SOLOW-SWAN MODEL FOR THE ANALYSIS OF THE EFFECT OF FOREIGN DIRECT INVESTMENTS IN UGANDAN ECONOMIC GROWTH

BY

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A RESEARCH REPORT SUBMITTED TO THE SCHOOL OF MATHEMATICS AND COMPUTING IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARDOF MASTER OF SCIENCE IN STATISTICS OF KAMPALAINTERNATIONAL UNIVERSITY

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DECLARATION

I, declare that this Thesis entitled "Solow-Swan Model for the Analysis of the effect of Foreign Direct Investments in Ugandan Economic Growth" is my own original compilation and has never been presented to any organization or institution of higher learning either as a paper or for any academic award. I also hold full responsibilities for all the mistakes in this study.

Signature: 

Date: 2/07/2023

APPROVAL

This is to acknowledge that, this thesis on "Solow-Swan Model for the Analysis of the effect of Foreign Direct Investments in Ugandan Economic Growth" has been carried out under my close supervision and is now ready for submission to the School of Mathematics and Computing in partial fulfillment of the requirements for the Master's Degree in statistics of Kampala International University with my approval.

Signature.....

(Supervisor)

Date: 03/01/2023

DEDICATION

This research is dedicated to my beloved parents Mother and daddy and my brother who have contributed immeasurably to my studies.

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The success in producing this work is attributed to such a number of people, to whom I wish to acknowledge my thanks. The completion of this piece of work has been such a task that would not have been a success when handled solely.

I first of all thank the Almighty Allah, who gave me abundant health, strength, and courage to be able to complete this work. My sincere gratitude goes to my supervisor whose commitment, patience and guidance, gave form to this piece of work.

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I further take recognition of my friends, for their encouragement and support in my academic endeavors.

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CHAPTER ONE
INTRODUCTION

1.0 Introduction

This section focused on the background of the study, problem statement, purpose, research goals, research questions, scope, hypothesis and significance of the study.

1.1 Background of the study

This study background includes the historical, theoretical, conceptual and contextual perspective.

1.1 Background of the study

1.1.1 Historical Viewpoint

UNCTAD reports that global foreign direct investment (FDI) inflows grew from $23 billion in 1975 to $1.95 trillion by 2017. Lower-middle income economies have seen a significant increase in foreign direct investment (FDI) inflows as well as a rise in growth rates over the past few decades. At the aggregate level, GDP growth for lower-middle income economies was strong over the past four decades. In 1975, GDP for these economies was just 311 billion dollars. But by 2017, this figure had grown to 6 trillion dollars. FDI accounted for 0.37% of GDP in 1975 and 1.94% of GDP in 2017. In 2017, upper-middle income economies received three times more foreign direct investment (FDI) than lower-middle income economies, but the annual growth rates were similar. There is a question of whether foreign direct investment (FDI) stimulates economic growth in lower-middle income economies, and to what extent. This is an issue of interest because it has implications for how these economies can develop. There is some evidence that FDI does stimulate economic growth in lower-middle income economies. This is likely because it makes these economies more productive and efficient. However, this effect is not always positive. Therefore, it is important to consider the effects of FDI on the economy as a whole. Generally, FDI appears to be a valuable tool for growth in these economies. The purpose of this paper is to contribute to the ongoing debate about whether foreign direct investment (FDI) has a positive or negative effect on economic growth in lower-middle income economies with data more up to date.

Global FDI inflows totaled 23 billion U.S. dollars in 1975, however, this number increased to 1.95 trillion U.S. dollars by 2017. According to UNCTAD, FDI inflows account for a significant

share of finance coming into developing economies. In 2018, 39 percent of all incoming finance was from FDI. Foreign direct investment (FDI) is a major source of external finance for developing countries, and its importance in promoting economic growth is clear. The aggregate GDP of lower-middle income economies grew from 311 billion in 1975 to 6 trillion in 2017, while inward FDI flows amounted to 789 million (0.37% of GDP) in 1975 and 127 billion (1.94% of GDP) in 2017. The increased FDI flows and economic growth rates may have been a result of the improved political and financial institutions of countries over the last two decades, which made it possible for them to participate in international trade. In 2017, lower-middle income economies experienced similar growth rates as upper-middle-income economies and at the same time, the amount of FDI inflows differ quite substantially.

Upon advance review, agreeing to the Africa Venture Report (2016), Western Europe was keeping the lion's share as the best source locale for capital speculations in Africa accounted for $30.1bn in 2015. In show disdain toward of the 38% diminishes of inflows in 2014, Western Europe leads the source districts having accomplished a 45% showcase share. A major commitment of remote coordinate ventures inflows in 2015 comes from Italy with ventures esteemed at 7.4bn in African region. Concerning to Asian speculators, India and China are the most nations. India features a priority with 5% showcase share of internal ventures in Africa. Agreeing to the Africa Venture Report (2016), sectoral information shows that the remote coordinate speculations in Africa are carried out basically within the areas of Trade Administrations, Promoting and Back, and Fabricating. Upon further assessment, the downturn from 2011 upturned in 2015 with an increment of 5 percent within the sum of venture. In spite of the truth that there was an increment of14 percent in capital investment as well, the value of extraction projects was $15.1bn after the decrease of 32 percent in 2015. The field of manufacturing had foreign direct investments with a value of $14.4bn in 2015.

Endeavors to convert Uganda's economy can be followed to 1900. The British Government had given grants that were utilized to convert the nation from an agrarian society. After Autonomy in 1962, financial change got to be the duty of the Government of Uganda (GOU). To move forward the living measures of Ugandans, the GOU set out on financial changes to pull in FDI to upgrade financial development, increment work and decrease destitution. Endeavors to draw in

FDI to Uganda started before long after Freedom, through the sanctioning of the Outside Speculation (Assurance) Act (FIPA) of 1964. These approaches finished into the marking of the Uganda–India Exchange Assention, which permitted Indians to set up trade ventures in Uganda. World Bank improvement markers uncovered that Net Household Item Development Rate (GDPGR) expanded from 4.1% per annum in 1962 to 7.79% per annum in 1970. In the interim, Gross Domestic Product (GDP)per capita increased from USD 62.02 to USD 133.40 during the same period.

Although Uganda has attracted increasing foreign direct investment since reforms in the early 1980s, there are few studies on the impact of foreign direct investment on economic growth, employment and poverty reduction. In the global context, most studies have focused on demonstrating the determinants and contribution of FDI to economic growth in countries such as Uganda, Nigeria and the Association of Southeast Asian Nations (ASEAN) countries. The first of these types of studies on Uganda was by Obwona (1996, 1998, 2001) on determinants of foreign direct investment and its impact on Uganda's economic growth. All studies focused on the period 1981-1995 and used mixed methods. All of these studies showed a positive relationship between foreign direct investment and economic growth. However, they contain errors in the measurements used, and the focus period should be updated. Other studies such as those by Riddervold (2011), the Ministry of Finance Planning and Economic Development (MFPED) and Annual Private-Sector Investment Surveys (PSIS) focus largely on trends in FDI inflows and general investment issues in Uganda. In studies on industrialized and developing countries in the ASEAN region and Latin America, which are proportionately more strongly represented in empirical research, little attention is paid to the subject of investigation. Few studies have examined the impact of foreign direct investment on economic growth, employment and poverty in Uganda.

1.1.2 Theoretical Perspective

The study utilizes the Solow growth model developed by Solow (1956). The Solow growth model breaks the growth of economies down to the basics, emphasizing the importance of capital and labor accumulation. An increase in capital accumulation, which is determined by the savings rate and the rate of capital consumption, stimulates economic growth only in the short term.

According to Barro, Mankiw and Sala-I-Martin (1995), the relationship between capital accumulation and growth over time is positive. The model follows the Inada condition, which implies that developing countries will eventually approach the same long-run equilibrium between capital and labor and output per capita as developed countries. Long-run equilibrium is reached when the savings rate equals the required investment. If the savings rate is greater than the required investment, then the capital stock will grow and vice versa. This implies that foreign direct investment can help the host country reach a new, higher steady state by increasing the capital stock. Solow (1957) emphasizes the fact that technological progress is the main driver of long-term economic growth. Nevertheless, von Solow does not draw any conclusions about the development of technological progress, so the state of the art is assumed to be exogenous.

1.1.3 Conceptual Perspective

According to the IMF (2003), foreign direct investment is defined as international investment that reflects the objective of an entrepreneur resident in one economy acquiring a permanent interest in a company resident in another economy. De Mello (1999) defines foreign direct investment as international cooperation between companies that involves significant equity participation and effective management decision-making authority in, or control of, the ownership of foreign companies. This broad definition includes the allocation of tangible and intangible assets by a foreign entity to a domestic entity, such as B. (i) capital flows, (ii) R&D, (iii) managerial skills and (iv) better technology.

Economic growth is the increase in a country's level of goods and services over a specified period of time, in this case economic growth is measured in terms of gross domestic product, expressed as percentage change Hausmann Rodrik and Velasco (2008). Economic growth: According to Lopez (2005), economic growth means the steady process by which the productive capacity of the economy is increased over time to meet rising levels of national production and income.

1.1.4 Contextual Perspective

Granting Uganda's FDI inflows have increased significantly since 1985, a few observations are worth noting. First, foreign direct investment has a positive impact on the hospitality industry by accelerating economic growth, creating jobs and reducing poverty in the long run. However, in 2010, out of a total population of 33 million, about 13 million were insecure non-poor2, representing 40% of the total population (MFPED, 2012).

Furthermore foreign direct investment to Uganda has increased by almost 20 percent, it increased from US$1.055 billion in 2018 to US$1.266 billion in 2019, reflecting the continued development of major oil fields and an international oil pipeline, as well as projects in construction, manufacturing and agriculture. The economy grew by 3.1 percent in FY2019/20, which is less than the 6.8 percent growth recorded in FY2018/19 and less than the forecast growth rate of 6.0 percent. The main driver of the economic slowdown was the triple effect of the COVID-19 pandemic, the locust plague and the floods on the economy. As lockdown easing continues, the economy is expected to slowly recover, reflecting the impact of a slow recovery in both external and domestic demand. Additionally, low merchandise exports and subdued tourism receipts are expected to continue to weigh on economic growth as global demand for Ugandan exports weakens. Therefore, economic growth is forecast to be in the range of 3.0 to 4.0 percent in the 2020/21 financial year and will increase further to 5.0 to 6.0 percent in the 2021/22 financial year. Economic growth is therefore expected to remain below the potential growth rate until FY 2022/23 (UIA, 2021).

