test examines the null of no Heteroscedasticity (homoscedasticity). The Decision criteria is such that; if the chi-square value is significant at the 5% significance level, then the null hypothesis cannot be rejected, and vice versa. The results are presented below.

Table 4. 8: Breusch-Pagan Test results

chi2(1)	Prob > chi2
19.01	0.1048

Ho: Homoscedasticity. Source: Author's computation based World Bank annual data 2022

The results in table 4.8 indicate that the p-value (0.1048) exceeds the 5% significance level implying that the null hypothesis of homoscedasticity cannot be rejected. Hence the model does not suffer from Heteroscedasticity.

4.4.3 Test for Normality of residuals

The Skewness/Kurtosis test for Normality was carried out to check for normal distribution of residuals of the model. The test examines the null of normal distribution. The Decision criteria is such that; if the p-value exceeds the 5% significance level, then the null hypothesis cannot be rejected. The test also presents values for skewness and kurtosis. The results are presented below

Table 4. 9: Skewness/Kurtosis tests for Normality results

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
Residuals	28	0.3178	0.3487	2.05	0.3596

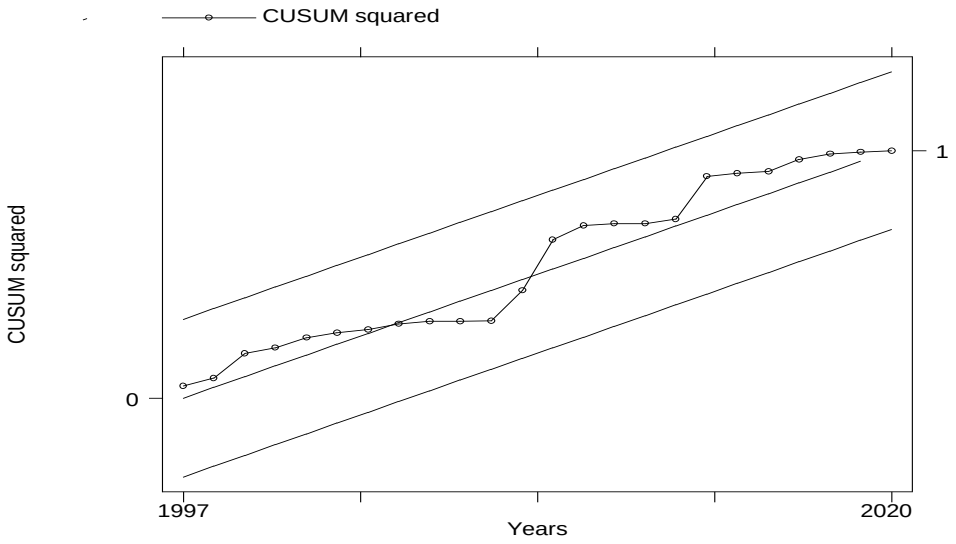
Ho: Normality. Source: Author's computation based World Bank annual data 2022.

The results in table 4.9 indicate that the p-value (0.3596) exceeds the 5% significance level implying that the null hypothesis of Normality cannot be rejected. Hence the residuals in the model are normally distributed.

4.4.4 Test for Model stability

The study tested to confirm whether the estimated model was stable. The Cumulative Sum (CUSUM) tests was used. This test is based on recursive regression residuals plotted against possible break points in the model within critical bounds of 5% significance. The model is stable if the CUSUM of residuals falls within the 5% critical bounds. The test results are represented in form of a graph below.

Figure 4.4.1: The CUSUM graph



The CUSUM graph indicates that the dotted line (the cumulative sum of residuals) entirely falls within the upper and lower critical bounds over the study period. The study thus concluded that the estimated model is stable and therefore the model results are reliable.

CHAPTER FIVE

DISCUSSION OF RESULTS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter discusses the results of the study as established in the previous chapter following the objectives of the study. The chapter draws conclusions and offers recommendations from the findings.

5.1 Discussion of results

This study was carried out following two objectives and four hypotheses. The findings of the study are thus discussed in relation to the objectives and hypotheses of the study.