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1.2 Problem Statement

FDI is considered a key factor for economic growth; Uganda is one of the economically hardest hit countries, with economic growth clearly on low horizons and in the single digits (Rovo, 2020). Uganda's real gross domestic product (GDP) grew by 2.9% in fiscal 2020, less than half the 6.8% recorded in fiscal 2019, driven by the impact of the COVID-19 (coronavirus) pandemic. GDP growth of a similar magnitude is expected for fiscal year 2022 (UEO, 2020). Uganda's recent high rates of economic growth have not been accompanied by strong employment growth. This lack of job growth has delayed poverty reduction in the country. For example, although the economy grew at an average annual rate of 4.5% between FY15/16 and FY17/18, the number of people living in poverty increased over the same period from 19.7% in FY15/16 to the 21.4% in FY17/182 (UEO, 2019). Worse, Uganda fared worse than other sub-Saharan African countries, with foreign direct investment accounting for an average of 4 percent of GDP over the past decade, while the regional average was 5.5 percent of GDP (UBOS, 2019). Foreign investment is focused on commodities, with almost 55 percent of foreign direct investment between 2008 and 2017 going to this sector. This reliance on commodities also contributed to the sharp fall in foreign direct investment between 2019 and 2020, when Uganda saw a 35 percent drop as COVID-19 hit the country. At the same time, FDI inflows were a significant part of external development finance, reaching 25 percent, while Kenya, Rwanda, and Nigeria remained below 20 percent. Moreover, the diversification of foreign investment flows towards the services sector, which contributed 31 percent of the total FDI inflows between 2009 and 2019, was another positive. In services, the largest single recipient of FDI inflows was the financial sector at 12 percent. The state of the economic growth presents significant scare as to whether the economic growth is explained by the foreign direct investments hence a statistical analysis of the effect of foreign direct investments and economic growth in Uganda 1988-2021.

1.3 Study Purpose

To conduct Solow-swan model for the analysis of the effect of foreign direct investments in Ugandan economic growth.

1.4 Study Objectives

1) To establish the casual relationship between foreign direct investments and economic growth of Uganda.
2) To examine the short run relationship between foreign direct investments and economic growth of Uganda.
3) To determine the long run relationship between foreign direct investments and economic growth of Uganda.

1.5 Research Questions

1) What is the casual relationship between foreign direct investments and economic growth of Uganda''?
2) What is the short run relationship between foreign direct investments and economic growth of Uganda?
3) What is the long run relationship between foreign direct investments and economic growth of Uganda?

1.6. Hypothesis

1) There is a casual relationship between foreign direct investments and economic growth of Uganda.
2) There is a short run relationship between foreign direct investments and economic growth of Uganda.
3) There is a long run relationship between foreign direct investments and economic growth of Uganda.

1.7. 0 Scope of the study

1.7.1 Geographical Scope

The investigation was conducted in Uganda, a least developed, highly indebted poor country (HIPC) with a GDP of approximately US$27,462 million (UBOS 2014).

1.7.2 Subject Scope

The aim of the study was a statistical analysis of the impact of foreign direct investment and economic growth in Uganda. The aims are to establish the incidental relationship between foreign direct investment and economic growth, then examine the short-term relationship between foreign direct investment and economic growth, and finally determine the long-term relationship between foreign direct investment and economic growth in Uganda.

1.7.3 Time Scope

The study was conducted as a time series data for a period of 34 years that is to say from 1988 to 2021. The time is chosen because it represents significant trends in the FDI of Uganda and economy of Uganda.

1.8 Significance of the study

FDI as a source of physical capital is an important tool for investment and production, and spurs a nation's economic growth, thus leading to employment generation and poverty reduction. FDI would be the main source of capital for developing countries, including Uganda, which is without well-developed capital markets. For GDP to increase investments have to increase, especially in the manufacturing sector and agriculture, which is the backbone of developing countries, the study is justified due to the continuous existence of economic growth hurdles in the country.

The findings of this research of significance to policy makers, investors, communities and academics in Uganda. Policymakers in the MFPED and the National Planning Authority in particular will find the policy implications of this thesis useful in formulating policies for both domestic and foreign investors.

If FDI has a positive impact on economic growth, employment and poverty reduction, policy makers should be encouraged to develop relevant and effective policies to attract FDI into strategic industries that benefit communities and help the unemployed find jobs.

Through this study, effective pro-investment policies will enable Uganda to become a more favorable destination for FDI and accelerate economic growth, employment and poverty reduction in Uganda.

The policies will 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

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

In this section, the researcher critically analyzes works of other people related to variables under study. The theoretical review constitutes the theory underlying the relationship between the two variables, conceptual framework, related literature and related studies.

2.1 Theoretical Review

The study uses the Solow growth model developed by Solow (1956). The Solow growth model breaks the growth of economies down to the basics, emphasizing the importance of capital and labor accumulation. An increase in capital accumulation, which is determined by the savings rate and the rate of capital consumption, stimulates economic growth only in the short term. According to Barro, Mankiw and Sala-I-Martin (1995), the relationship between capital accumulation and growth over time is positive. The model follows the Inada condition, which implies that developing countries will eventually approach the same long-run equilibrium between capital and labor and output per capita as developed countries. Long-run equilibrium is reached when the savings rate equals the required investment. If the savings rate is greater than the required investment, then the capital stock will grow and vice versa. This implies that foreign direct investment can help the host country reach a new, higher steady state by increasing the capital stock. Solow (1957) emphasizes the fact that technological progress is the main driver of long-term economic growth. Nevertheless, von Solow does not draw any conclusions about the development of technological progress, so the state of the art is assumed to be exogenous.

Labor and capital stock productivity are expected to increase as a result of new technologies, and this will continue to lead to more consistent returns on investment (De Jager, 2004). Due to declining returns on the marginal product of capital, the impact of FDI on economic growth is only a short-term effect, leaving long-run growth unchanged. Therefore, additional capital investments are unprofitable when the economy is in equilibrium. The only way for an economy to experience long-term growth with diminishing returns on the marginal product of capital is to discover new technologies through investment in research and development.

Despite that the Solow model generally serves as the basis of economic analysis, it is important to shed light into the limitations that comes along due to the fact that the model is grossly simplified. The model excludes environmental considerations such as natural resources and pollution. Further, the model relies on the assumption of a closed economy meaning that the government is totally absent.

The model of Romer (1990) of endogenous technological change highlights that a large population is not enough to stimulate economic growth, rather the rate of growth is determined by the human capital stock in the country. It is believed that technological development is achieved through a population with greater knowledge, education and training and hence, the endogenous growth theory emphasizes the role of accumulation of knowledge.

The Ozawa Economic Development FDI Theory

The Economic Development FDI Model was industrialized by Ozawa (1992) based on earlier theories. Based on the H-O Theory of comparative advantage, Kojima (1975) and Kojima and Ozawa (1985) explained that countries first, gain from trade when produce and exports are commodities of their comparative advantage, and when imports are goods of comparative disadvantage. Second, firms gain even more from increased trade when comparative disadvantage of intangible assets are transferred to host nations with comparative advantage in those intangible assets.

Ozawa (1992) pointed out that, first, the supply and demand conditions are not similar between countries due to different equipment and technology of supply-side factors and consumer tastes on the demand side. Second, companies such as academic and research institutions develop technologies and own intangible assets. Such institutions generate and commercialize technology and skills. Third, economies are not homogeneous but have a hierarchy at the global and regional levels. For example, the US is a global leader, and Germany, the UK and France are regional leaders in the EU. In terms of industrial development, some are leaders while others are laggards, with different comparative advantages. Fourth, nations possess natural and compatible stages of development that can be structurally built sequentially as stages of industrial development of

developed nations. Fifth, structural adjustment is a move from inward substitution of imports to export-oriented trade and investment, and governments have a significant role to play.

Considering these characteristics, a nation's competitiveness and level of economic development are similar. The structural characteristics of a nation indicate four stages of development: factor-driven, investment-driven, innovation-driven, and wealth-driven. The nation's economy depends on natural resources and labour. Economic activities are labor intensive to utilize the most abundant resource. The least developed countries belong to this first stage of development, in which economic growth is driven by factors of production such as raw materials and labour. As a result, resource- and job-seeking foreign investors often target least-developed countries like Uganda to take advantage of the host country's low labor costs and abundant natural resources. This phase is also associated with trade in primary products and labor-intensive goods. FDI inflows to the least developed countries dominate, while there are either no or minimal FDI outflows.

Investment-driven FDI: Second Development Stage

This period is characterized by, intermediate and capital goods such as heavy machinery and chemicals used in the manufacture of end products. It is also composed of the infrastructural building materials used in housing construction, public building construction and communications.

Innovation-driven: Third Development Stage

This segment is similar to the second phase of economic growth. Most developing countries fall into this category. Foreign direct investment continues to flow into the country, but labor costs and living standards are rising over time, and foreign direct investment outflows are occurring. Innovation-driven foreign direct investment is the third stage. As Kojima and Ozawa (1985) note, FDI inflows are motivated by market and technology factors. The transition countries include China, Russia, Brazil and South Africa.

Wealth-Driven: Fourth Development Stage

This is the highest level of development for most developed countries and is marked by drift, recessions and decline. Borrowing from PLC theory, the stages of development are distinguished by the changing factor endowment proportions in nations of three main factors used in industrial activity: physical capital, human capital and resource capital, both natural raw materials and labour. According to Ozawas theory, economic growth occurs through changing and improving patterns, trends and patterns of a country's factors and technological endowments. With the growth of physical and human capital, the gross national product also increases. A certain stage of a country's competitive development is related to its export competitiveness.

2.2 Casual Relationship between FDI and Economic Growth Rate

Anwar and Nguyen (2010) argue that there is a two-way relationship between foreign direct investment and economic growth in Vietnam, but only in four out of seven regions. The authors' main findings are that investing in (i) education and training, (ii) the development of financial marketing, and (iii) narrowing the existing technological gap between Vietnam-based local firms and foreign firms enhances the impact of FDI on economic growth

According to Umoh, Jacob and Chuku (2017) use both single and simulation equation systems in their study in which they examine whether endogenous effects of FDI on economic growth in Nigeria can be found over the period 1970-2008. Their results show that FDI not only stimulates economic growth, but that the relationship is reversed, i. H. a bidirectional causality.

According to Caesar, Haibo, Udimaland Osei-Agyemang (2018) find similar findings for China. However, Mah (2010) highlightsthat FDI inflows have not promoted economic growth, rather economic growth has causedFDI inflows into China.

According to Iqbal, Shaikh and Shar (2018) investigate the causality relationship between FDI, international trade and economic growth over the period 1998-2009 in Pakistan. Their main findings are that the impact of FDI is positive on the trade growth and that FDI inflows into the country was due to Pakistan’s great performance in economic growth during the 21st century.

According to Jugurnath, Chuckun and Fauzel (2016) investigate the casual relationship between foreign direct investments on economic growth in SSA for a panel of 32 countries during the period 2008–2014. Their GMM result shows foreign direct investment has a positive and significant effect on economic growth.

The GMM system, Nketiah-amponsah and Sarpong (2019) examined the fortuitous relationship between FDI and economic growth in SSA. Their results show that foreign direct investment has a beneficial effect on economic growth when it interacts with the infrastructure of the host country.

Accordion to Alzaidy et al. (2017) studied in Malaysia over the period 1975– 2014, and Azman-saini et al. (2010) by using cross country observations from 91 countries over the period 1975–2005 shows that foreign direct investment has a positive and statistically significant effect on economic growth. But the positive impact is determined by the level of financial development.

Accordion to Dinh, Vo and Nguyen (2019) conducted a study on developing countries from 2000 to 2014 by applying VECM and FMOLS. Their short-run result shows foreign direct investment hurts economic growth, but it has a positive effect in the long run.

Accordion to Khobai, Hamman, Mkhombo, Mhaka, Mavikela and Phiri (2018) investigate the FDI-growth nexus in South Africa by covering a period 1970–2016 by employing quantile regressions. The findings reveal that foreign direct investment has a negative and substantial effect at the lower extreme quantiles but has no significant influence at the higher quantiles.

According to Masipa (2014) estimated the impact of foreign direct investment on economic growth and employment in South Africa over 24 years. After conducting Johansen cointegration technique and the Granger causality test, the study found a positive long run relationship among FDI, GDP and employment in South Africa. The study concluded that foreign investment should be considered as an instrument to boost long term economic growth in the South African context.

According to Irfan, Mahmood, and Farid (2014) investigated a dynamic interaction among foreign investment inflows, domestic investment and economic growth in Pakistan over the period 1976-2010. After performing Johansen cointegration approach and Toda Yamamoto

causality technique, the existence of long run interaction between the three variables was revealed. A bi-directional causality was further supported by Toda Yamamoto test.

2.3 Short run Relationship between FDI and Economic Growth Rate

Some researchers have observed a positive association between FDI and growth (Haider, Gul, Afridi, and Batool, 2017). Others have found negative links to FDI growth. Studies on Pakistan analyzing the long- and short-term relationship between FDI, GDP, GNI and IMP are limited. This article attempts to fill the gap in the literature by performing some regressions on time series data to examine the causality relationship between FDI, GDP, IMP and GNI in Pakistan using the ADF Unit Root Test, the Johansan Co-Integration Approach, VECM and Granger causality methods.

Makiela and Ouattara (2018) conducted a study based on a sample of developed and developing countries over the period 1970-2007. Their results show that foreign direct investment has a positive short-run relationship with host country economic growth in the period 1981 to 2017.

Olawumi and Olufemi (2016) examined the impact of foreign direct investment on economic growth in some selected African economies over the period 1980-2013. They used a modified growth model, ordinary least squares, and a generalized method of moments. FDI inflows into the Central African Republic were found to have no statistically significant impact on economic growth. The panel analysis showed that the impact of FDI on GDP growth in African countries was limited or negligible.

Accordion to Sajid and Lan (2010) examined the link between foreign direct investment and economic growth in 61 Vietnam provinces from 1996-2005. The simultaneous equations model revealed a two-way linkage among FDI inflows and GDP growth in Vietnam. However, this outcome was not the case for each of the regions.

Accordion to Abdillahi and Mohd (2021) discovered the impact of foreign direct investment inflows on Ethiopia's economic growth using 36 years' time series data. The vector auto regression (VAR) model found FDI to have a positive and significant effect on GDP

advancement. Authors recommended policymakers to open up and restructure the financial and agriculture sectors so that Ethiopia can experience healthier growth.

According to Georgopoulos et al., (2018) incorporate the concept of divestment risk within the IDP framework and find that the failure of Greece to upgrade traditional industries to high-tech ones was a considerable source of divestment, hindering the country's progress to higher stages of the IDP. More recently, Gorynia et al. (2019) have confirmed the quadratic relationship between NOI and economic development in a group of Eastern European countries, but they argue that institutional reforms may not uniformly accelerate progress on the IDP.

Avomet al. (2020) indicate that global IFDI growth has been slowing over the past three decades, from 21 per cent in the 1990s to 1 per cent after the 2008/09 financial crisis. Jardet et al. (2022) show that IFDI peaked in 2015–2016 at 2.7 percent of world gross domestic product (GDP), and then contracted sharply in 2020 to1.2 per cent. One explanation for this IFDI slowdown may be the historically high economic uncertainty of the past decade.

Jardet et al. (2022) shows that global uncertainty affects IFDI more than domestic uncertainty in a host country, with high global uncertainty having a large negative effect on IFDI and the effect of low uncertainty on IFDI being much smaller. Furthermore, they find that MNEs favour developed economies when global uncertainty remains high for longer periods, highlighting a different impact of uncertainty in the developed versus the developing economies. The country's level of economic development seems to also play a role here.

Avom et al., (2020) show that global economic uncertainty reduces IFDI more in emerging and developing economies. Developing nations are mostly IFDI receivers and typically engage in less OFDI, implying that high global economic uncertainty hurts developing nations more, since IFDI cannot offset OFDI in their case.

2.4 Long run relationship between FDI and economic growth

Ridzuan, Ismail and CheHamat (2017) found a positive effect of FDI on economic growth in Singapore. The data spanned four decades from 1970 to 2013. More recent support came from Sothan and Zhang (2017) who showed that FDI had a growth effect in Cambodia. The study covered a period of more than three decades from 1980 to 2014. According to a time series study, support for foreign direct investments also came from Qatar for exactly two decades (1990 to 2010). The result showed that foreign direct investment and economic growth had a long-term interaction (Almfraji, Almsafir& Yao, 2014). Much of the literature has come to the same conclusion; However, the positive relationship between FDI and economic growth is far from certain. There are also negative effects that foreign direct investment can have. It is possible that foreign direct investment has simply no or only an insignificant effect on economic growth. FDI naysayers usually stem from empirical research that has found no significant impact of FDI on economic growth.

According to Saqib, Masnoon, and Rafique (2013) even found that FDI negatively affects economic growth in Pakistan. Moreover, evidence in Tunisia could not support the existence of FDI growth effect based on a study covering 38 years from 1970 to 2008.

Evidence from China also, showed similar results where FDI's effect on economic growth was not significant based on time series data from 1985 to 2003 (Zhao & Du, 2007). A time series study in Serbia also showed that inward FDI did not significantly affect economic growth. The study covered a 12 year period from 2007 to 2018 (Vasa &Angeloska, 2020). Another similar result was found in Latin America based on panel data of 22 Latin American countries from 1980 to 2006. The results showed that the effect of FDI on economic growth is only marginal. There is also much literature that found no long run significant influence when FDI was studied independently.

Accordion to Azman-Saini, Law & Ahmad (2010) who found that, the effect of FDI on economic growth only exists when the host country has exceeded a certain threshold of financial market development. They specifically mentioned that the long run effect of FDI on economic growth does not exist until then.

Carkovic and Levine (2012) argues that, the positive effects found in previous studies are most likely due to not controlling for endogeneity and the country specific omitted variables. By employing Arellano-Bond Generalized Moment of Methods, the authors conclude that FDI does not exert an independent influence on economic growth. According to Sarkar (2007), the majority of 51 developing countries over the period 1970-2000 do not support a long-term relationship between FDI and economic growth. This results irrespective of the level of openness and GDP per capita.

For instance, the study of Herzer, (2012) reveals that an increase in the FDI-GDP ratio is connected to a long-run GDP decrease (increase) in approximately 60% (40%) of the countries. The main finding from the study conducted by De Gregorio (1992), using panel data of 12 Latin American countries during 1950-1985, is that FDI compared to domestic investment is three to six times more effective.

Bende-Nabende, Ford and Slater (2011) conclude that, FDI has positive effects inASEAN58, both directly and indirectly in Indonesia, Malaysia and the Philippines but negative in Singapore and Thailand. The authors also highlight that the host country must have a sufficient level of human capital, adequate infrastructural services as well as having a liberal trade environment in order to benefit from the spillovers produced by FDI indirectly.

Pegkas (2015) studied the impact of FDI on economic growth in the Eurozone countries over 2002-2012 and the results indicate a positive relationship. The author used FEM and REM as a part of the method and concludes that a significant factor promoting economic growth in the Eurozone is the stock of FDI. The positive relationship between FDI and economic growth has also been highlighted in more recent studies (Suliman, Elian & Ali, 2018) where the effects from FDI have shown to be greater in magnitude in developing countries than the developed ones (Makiela & Ouattara, 2018).

Malefane and Odhiambo (2018) investigated the dynamic impact of trade openness on economic growth in South Africa. Their long run empirical results show that trade openness had a positive and significant impact on economic growth when the ratio “total trade-*GDP”* was used as proxy

of trade openness, but not when other proxies were used.6 Their short run empirical results showed that when the first three proxies of openness were used, trade openness had a positive impact on economic growth, but not so when the trade openness index was used. Based on these results, they concluded that promoting policies that support international trade was relevant for the South African economy

Zahonogo (2017) empirically investigated the effects of trade openness on economic growth in SSA. He employed a dynamic growth model using data covering the period 1980 to 2012 in 42 SSA countries. His results showed the existence of a trade threshold below which an increase in trade openness had beneficial effects on economic growth while above this threshold the effects tended to decline

Tinta (2018) examined whether countries should develop strategies to increase international trade through an increase in the degree of openness or whether countries should develop policies to strength community or regional trade through potential value chains within regional integration. For this, they estimated two models with fixed-effects panels. The models' estimations used data from ECOWAS countries covering the period 1995 to 2012. Their results showed that regional integration needed to be strengthened and better promoted to stimulate the potential of each country to move from discontinuous growth to sustained growth. Based on these results, they concluded that international trade is not a better solution for ECOWAS countries for fostering economic growth but regional trade connected to the creation of value chains is.

Moyo and Khobai (2018) investigated whether trade openness had a positive effect on economic growth in SADC by doing a panel data analysis for 11 countries for the period 1990-2016. Their results showed that trade openness had a negative impact on economic growth in the long-run. Based on these results, the authors concluded that trade openness jeopardized growth in SADC countries in the long-run.

Hobbs et al. (2021) investigated the relationships between foreign direct investment, trade, and economic growth in Albania. Econometric tests were used: specifically, the unit root test, the

unit root test with a structural break, the Johansen cointegration analysis, the error correction model, and the Granger causality test. Results showed that GDP's growth caused export and foreign direct investment growth in the short term, but not vice versa.

Prasanna (2010) analyzed the direct and indirect impact of FDI on domestic investment in India. Using time series data from 1991 -92 to 2006-09, the author followed the methodology utilized by UNCTAD (1999a) for the study. The reason for adopting such a model with lags was because the model had been developed from an unbiased dimension and studies both the direct impact of FDI on domestic investment and the indirect impact that is crowding in or out of FDI.

CHAPTER THREE
METHODOLOGY

3.0. Introduction

This section comprises the research design, data type and sources, data analysis, ethical consideration and limitations of the study.

3.1 Research Design

The study was conducted based on an ex post facto research design with a focus on longitudinal design. The study fully used quantitative research to evaluate the secondary data for scientific evaluation and to determine the conclusions for the objectives. The design is a quasi-experiment intended to determine the influence of the independent variable on the dependent variable. The fundamental basis for design is the hypothesis to determine the impact on others, and this is done by evaluating the control environment. The design used does not involve random assignments as published random data were used for the random assignments as the design was performed in the study.