5.1.1 The long run and short run effect of foreign direct investment inflows on economic growth in Uganda

There is a positive and significant effect of FDI on economic growth in Uganda both in the short run and the long run. This implies that an increase in FDI leads to an increase in economic growth and a reduction in FDI similarly leads to a decrease in economic growth. It is evident that, the short run effect of FDI on economic growth is from the current year and that means that the effect on GDP happens immediately. This quick response signals that FDI, is an immediate trigger of economic growth in Uganda. FDI inflows into Uganda incorporate investments in Mining and quarrying, Manufacturing and Financing, insurance & business services. From the results of this study, improvement in all these areas, immediately (in a space of one year) result into increase in GDP. Most investments in these sectors in Uganda's economy are owned by foreign investors and yet these are some of the largest contributors to Uganda's GDP. FDI stimulates economic growth through innovation spill overs. This is what Zamani and Tayebi (2022) establish, thus suggesting that higher FDI boosts economic growth.

The results of the study reveal further that the positive effect of FDI on economic growth in the long run is stronger than the short run effect. Although in the short run GDP increases by about 0.056% when FDI increases by 1%, in the long run GDP increases by 0.62% for every one percentage increase in FDI. This is an indicator that the long run effect of FDI on GDP is more than ten times bigger than the short run effect. Thus, this study reveals that the positive contribution of FDI on GDP in Uganda is not only immediate but also multiplies itself more than ten times in the long run.

5.1.2 The long run and short run effect of Foreign Direct Investment volatility on economic growth in Uganda

There is a positive and significant effect of FDI volatility on economic growth in Uganda in the short run. This implies that an increase in FDI volatility increases economic growth and a reduction in FDI volatility reduces economic growth. The short run effect of FDI volatility on economic growth spreads across two years, the current year and the previous year, meaning that instabilities in FDI inflows affect GDP both immediately and even after a year. Volatilities by nature are known to causes shocks in macroeconomic variables which could be observed as positive effects/increases (Mensah & Mensah, 2021). The positive effect of FDI instabilities (volatility) on economic growth is one of such cases. This can be interpreted to mean that FDI volatility has an inflaming effect on Uganda's GDP in the short run. According to Mumtaz and Musso (2021) since instabilities are full of uncertainties, they are inflationary. Inflationary tendencies raise GDP values. In the long run, the effect of FDI volatility is negative and significant indicating that the higher the volatility, the smaller the economy grows and the lower the volatility, the higher the economy grows. Sustained instabilities in FDI hurt investment and business projections and thus hinder growth. Therefore, FDI volatility in Uganda inflames the

economy in the short run and then contracts it in the long run. From these results, lowering FDI instabilities improves economic growth. The results are in agreement with Yeboua (2021) who also establishes a negative relationship between FDI volatility and economic growth.

The results of the study reveal further that the positive effect of FDI on economic growth in the long run is stronger than the short run effect. Although in the short run GDP increases by about 0.056% when FDI increases by 1%, in the long run GDP increases by 0.62% for every one percentage increase in FDI. This is an indicator that the long run effect of FDI on GDP is more than ten times bigger than the short run effect. Thus, this study reveals that the positive contribution of FDI on GDP in Uganda is not only immediate but also multiplies itself more than ten times in the long run.

5.2 Conclusions from the study

This study aimed at establishing the effect of FDI inflows and FDI-inflow volatility on economic growth in Uganda, measured by level of GDP. An Autoregressive Distributive lag model was estimated since it yields reliable estimates of model parameters especially when the regressors have mixed levels of integration. The findings of the study showed that, in the long run, FDI inflows had positive and significant effects on GDP while volatility negatively and significantly affected GDP. In the short run, economic growth was positively and significantly affected by both FDI inflows and FDI-inflow volatility. The results thus reveal that FDI is a very important factor of economic growth both for the short run and the long run periods while FDI-inflow volatility is a long-term GDP – reducing factor that should be stabilised.

5.3 Recommendations

The study recommends that government and policy makers should boost FDI inflows by formulating attractive investment options for investors. This is because FDI has both an

immediate and a long term positive and significant effect on growth. Government should broaden FDI inflow composition and attract investments into other lagging sectors of the economy like agriculture.

Government should avoid extreme FDI-inflow volatility. This can be done by smoothening the business registration processes, easing investment requirements and allowing rule of law. In so doing, FDI-inflow volatilities would be avoided.

5.4 Limitations of the study

This study employed annual data that was short in supply and therefore formed a short study period. The small size of the study period may not be enough to fully understand the long term dynamics of FDI and economic growth.

5.5 Areas for further research

Further studies on this subject can consider carrying out a comparative study across East Africa to understand how the different member countries' FDIs and volatilities affect their specific GDPs.

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