3.2 Mathematical description of Solow-Swan model

The Solow model's foundation is that, at every point in time, a country's revenue is divided in two consumption and investments, as was mentioned in preceding chapter I(t) in terms of math, this can be written as

$$Y(t) = C(t) + I(t) \tag{3.1}$$

The fact that I(t) is a function of the share of the income saved as also been emphasized the consumption is thus inferred to be proportional to the remaining share.

$$Y(t) = (1 - S)Y(t) + I(t) \tag{3.2}$$

Which gives

$$I(t) = SY(t) \tag{3.3}$$

According to MRW (1992), the Solow model more closely matches the data when human capital is taken in to account in the classical aggregate production function.

After words, let's look the labor enhanced production function.

$$Y = F(K, H, AL) \quad (3.4)$$

This function is assumed to be characterized by constant return to scale and diminishing marginal returns to effective labor (AL), physical (K) and human (H) capital, which are the only factors of the production. The savings are now invested with respects to the rates S_k and S_hi.e. the fractions of income respectively devoted to the formation of physical and human capital, human capital depreciates and, thereby, δ_k and δ_k are assumed to be the respective rates of decay of physical and human capital.

3.3 Model Specification and implementation

The Solow-Swan model is an exogenous growth model based on the HMD. This model is attributed to Solow (1956) and Swan (1956) and is commonly referred to as the Solow-Swan model. It has been cited as a major milestone in neoclassical economic growth theories (Dewan & Hussein 2001). The Solow-Swan model, based on the HDM, argued that labor is an important means of production alongside capital. Solow and Swan found that capital and labor are not fixed, but that productivity growth occurs due to technological advances. So the Solow-Swan model shows that the output represented by GDP depends on physical capital, labor and efficiency. To derive this relationship, the Solow-Swan model used the relationship between the inputs to the production process and the resulting output, which is described by a production function. The production function gives the highest output that a firm can produce for any given combination of inputs (Pindyck & Rubinfeld 2001). This is based on the assumption that there are two inputs: labor and capital. The production function can be specified as:

$$F(K, L) \quad (3.5)$$

Where K= Capital and L= Labor

This equation shows that, in the Solow-Swan model, the first technology efficiency, labeled A, is a residual (Ilboudo 2014; Muggeridge 2015). This is because the change in output growth, commonly referred to as the Solow residual, is left unexplained. Second, the Solow-Swan model can explain the impact of physical capital on economic growth using the production function (Barro & Salai-Martin 2004).

From this production function we can see that this industry has constant returns to scale that is, the amount of output will increase proportionally to any increase in the amount of inputs. Consider an aggregate production function of the form,

$$Y = AL^{\beta}K^{\alpha} \quad (3.6)$$

Where:

Y = total production (the real value of all goods produced in a year or 365.25 days)

L = labor input (the total number of person-hours worked in a year or 365.25 days)

K = capital input (the real value of all machinery, equipment, and buildings)

A = total factor productivity

In estimating the linear combination of the variables in the model an alternative approach, which certainly has more advantage over both the single equation and Johansen maximum likelihood procedures is adopted for this study. This approach was proposed by Stock and Watson, (1993). This approach improves on others by correcting the effect of endogeneity and serial correlation which is the major criticism of single equation method and the Johansen maximum likelihood procedure by including leads and lags of first differences of the repressors. In addition, the Stock-Watson method has asymptotic optimality properties like the Johansen procedure. This is expressed below as:

$$Y_t = \alpha_1 + \alpha_2 \ln K_t + \alpha_3 \ln L_t + \alpha_4 \ln FDI + \alpha_5 \ln EXR + \alpha_6 \ln IR + e_1 \quad (3.7)$$

α= Active return on an investment, Y_t = Economic growth, K= Capital, L = Labor, FDI= Foreign Direct Investments, EXR= Exchange Rate, IR= Interest rate e_1= Error term.

Based on the discussion on the measurement of foreign exchange rate was adopted in this study. Therefore, foreign direct investments, labour, capital, Exchange rate and Interest rate are adopted. These four measures are adopted because of their relevance in the production process that can lead to increased focus for economic growth.

3.4 Variable definition and Measurements

Foreign direct investment (FDI) is defined as investments made by a company or an individual investor in one country in business interests in another country. Normally, foreign direct investment is the sum of equity, reinvested earnings and other short- and long-term capital. It provides facilities for technology, employment and innovation, which is the best predictor of the

country's economic growth (Chen & Dao, 2011). It is measured in foreign direct investment at constant percentage price changes.

The exchange rate is the value at which the country's currency can be converted into foreign and internationally recognized currencies such as dollars. It is in fact the conversion of local currency into international currencies. Exchange rate volatility refers to the extent to which the prices of currencies tend to fluctuate over time (Cote, 1994).

Work actually means, Any kind of physical or mental exertion. In economic terms, work is the effort expended to produce goods or services. It includes all kinds of human effort, physical exertion, mental exercise, exertion of the intellect, etc., in exchange for an economic reward (Kanamori& Zhao, 2006). It is measured by labor force participation and growth rate.

Capital refers to the assets physical tools, plant, and equipment that enable increased labor productivity. Capital is one of the four main factors of production, the others being land, labor and entrepreneurship. Common examples of capital are hammers, tractors, assembly lines, computers, trucks, and railroads (Chen, 2012). It is based on gross fixed capital formation rates.

Economic growth is the increase in the level of goods and services of a country within a fixed period of time; in this case economic growth was measured in term of Gross Domestic Product expressed in the percentage change.

3.5 Data Analysis

3.5.1 Descriptive statistics

3.5.1.1 Skewness

Skewness is a measure of asymmetry or distortion of symmetric distribution. It measures the deviation of the given distribution of a random variable from a symmetric distribution, such as normal distribution. A normal distribution is without any skewness, as it is symmetrical on both sides. Hence, a curve is regarded as skewed if it is shifted towards the right or the left.

3.5.1.2 Karl Pearson’s Coefficient of Skewness

This method is most frequently used for measuring skewness. The formula for measuring coefficient of skewness is given by

$$S_k = \frac{Mean - Mode}{\sigma} \quad (3.8)$$

The value of this coefficient would be zero in a symmetrical distribution. If mean is greater than mode, coefficient of skewness would be positive otherwise negative. The value of the Karl Pearson's coefficient of skewness usually lies between ±1 for moderately skewed destitution. If mode is not well defined, we use the formula

$$S_k = \frac{3(Mean - Median)}{\sigma} \quad (3.9)$$

However, we can obtain the mode by using the empirical relationship among the central measures, that is:

Mode = 3 Median – 2 Mean

Here, -3 ≤ S_k≤ 3.

3.5.1.3 Kurtosis

If we have the knowledge of the measures of central tendency, dispersion and skewness, even then we cannot get a complete idea of a distribution. In addition to these measures, we need to know another measure to get the complete idea about the shape of the distribution which can be studied with the help of Kurtosis (KP Balanda, HL MacGillivray). Prof. Karl Pearson has called it the "Convexity of a Curve" (Chen, 2012). Kurtosis gives a measure of flatness of distribution.

The degree of kurtosis of a distribution is measured relative to that of a normal curve. The curves with greater peaked Ness than the normal curve is called "Leptokurtic". The curves which are flatter than the normal curve is called "Platykurtic". The normal curve is called "Mesokurtic

3.5.1.4 Karl Pearson's Measures of Kurtosis

Karl Pearson uses the second and fourth central moments to estimate the measure of kurtosis and is given by

$$\beta_2 = \frac{\mu_4}{\mu^2} - 3 \quad 3.10$$

where, μ2 = Second order central moment of distribution

μ4 = Fourth order central moment of distribution

3.5.1.5 Jarque-Bera (JB)

The **Jarque-Beratest** isa goodness-of-fit test of whether sample data have the skewness and kurtosis matching a normal distribution (Thadewald, 2007). The test is named after Carlos Jarque and Anil K. Berac and the test statistic is always nonnegative such that if JB statistic is far from zero, it signals the data does not fit a normal distribution (Brys, et al., 2004).

The test statistic *JB* is defined as

$$JB = \frac{n}{6}\left(S^2 + \frac{1}{4}(K-3)^2\right) \tag{3.8}$$

Where *n* is the number of observations (or degrees of freedom in general);

S is the sample Skewness; K is the sample kurtosis.

Then our null hypothesis for the JB test is that for each of the variables of investigation 'the variable is not normally distributed.'

If JB statistics is far from zero, its signal data does not fit a normal distribution.

3.5.2 Preliminary Variables Investigation

Examine the relationships between, the times series mentioned above, this section uses series transformed into logarithmic form by graphs. This is to take advantage of logarithmic expressions. Charts provide visual impact and help describe the relationship between two or more sets of related data or variables. A chart predicts the functional relationship between two or more economic variables by providing generalizations about economic phenomena. The graphical analysis is a tool to explain the way in which the variables used are related to Uganda's economic growth, employment and poverty. After the graphical examinations, this study undertakes a correlation study of the variables.

3.5.3 Correlation Analysis

When variables are related, there is a correlation between them. Correlation analysis is used to measure the degree of linear association between variables. The correlation between the variables is between negative and positive (-1 to +1). In this study, no correlation means zero relationship in absolute terms. Second, 0.60 denotes strongly correlated variables above. Third, in absolute terms, the numerical value (1) between two variables is considered perfect correlation. In this regard, perfect correlation between the variables means that knowing the value of one variable accurately predicts the value of the other variable. The larger the correlation magnitudes, the more perfectly related the variables are. In this study, a correlation coefficient greater than 0.60 indicates a strongly correlated relationship between variables. When two explanatory variables are highly correlated in a single regression analysis, economic analysis typically removes at least one from the study.

Now let's look the for formula of Pearson correlation

$$\rho_{X,Y} = \frac{COV(X,Y)}{\sigma_X \sigma_Y} \tag{3.12}$$

Were

COV Is the covariance

σ_X Is the stander deviation of X

σ_Y Is the stander deviation of Y

3.5.4 Trend Analysis

Trend analysis is required prior to testing for unit root testing to determine whether or not the series is stationary around a constant or trend that can be included during unit testing.

Due to the non-stationary between the time series, the trend analysis used in this study is a graphical display to check the trend indicated by the series. Through trend analysis, the study can check whether the fluctuations in the series always go back to the mean of Maradiaga (Maradiaga, Pujula& Zapata 2013).

3.5.4 Unit Root Testing

3.5.4.1 Augmented Dickey- Fuller Tests (ADF)

Song and Witt (2000), state that the ADF approach obtains critical values based on Monte Carlo simulations. The variables are tested at level and first difference based on the procedure recommended by Enders (1995), The non-stationary series null hypothesis is rejected in favor of the stationary alternative for any test if the ADF test statistic is greater than the critical values and the corresponding probability value is less than 5%.In this study is the choice of delay length in treating autocorrelation and heteroscedasticity. This is because if too small a delay length p is used, serial correlation remaining in the errors can skew the test. If the delay is too long, the strength of the test will be affected. Because of these weaknesses, the ADF test can be validated by the Phillips-Perron (PP) test.

Now, we will see the formula for Augmented Dickey fuller test, and it goes on as follows

$$\mathbf{y_{(t)} = c + \beta t + \alpha y_{(t-1)} + \phi \Delta y_{(t-1)} + \phi 2 \Delta y_{(t-2)} + \ldots + \phi p \Delta y_{(t-p)}} \qquad (3.13)$$

Where

$y_{(t)}$=No value in the time series at time t or lag of 1 time series

$\mathbf{\Delta y_{(t-1)}}$= First difference of the series at time (t-1)

$\boldsymbol{\alpha}$ =Is an intercept constant called a *drift*,

$\boldsymbol{\beta}$ =Is the coefficient on a time trend,

$\boldsymbol{p}$= Is the lag order of the first-differences autoregressive process,

3.5.4.2 The Phillips-Perron Test for Unit Roots

Philips and Person (1988) developed the pp test to validate ADF test hypothesis. However, the PP test is more comprehensive because the test incorporates an automatic correction to the Dickey-Fuller procedure to allow for autocorrelated residuals and heteroscedasticity. Similar to the ADF tests, the conclusions and hypothesis for the PP tests is the same. The null hypothesis of non-stationary series is rejected in favour of the stationary alternative for each test when the PP test statistic is more than the critical values, and the corresponding probability value less than 5%.

The basic equation in the unit root units

$$Y_{(t)} = \beta Y_{t-1} + \varepsilon \tag{3.14}$$

Were ϵ is a stationary random disturbance term. The predicted value for the series y is constant and conditional on t, and the variance grows over time.

3.6 Model estimation Analysis

The accepted study adopts the autoregressive distributed lag (ARDL) approach, to co-integration developed by Pesaran (1997) and the subsequently newly developed bounds-testing approach of Pesaran, Shin & Smith (1999, 2001). The study chooses the ARDL approach because of its comparative advantages over other cointegration approaches such as Engle & Granger (1987), Johansen &Juselius (1990, 1992) and Johansen (1995). While these approaches require variables to be integrated in the first order of difference I(1) and an equal delay length must be assumed in the model, the ARDL method was designed to circumvent these requirements due to the unreliability of the existing unit root tests used in determining the order of the variables is used for integration (Duasa, 2007).

3.6.1 Causality Test

Granger Causality test examines whether lagged values of one variable helps to predict another variable. Granger causality means that if one variable for example in our study, FDI granger causes, Economic growth, then FDI is a useful predictor of Economic growth rate whereas past values of FDI do not help to predict economic growth when controlling for past values of FDI. Therefore, in the VAR model we can identify whether Foreign Direct investments predict Economic growth rate using Granger Causality test. As it is hard to interpret parameters of VAR model directly, it is common to use the Impulse Response Function and Forecast Error Decomposition of the variables.

3.6.2 Long Run relationship

The ARDL limit test approach, to co-integration determines the long-run relationship between variables and also derives the error-correction representation model for estimating short-run

coefficients of the variables when there is a long-run relationship between them. The F-statistic of the joint significance test (Wald test) is used to determine whether the lagged levels of the variables are significant and co-integrated in the first difference regression of the model (Conditional Error Correction Model Specification). The F statistic is compared with the two from Pesaran et al. (2001), applicable to studies with large samples, and further reformulated by Narayan (2004, 2005) to allow studies with small samples of observations ranging from 30 to 80. The critical values form the lower bound and upper bound for I(0) and I(1) depending on whether the model contains a deterministic trend or not. If the F-statistic falls above or above the upper bound, a long-term relationship is said to exist between the variables; if it falls below or falls below the lower bound, there is no long-term relationship between the variables. The decision as to whether there is cointegration between the variables remains ambiguous when the F-statistic falls between the upper and lower bounds.

3.6.3 Error Correction Model

The existence of short-term relationships between the variables is tested using two approaches. First, the second part of the VECM systems shows the short-term relationships. The values generated are used to interpret the theoretical short-termism between series. Second, the study performed a Granger causality test, which reflects the causal relationship between variables, which also serves as a short-run and F/Wald test statistic. The zero for no causality is rejected at a statistically critical value of 1%, 5% and 10%.

The conditional error correction model (short-run ARDL model) is based on the assumption of uncorrelated residual terms. Therefore, it is necessary to adequately determine the optimal delay length for the underlying ARDL model in which the perturbation terms are not serially correlated (Wolde-Rufael, 2010) and (Pesaran et al., 2001). In determining the optimal delay length, we use the Akaike Information Criterion, AIC (Akaike, 1974), Schwarz Bayesian (or Information) Criterion, SBC (Schwarz, 1978), and Hannan-Qiunn Criterion, HQC (Hannan& Quinn, 1979) m ethods. The delay length at which the values of these methods are minimized is the optimal delay (Pesaran et al., 2001). The popularly used ones are AIC and SBC, but SBC is more economical. However, Al-jammal (2010) noted that AIC is preferred between AIC and SBC in a simulation

study, and when the difference between the minimum AIC and another AIC of a model is less than two (2), the rule of thumb indicates substantial evidence down for the model on both AICs.

3.7 Statistical Diagnostic tests

3.7.1 Correlogram Analysis

Testing serial correlation begins, by presenting the simple visual test for creating correlogram plots. The model is free of autocorrelation due to the way the residuals are plotted. A valid model is indicated by the residuals falling between the standard limits of -1 and 1.

3.7.2 Portmanteau Residual Test for Autocorrelations

In addition to the correlogram plots, autocorrelation was tested mathematically using the residual portmanteau tests for autocorrelations. These tests are based on the Ljung-Box Q statistic and the corresponding probability values (Kulendran 1996). The test statistic for the Q-statistic is reported as a chi-squared Q-distribution, with a zero indicated if the Q-statistic probability values are greater than 5% (> 0.05). The Q-Statistic test is commonly used in economic studies, and the test is integrated into time-series programs such as E-views, which are used in this study.

3.7.3 Residual Normality Test

In economic analysis, the Jarque-Bera (JB) test, is used to test whether the null hypothesis error term is normally distributed. The testable hypothesis is specified as follows: If the error term of the time series model is first normally distributed, arithmetically the value of the skewness is given between -1 <0< 1, where the corresponding probability value is greater than 5% of the critical value. Normality is also indicated through the construction of histograms, indicated by a peak around zero and a distinct flattening out either side with a bell curve or Gaussian distribution.

3.8 Validation of the Estimated Simultaneous Equations

This section tests the approaches used to test each equation for stability, autocorrelation, heteroscedasticity, and normality. Before diagnostic tests, the fit of the models is first examined by fitted R-squared and F-statistics. The fitted R-squared is used as a measure of the model's goodness of fit and indicates the variance of the dependent variables explained by the

independent variables in the system. The fitted R square is used because this never decreases as more regressors are added to the model. To test the goodness of fit, the simulated output of VECM provides the results. First, the fitted R-squared values are used, checking their closeness to one for a good model.

3.8.1 Stability Tests

The residuals for each equation are tested for stability by testing the residuals using the actual fitted graph and table first. The fitted chart shows the actual values of the dependent variable used in a regression from the original data. A valid model is proven by both the regression line and the original data line plot moving together, otherwise the results are invalid. The fitted table provides statistics on the overall significance of the fitted model. This is demonstrated by the way in which the residual line for a normally fitted model varies between one and minus one (1 and 1). Data stability is also indicated through the use of the Cumulative Sum Control Chart (CUSUM) test statistic and recursive coefficients. To accept the null hypothesis, stability is confirmed within the critical limits of 5% of parameter stability. Parameters are shown as stable when the line graph fluctuates between the two limits.

3.8.2 Serial Correlation Tests

The serial correlation tests used include Q-Statistic tests developed by Ljung and Box (1978) and the Breusch-Godfrey LM test proposed by BreuschBreusch and Godfrey (1986). These are compared to Durbin-Watson (DW) as explained by Durbin and Watson (1971). The Q-Statistics test hypothesis for the lack of autocorrelation is rejected if the probability values are less than 5% of the critical value. The Breusch-Godfrey LM test statistic calculates the lag order based on an auxiliary regression of the residuals of the estimated regression. The testable hypothesis is specified as:

3.8.3 Heteroscedasticity Tests

This study uses two tests of whether or not data are heteroscedastic: the autoregressive conditional heteroscedasticity (ARCH) and the Breusch-Pagan-Godfrey heteroscedasticity tests. The ARCH tests for heteroscedasticity under the testable hypothesis are specified as follows: The zero is accepted for no ARCH effects if the probability values are greater than 5%. The Breusch-Pagan-Godfrey heteroscedasticity test is now used as a validation test for the ARCH

tests. Zero is also accepted for data homoscedasticity when probability values are greater than 5%.

CHAPTER FOUR

PRESENTATION, INTERPRETATION AND ANALYSIS OF FINDINGS

4.0 Introduction

The study conducted Solow-swan model analysis on the effect of foreign direct investments in Ugandan economic growth. The study objectives were to establish the casual relationship between foreign direct investments and economic growth of Uganda. Then to examine the short run relationship between foreign direct investments and economic growth of Uganda and thirdly to determine the long run relationship between foreign direct investments and economic growth of Uganda. The findings in the study are provided based on the descriptive statistics of the study, Stationarity analysis, co-integration and correlation tests. The analysis for the study objectives was based on Granger causality tests, ARDL tests for the long run and short run, and then followed by diagnostic and stability tests to determine the state of the effect between 1988 to 2021.

4.1 Descriptive Statistics on foreign direct investments and economic growth of Uganda 1988-2021

Table 4.1: Descriptive statistics on foreign direct investments and economic growth of Uganda 1988-2021

	FDI	Economic Growth	Interest Rate	Exchange Rate	Capital	Labour
Mean	2.520	6.568	10.300	1947.263	20.464	3.417
Median	2.700	6.400	13.500	1788.500	20.800	3.300
Maximum	6.650	11.500	22.990	3750.650	27.600	4.800
Minimum	-3.760	3.100	-35.010	106.000	10.800	3.000
Std. Dev.	2.065	2.016	13.059	1054.216	4.795	0.414
Skewness	-0.919	0.471	-2.498	0.314	-0.320	1.793
Kurtosis	4.932	2.875	9.140	2.215	2.095	5.777
Jarque-Bera	10.07	1.281	88.784	1.432	1.740	29.150
Sum	85.700	223.330	350.230	66206.93	695.80	116.200
Observations	34	34	34	34	34	34

Source: Ugandan Bureau of Statistics, 2022 Publications based on E-views

Descriptive statistics were used to compare the means, standard deviation, skewness, kurtosis and normality of foreign direct investments, exchange rate, inflation rate, labour, capital and economic growth rate. Table 4.1 shows that the average of foreign direct investments is 2.520 and its median value is 2.700. These two values are close to each other indicating minor symmetry with the variable.

A closer look at the remaining variables in the above table shows that all the means of the variables are very closer to their median values. This can show that there is minor symmetry in each of the variables above.

The maximum and minimum values of the series are also given for each series under the row maximum and minimum, respectively. Looking standard deviation, it measures of dispersion around the mean in the series. Interpreting standard deviation of the series in absolute terms, the distribution with smaller standard deviation exhibits less dispersion and larger standard deviation shows higher dispersion. Accordingly, in Table 4.1 economic growth rate is a less dispersed series with the value of 2.016 while economic growth rate has the highest dispersion with a value of 2.065

Symmetry of the distribution of the series around the mean is measured by skewness. For a distribution to be considered Symmetric it should have a zero skewness value. Thus, by observing the row of skewness from the above table only FDI and Interest rate is negatively skewed with a value of -0.919 and -2.498 respectively otherwise the rest of the variables seem to have symmetric distribution because their values are not far from zero.

The row under kurtosis in the above table, measures flatness and peakedness of the distribution is measured by kurtosis of a series. For a distribution to be considered normal it should have a kurtosis value of 3 and hence our entire variable under study has digits that are no kurtosis.

The null hypothesis of JarqueBera (JB) test for normality normal distribution cannot be rejected for all variables. Because all variables of JB is far from zero.

4.2 Unit Root Test Results Using the ADF test

This section involves testing for the Stationarity of the individual variables using Augmented Dickey-Fuller test. Table 4.2 indicates the unit root test results performed in this study following ADF test. A maximum number of Slags were used for the ADF tests (as determined automatically by E-views statistical package).

Table 4.2: ADF Test Results at level for Intercept, then Trend and Intercept

Variable	Intercept	Critical value 5%	p-value	Trend & Intercept	Critical value	p-value	Decision
FDI	-1.890099	-2.767888	0.64056	-2.453 22	-2.12332	0.00032	Reject
Exchange Rate	-3.320001	-3.657589	0.54589	-3.895440	-3.21352	0.79670	Do not reject
Interest Rate	-1.145446	-1.123546	0.65467	-3.154090	-4.76504	0.67543	Do not reject
Labour	-4.214353	-4.322111	0.56486	-2.434555	-3.12226	0.56489	Do not reject
Capital	-4.431202	-4.1008993	0.56700	4.2345449	- 3.98045	0.45678	Do not reject
Economic Growth	2.3212455	-2.132455	0.74300	3.6750505	-3.21586	0.54211	Do not reject

Source: Ugandan Bureau of Statistics, 2022 Publications based on E-views

Results in Table 4.2 present findings on ADF Test Results at level for Intercept, then Trend and Intercept, the rest of the variables apart from FDI were found to be unit root or non stationary in their level form. This can be seen by observing the values of the Augmented Dickey-Fuller (ADF) test with the critical values of the test statistics at all 0.05 level of significance. Therefore, the Null-Hypothesis is not rejected and thus it is sufficient to conclude that there is unit root in the variable economic growth rate in their level form. As a result, these variables was differenced once and both the ADF test was performed on them as indicated in table 4.2.1 On the other hand, the independent variables of FDI and economic growth rate and economic growth rate were found be stationary in their level forms as indicated in Table 4.2.2. Comparing the observed values of both the Augmented Dick-Fuller test (ADF) with the critical values of the test statistics

revealed that all these two independent variables were stationary at level, and thus the Null-Hypothesis of non-Stationarity is rejected followed by the conclusion that all these variables are stationary at level

Table 4.3: ADF Test Results at first difference for Intercept, then Trend and Intercept

Variable	Intercept	Critical value 5%	p-value	Trend & Intercept	Critical value	p-value	Decision
FDI	-2.957110	-2.767888	0.0004	-2.45322	-212332	0.00002	Reject
Exchange Rate	-4.544544	-3.657589	0.0545	-3.895440	-3.21352	0.00054	Reject
Interest Rate	-3.245446	-3.123546	0.0054	-3.154090	-4.76504	0.00056	Reject
Labour	-5.895445	-5.3254040	0.0065	-5.656957	-5.65498	0.00021	Reject
Capital	-4.431202	-4.1008993	0.00000	4.2345449	- 3.98045	0.00001	Reject
Economic Growth	-3.954021	-3.8903333	0.00043	3.6750505	-3.21586	0.00000	Reject

Source: Ugandan Bureau of Statistics, 2022 Publications based on E-views

All the variables that were found to be non-stationary at level become stationary when they were differentiated once, and thus the Null-Hypothesis of non-stationarity was rejected followed by the conclusion that all these variables became stationary or have no unit root. Having known that our even the variable that was non-stationary at level but become stationary at first difference, it implies that they qualify for Cointegration. For Cointegration to be applied at least one variable should be non-stationary at level but become stationary at first difference and thus Cointegration was applied.

4.3 Co-integration

In the Johansen's co-integration approach, similar to the Engle-Granger approach of co integration the first step is to check for stationarity of the concerned variables in the study. As discussed in subsection earlier, variables that are relevant for this study is found to be integrated in different orders, i.e., some are 1(0) and others 1(1). Given that all variables become stationary at their first order, it became the most desirable case in order to continue with the Johansen's approach of co-integration test. The test is performed in order to determine the existence of co-

integration between Economic growth rate (Y) and the independent variable of Foreign Direct Investments.

Table 4.4: Johansen's co-integration approach Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.797082	161.6507	95.75366	0.0000
At most 1 *	0.747352	110.6122	69.81889	0.0000
At most 2 *	0.673162	66.58795	47.85613	0.0004
At most 3 *	0.400885	30.80265	29.79707	0.0382
At most 4	0.362310	14.40897	15.49471	0.0724
At most 5	0.000377	0.012057	3.841466	0.9123

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Ugandan Bureau of Statistics, 2022

Publication based on E-views

Table 4.5: Johansen's co-integration approach Test

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.797082	51.03850	40.07757	0.0020
At most 1 *	0.747352	44.02421	33.87687	0.0022
At most 2 *	0.673162	35.78531	27.58434	0.0036
At most 3	0.400885	16.39368	21.13162	0.2027
At most 4 *	0.362310	14.39691	14.26460	0.0476
At most 5	0.000377	0.012057	3.841466	0.9123

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Ugandan Bureau of Statistics, 2022 Publications based on E-views

The findings of Table 4.5 above from the Unrestricted Cointegration trace rank test shows that there is no co-integration between foreign direct investments and economic growth rate. Comparing the p-value at none and the p-value at most 1, it is decided that we fail to reject the null hypothesis at 0.05 level of significance. It is therefore concluded that there is no long run relationship between the variables in the model.

Results based on the Maximum Eigen value indicate that there is no Cointegration between foreign direct investments and economic growth rate. These findings confirm the results got from the first trace rank test hence by observing the p- values from the above table we fail to reject the null hypothesis that there is no Cointegration among these two variables thus we conclude that there is no long run relationship between foreign direct investments and economic growth of Uganda from 1988 to 2021.

4.3.1 Correlation

Table 4.6: Correlation analysis between the variables

	FDI	Exchange Rate	Interest Rate	Capital	Labour	Economic Growth
FDI	1	0.478	0.604	0.653	0.026	0.121
Exchange Rate	0.478	1	0.416	0.844	0.624	-0.235
Interest Rate	0.604	0.416	1	0.360	0.056	-0.038
Capital	0.653	0.844	0.360	1	0.330	-0.187
Labour	0.026	0.624	0.056	0.330	1	-0.096
Economic Growth	0.121	-0.235	-0.038	-0.187	-0.096	1

Source: Ugandan Bureau of Statistics, 2022 Publications based on E-views

Table 4.6 which show the extent to which all variables used in the econometric model are correlated. Generally, correlation test shows the lowest and highest correlation coefficients approximately given as 0.121 between foreign direct investments and economic growth of Uganda from 1988 to 2021. We used the coefficients to conclude that there is no evidence of correlation the variables, thus no influence the variances and co-variances and as such the precision of our estimation.

4.4 Casual relationship between foreign direct investments and economic growth of Uganda (1988-2021

The first research objective set to establish the casual relationship between foreign direct investments and economic growth of Uganda from 1988 to 2021. To fulfill the objectives and address the research objective, the researcher employed Granger causality test in order to determine the casual relationship between the variables.

This test set to establish if foreign direct investments granger causes economic growth rate or not, granger causality tests were carried out and the findings have been indicated in the table 4.5

Table 4.7: Pairwise Granger causality test between foreign direct investments and economic growth of Uganda (1988-2021

Null Hypothesis:	Obs	F-Statistic	Prob.
ECONOMIC_GROWTH does not Granger Cause DFDI	32	0.27700	0.7602
DFDI does not Granger Cause ECONOMIC_GROWTH		0.62682	0.0419
DEXCHANGERATE does not Granger Cause DFDI	32	1.00140	0.3806
DFDI does not Granger Cause DEXCHANGERATE		3.23577	0.0550
DINTEREST_RATE does not Granger Cause DFDI	32	0.12147	0.8861
DFDI does not Granger Cause DINTEREST_RATE		1.11332	0.3431
DLABOUR does not Granger Cause DFDI	32	1.66551	0.2079
DFDI does not Granger Cause DLABOUR		1.38704	0.2671
DCAPITA does not Granger Cause DFDI	32	0.50652	0.6082
DFDI does not Granger Cause DCAPITA		2.11738	0.1399
DEXCHANGERATE does not Granger Cause ECONOMIC_GROWTH	32	3.21964	0.0557
ECONOMIC_GROWTH does not Granger Cause DEXCHANGERATE		0.02435	0.9760
DLABOUR does not Granger Cause ECONOMIC_GROWTH	32	0.13238	0.8766
ECONOMIC_GROWTH does not Granger Cause DLABOUR		0.63452	0.5379

Source: Ugandan Bureau of Statistics, 2022 publication based on E-views

The findings in the above Table 4.7 have been used to examine if foreign direct investments granger causes economic growth in Uganda or not. To establish this, the two null hypotheses have been setup in the table above. The rejection criterion is that the study rejects that null hypotheses above if the p value of any of the above null hypothesis in table is less than 0.05.

Following the outcome of the above results of the p-value of 0.7602 of Granger causality test, the current study fails to reject the first null hypothesis and concludes that foreign direct investments does not Granger Cause economic growth. However, following the p-value (0.0419) of the second null hypothesis in table 4.7 above, the study rejects the second stated null hypothesis above and thus concludes that FDI Granger-causes economic growth rate at 5% significance level. In nut shell this study can conclude that FDI causes economic growth in Uganda given the study variable while on the other hand, the findings have indicated that economic growth is highly affected by foreign direct investments. Based on the findings, the research contends that there is a casual relationship between foreign direct investments and economic growth of Uganda 1988-2021.

4.5 Short run relationship between foreign direct investments and economic growth of Uganda 1988-2021

To capture the short run dynamics of the model, the method of Engle-Granger cointegration is a way that one can estimate the short-run equilibrium relationship between two or more variables. This short-run relationship between two variables can be formulated in a model called error correction model (ECM). The error of equilibrium (disequilibrium) can be used to combine the short-run to long-run period. The specificity of the error correction model forces the long-run behavior of endogenous variables to converge to the cointegration relationship while arranges the short-run dynamics.

Table 4.8: Error correction regression on foreign direct investments and economic growth of Uganda 1988-2021

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Economic Growth	0.222	0.1522	1.461	0.0203
FDI	-0.976754	0.537665	-1.816657	0.0436
D(LEXCHANGE_RATE	-0.656270	0.393608	-1.667318	0.1103
D(LLABOUR)	0.776379	0.480580	1.615504	0.1211
D(LCAPITAL)	1.742292	0.758742	2.296292	0.0321
CointEq(-1)*	1.158830	0.157256	7.369092	0.0000

R-squared	0.676716	Mean dependent var	-0.003076
Adjusted R-squared	0.628822	S.D. dependent var	0.418639
S.E. of regression	0.255053	Akaike info criterion	0.247911
Sum squared resid	1.756407	Schwarz criterion	0.476932
Log likelihood	1.033421	Hannan-Quinn criter.	0.323825
Durbin-Watson stat	2.210516		

* p-value incompatible with t-Bounds distribution.

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	6.033723	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Ugandan Bureau of Statistics, 2022 Publications based on E-views

Results in Table 4.8 indicate coefficient of error correction term is (1.15883) which is positive and statistically significant at 5% level of significance. The magnitude of the coefficient implies that about 115% of the disequilibrium caused by previous year's shocks converges back to the current year's short run equilibrium.

The estimated coefficient and p-value of foreign direct investments (FDI) and economic growth are 0.0436 and 0.0203. This means that FDI has a positive significant effect on economic growth rate of Uganda (1988-2021). This implies that a 1% unit increase in foreign direct investments increases economic growth by 0.0436 in the short-run.

The estimated coefficient of foreign direct investment (FDI) and P-value are 0.0436 and 0.0203. This implies that foreign direct investment has a significant relationship with the economic growth rate in Uganda. Furthermore, according to the coefficients and P-values of Capital and Labor in the above table, both capital and labor have no significant effect on the economic growth rate.

The coefficient of (R^2) is 0.676716, this indicates that about 67.6% of total variation or a change in the growth of Uganda is explained by changes in the explanatory variables in the model, while the remaining is explained by other factors not included in the study.

4.6 Long run relationship between foreign direct investments and economic growth of Uganda 1988-2021

To assess the long-run relationship between foreign direct investments and economic growth of Uganda 1988-2021, the Autoregressive Distributed Lags (ARDL) method is utilized. The ARDL method was introduced and developed by Pesaran& Shin (1998) and was refined a few years later by Pesaran et al. (2001). The ARDL method has been extensively utilized as it provides several advantages over traditional statistical methods for assessment of cointegration and short/long-run relationships.

Table 4.9: Long run relationship between foreign direct investments and economic growth of Uganda 1988-2021

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.964531	5.019788	1.586627	0.1252
ECONOMIC_GROWTH(-1)*	-1.072895	0.190546	-5.630649	0.0000
FDI**	0.786777	0.306961	2.563121	0.0168
EXCHANGE_RATE**	0.000311	0.000970	0.320301	0.7514
INTEREST_RATE**	0.043530	0.069145	0.629545	0.5347
LABOUR**	0.242339	1.288980	0.188008	0.8524
CAPITAL(-1)	-0.266328	0.188865	-1.410147	0.1708
D(CAPITAL)	0.262817	0.266548	0.986003	0.3336

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	0.733322	0.273598	2.680291	0.0128
EXCHANGE_RATE	0.000290	0.000916	0.316174	0.7545
INTEREST_RATE	0.040572	0.063773	0.636199	0.5304
LABOUR	0.225874	1.194626	0.189075	0.8516
CAPITAL	-0.248233	0.180224	-1.377361	0.1806
C	7.423402	4.732498	1.568601	0.1293

EC = ECONOMIC_GROWTH - (0.7333*FDI + 0.0003*EXCHANGE_RATE +
0.0406*INTEREST_RATE + 0.2259*LABOUR -0.2482*CAPITAL + 7.4234
)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	4.89264	10%	2.08	3

	0			
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15
Actual Sample Size	33		Finite Sample: n=35	
		10%	2.331	3.417
		5%	2.804	4.013
		1%	3.9	5.419
			Finite Sample: n=30	
		10%	2.407	3.517
		5%	2.91	4.193
		1%	4.134	5.761

Source: Ugandan Bureau of Statistics, 2022 Publications based on E-views

Results in Table 4.9 shows that the F- statistic is 4.892640, which is greater than the upper bounds of all significant levels of 10%, 5%, 2.5%. This implies that there was a long run relationship between foreign direct investments and economic growth of Uganda from 1988 to 2021.

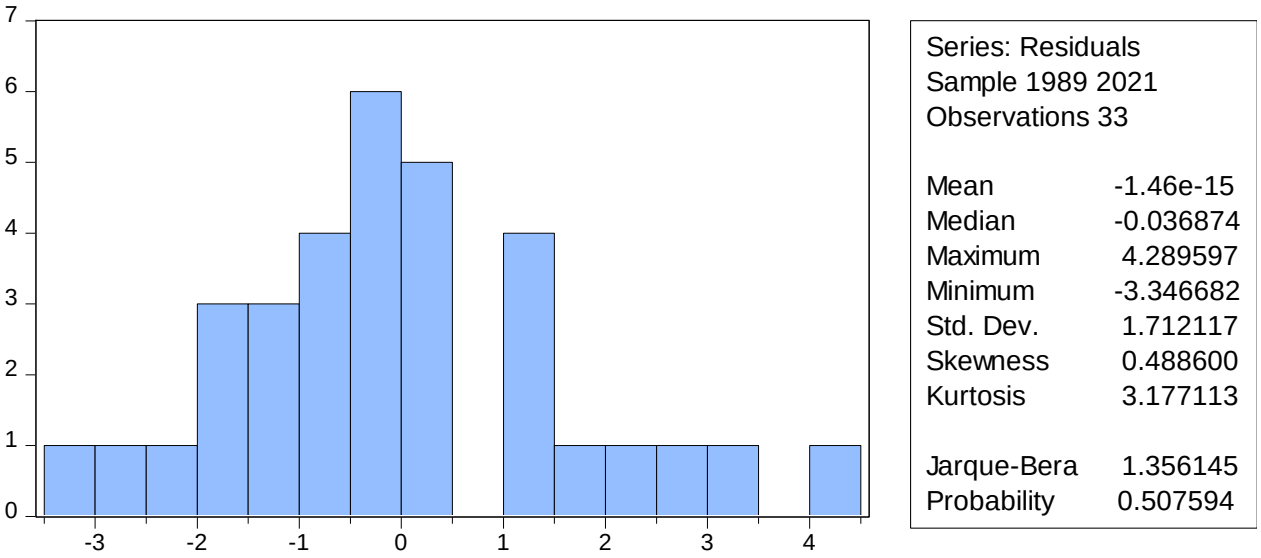
From the above long run coefficient analysis, the estimated coefficient of the constant (C) is -7.964531. This means keeping all other factors constant, economic growth was increased by 7.965 during the period of 1988 to 2021 in the long run. This result reveals that a 1 unit increase in foreign direct investments by 7.964. The estimated coefficient and p-value of foreign direct investment and economic growth are 0.0168 and 0.000 respectively. The results imply that foreign direct investments significantly determine the economic growth of Uganda from 1988 to 2021. The researcher contends that a long run relationship is detected between foreign direct investments and economic growth of Uganda 1988-2021.

4.7 Residual diagnostics

4.7.1 Normality Tests

Normality test is performed on residuals to determine whether residuals are normally distributed around the mean and constant variance. The absence of this condition implies that OLS estimators are still BLUE but we cannot assess their statistical reliability by classical tests of significance.

Figure 4.1: Normality Tests



Source: Ugandan Bureau of Statistics, 2022 Publications based on E-views

The normality test from above showed that residuals are normally distributed (the probability of Jarque-Bera is equal to 1.356 and is greater than critical probability 5%). The confirmation of residual normality as shown by Figure 4.1 above implies that the estimated linear regression model has realistic predictive powers, and valid predictions can be drawn from its results.

4.7.2 Serial correlation

Autocorrelation is a characteristic of data which shows the degree of similarity between the values of the same variables over successive time intervals. This assumption states that the covariance between the error terms over time is zero. To check the presence of autocorrelation in the model, the researcher used the Breusch-Godfrey test, which allows the examination of the relationship between error terms and several it's lagged value at the same time. Therefore, the hypotheses of the autocorrelation test were formulated as follows:

Table 4.10: Serial Correlation analysis

Breusch-Godfrey Serial Correlation LM Test:				
F-statistic	0.177556	Prob. F(2,23)		0.8385
Obs*R-squared	0.501761	Prob. Chi-Square(2)		0.7781
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECONOMIC_GROWTH(-1)	-0.158523	0.495698	-0.319798	0.7520
FDI	0.082098	0.364698	0.225113	0.8239
EXCHANGE_RATE	-0.000222	0.001120	-0.197992	0.8448
INTEREST_RATE	0.004867	0.072474	0.067154	0.9470
LLABOUR	0.807811	5.404824	0.149461	0.8825
CAPITAL	0.008320	0.285109	0.029182	0.9770
CAPITAL(-1)	-0.002944	0.309383	-0.009514	0.9925
C	0.075164	6.433232	0.011684	0.9908
RESID(-1)	0.174580	0.525754	0.332057	0.7429
RESID(-2)	-0.120784	0.220549	-0.547653	0.5892
R-squared	0.015205	Mean dependent var		-1.46E-15
Adjusted R-squared	-0.370150	S.D. dependent var		1.712117
S.E. of regression	2.004091	Akaike info criterion		4.473306
Sum squared resid	92.37679	Schwarz criterion		4.926793
Log likelihood	-63.80955	Hannan-Quinn criter.		4.625890
F-statistic	0.039457	Durbin-Watson stat		1.998923
Prob(F-statistic)	0.999988			

Source: Ugandan Bureau of Statistics, 2022 Publications based on E-views

The results in table 4.8 show that the result of serial correlation test for both F-statistics and Obs R-squared are greater than 0.05, in this case, the null hypothesis of no autocorrelation should be not-rejected; since, the p-value is greater than 0.05. This implies the model is free from autocorrelation.

4.7.3 Correlogram residuals

Table 4.11: Correlegram residuals

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. |. |	. |. |	1	0.053	0.053	0.1031	0.748
. |*. |	. |*. |	2	0.119	0.117	0.6330	0.729
. |. |	. *|. |	3	-0.063	-0.076	0.7851	0.853
. *|. |	. *|. |	4	-0.156	-0.166	1.7549	0.781
. |*. |	. |** |	5	0.176	0.219	3.0331	0.695
. *|. |	. *|. |	6	-0.176	-0.180	4.3555	0.629
. *|. |	. *|. |	7	-0.079	-0.143	4.6354	0.704
. *|. |	. *|. |	8	-0.176	-0.116	6.0663	0.640
. *|. |	. *|. |	9	-0.157	-0.081	7.2453	0.612
. *|. |	. *|. |	10	-0.101	-0.189	7.7534	0.653
. |*. |	. |** |	11	0.185	0.290	9.5412	0.572
. *|. |	. *|. |	12	-0.072	-0.180	9.8231	0.631
. |*. |	. |. |	13	0.108	0.059	10.496	0.653
. *|. |	. *|. |	14	-0.094	-0.129	11.037	0.683
. |. |	. |*. |	15	0.034	0.129	11.111	0.745
. |** |	. |. |	16	0.274	0.062	16.197	0.439

*Probabilities may not be valid for this equation specification.

Source: Ugandan Bureau of Statistics, 2022 Publications based on E-views

Correlogram of Residuals Correlogram of residuals indicates that they are stationary in nature and have no pattern. The intention was to know about the trend of FDI and economic growth, whether it will increase or decrease.

4.7.4 Arch Heteroskedasticity Test

The regression method assumes that the random error terms in the regression model display constant and equal variance. Therefore, to test for the presence of heteroscedasticity in the regression model a Breusch-Pagan/Cook-Weisberg Heteroscedasticity test was conducted.

Table 4.12: Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.086697	Prob. F(1,30)		0.7704
Obs*R-squared	0.092210	Prob. Chi-Square(1)		0.7614
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.745657	0.940740	2.918613	0.0066
RESID^2(-1)	0.053837	0.182843	0.294444	0.7704
R-squared	0.002882	Mean dependent var		2.903144
Adjusted R-squared	-0.030356	S.D. dependent var		4.312834
S.E. of regression	4.377805	Akaike info criterion		5.851433
Sum squared resid	574.9552	Schwarz criterion		5.943042
Log likelihood	-91.62293	Hannan-Quinn criter.		5.881799
F-statistic	0.086697	Durbin-Watson stat		2.006892
Prob(F-statistic)	0.770447			

Source: Ugandan Bureau of Statistics, 2022 Publications based on E-views

Findings in Table 4.12 on ARCH heteroskedasticity approach, as shown in Table 4.10 indicate the there exist no heteroscedasticity with the chi-square of 0.7614 which is greater than critical p-value 5%). Therefore, the error in the regression model has a constant variance or (homoscedasticity). In this case, the null hypothesis of no Heteroscedasticity problem in the model is accepted, implying that model does not suffer from heteroscedasticity.

4.7.5 Ramsey RESET Test

To estimate the model, the researcher was carried out the Ramsey-RESET Test to check on the model specification. The hypothesis of the model specification test is formulated as follows;H_o: The model is correct. H_1: H_o is not true. Decision Rule: Reject H_o if the p-value is less than the significant level of 0.05. Otherwise, do not reject H_o

Table 4.13: Ramsey RESET Test

	Value	Df	Probability
t-statistic	0.797171	24	0.4332
F-statistic	0.635481	(1, 24)	0.4332

F-test summary:

	Sum of Sq.	Df	Mean Squares
Test SSR	2.419683	1	2.419683
Restricted SSR	93.80305	25	3.752122
Unrestricted SSR	91.38337	24	3.807640

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
ECONOMIC_GROWTH(-1)	0.092441	0.282403	0.327335	0.7463
FDI	-1.074189	2.354257	-0.456275	0.6523
EXCHANGE_RATE	-0.000243	0.001180	-0.206096	0.8385
INTEREST_RATE	-0.054759	0.142309	-0.384791	0.7038
LLABOUR	-2.255045	6.243101	-0.361206	0.7211
CAPITAL	-0.268998	0.718463	-0.374407	0.7114
CAPITAL(-1)	0.588416	1.433062	0.410601	0.6850
C	-1.005080	12.51508	-0.080310	0.9367
FITTED^2	0.175558	0.220226	0.797171	0.4332

R-squared	0.303049	Mean dependent var	6.516061
Adjusted R-squared	0.070732	S.D. dependent var	2.024219
S.E. of regression	1.951318	Akaike info criterion	4.401888
Sum squared resid	91.38337	Schwarz criterion	4.810026
Log likelihood	-63.63114	Hannan-Quinn criter.	4.539214
F-statistic	1.304463	Durbin-Watson stat	1.948050
Prob(F-statistic)	0.288058		

*Note: p-values and any subsequent tests do not account for model selection.

Source: Ugandan Bureau of Statistics, 2022 Publications based on E-views

Table 4.13 show the stability test results using Ramsey reset approach which has been conducted to analyze if coefficients of the regression equation are stable. For the probabilities 0.4332 of t and F statistics which are below the 95% confidence interval, it has been concluded that the coefficients are stable and can be used for forecasting. After performing various diagnostic tests, it has been approved that the regression is not spurious and its coefficients can be used for forecast or future prediction.

CHAPTER FIVE

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

The purpose of the study was to examine the effect of foreign direct investments on economic growth rate. This chapter starts with discussion of the findings presented in reference to other similar works done in previous studies. The section then draws conclusions from these discussions after which it offers its recommendations. Finally, it suggests areas that are potential grounds for research that could not be completed in the body of this report.

5.1 Discussion of Findings

This section was further organized into three subsections with respect to the research objectives that guided the study.

5.1.1 Casual relationship between foreign direct investments and economic growth of Uganda

Based on the findings, the researcher contends that there is a casual relationship between foreign direct investments and economic growth of Uganda 1988-2021. The p-value (0.0419) of the second null hypothesis in table 4.3 above, the study rejects the second stated null hypothesis above and thus concludes that FDI Granger-causes economic growth rate at 5% significance level. The findings are in agreement with those of Iqbal, Shaikh and Shar (2018) who investigated the causal relationship between FDI, international trade and economic growth over the period 1998-2009 in Pakistan. Their main findings are that the impact of FDI is positive on the trade growth and that FDI inflows into the country were due to Pakistan's great performance in economic growth. The findings are in agreement with those of Jugurnath, Chuckun and Fauzel (2016) investigate the casual relationship between foreign direct investments on economic growth in SSA for a panel of 32 countries during the period 2008–2014. Their GMM result shows foreign direct investment has a positive and significant effect on economic growth. The findings are in agreement with those of Alzaidy et al. (2017) who studied in Malaysia over the period 1975– 2014, and Azman-saini et al. (2010) by using cross country observations from 91 countries over the period 1975–2005 shows that foreign direct investment has a positive and statistically significant effect on economic growth.

5.1.2 Short run relationship between foreign direct investments and economic growth of Uganda

Results in Table 4.8 indicate coefficient of error correction term is (1.15883) which is positive and statistically significant at 5% level of significance. The findings indicted a statistically significant relationship between foreign direct investments and economic growth of Uganda in the short run. The findings agree with those of Makiela and Ouattara (2018) conducted a study based on a sample of developed and developing countries over the period 1970-2007. Their results show that foreign direct investment has a positive short-run relationship with host country economic growth in the period 1981 to 2017. Although in disagreement with those of Olawumi and Olufemi (2016) examined the impact of foreign direct investment on economic growth in some selected African economies over the period 1980-2013 and found to have no statistically significant impact on economic growth. The findings are also in agreement with those of Abdillahi and Mohd (2021) who discovered the impact of foreign direct investment inflows on Ethiopia's economic growth using 36 years' time series data. The vector auto regression (VAR) model found FDI to have a positive and significant effect on GDP advancement and in agreement with those of Jardet et al. (2022) who contend that IFDI more than domestic uncertainty in a host country, with high global uncertainty has a large negative effect on IFDI and the effect of low uncertainty on IFDI being much smaller.

5.1.3 Long run relationship between foreign direct investments and economic growth of Uganda

Results in Table 4.9 show that there exist long run relationship between foreign direct investments and economic growth of Uganda. The study F- statistic is 4.892640, which is greater than the upper bounds of all significant levels of 10%, 5% and 2.5%. This implies that there was a long run relationship between foreign direct investments and economic growth of Uganda from 1988 to 2021. The findings agree with those of Azman-Saini, Law & Ahmad (2010) who found that FDI significantly affect economic growth only exists when the host country. Even according to Sarkar (2007), the majority of 51 developing countries over the period 1970-2000 do not support a long-term relationship between FDI and economic growth. The findings agree with those of Pegkas (2015) who studied the impact of FDI on economic growth in the Eurozone countries over 2002-2012 and the results indicate a positive relationship. The author used FEM

and REM as a part of the method and concludes that a significant factor promoting economic growth in the Eurozone is the stock of FDI

5.2 Conclusions

5.2.1Casual relationship between foreign direct investments and economic growth of Uganda

Based on the findings, the researcher contends that there is a casual relationship between foreign direct investments and economic growth of Uganda 1988-2021. The p-value (0.0419). Based on the findings the study conclude that foreign direct investments casually predicts the economic growth meaning that any increase in the foreign direct investments in Uganda has an effect on the economic growth of Uganda.

5.2.2 Short run relationship between foreign direct investments and economic growth of Uganda

Results in Table 4.8 indicate coefficient of error correction term is (1.15883) which is positive and statistically significant at 5% level of significance. The findings indicted a statistically significant relationship between foreign direct investments and economic growth. The study conclude that even the short run, foreign direct investments has a significant but low relationship with the economic growth of Uganda (1988-2021). The study findings imply that the foreign direct investments can be an inducement to the economic growth though to a low statistical value in the short run.

5.2.3 Long run relationship between foreign direct investments and economic growth of Uganda

Results in Table 4.9 show that there exist long run relationship between foreign direct investments and economic growth of Uganda. The study F- statistic is 4.892640, which is greater than the upper bounds of all significant levels. The study findings indicate that in the long run, foreign direct investments significantly induces the economic growth of Uganda contending that the state of foreign direct investments can induce the economic viability of the economies in

Uganda to a moderate level. In the long run, FDI generates economic growth to moderate terms in the period of time (1988-2021).

5.3 Recommendations

5.3.1 Casual relationship between foreign direct investments and economic growth of Uganda

Based on the findings, the researcher contends that there is a casual relationship between foreign direct investments and economic growth of Uganda 1988-2021. Based on the findings, the researcher recommends that mechanisms significant for inducing the foreign direct investments are significant determinants for the economic growth of the country. There is need for making business and diplomatic moves, signing and implementing bilateral, multi-lateral and regional treaties. These policies will help in bringing in the much needed foreign currency by way of FDI which will help in reducing exchange rate for economic growth of Uganda.

5.1.2 Short run relationship between foreign direct investments and economic growth of Uganda

The findings indicted a statistically significant relationship between foreign direct investments and economic growth of Uganda in the short run. The study recommends the following measures to be undertaken. Uganda should pursue policies to attract FDI more into all sectors in order to sustain and improve the effect of FDI in the area of extractive industry which is capital intensive with little spill-over effect. Policy mechanisms need to be anchored to the developed of tax holidays and incentives such as land in the short run in order to attract the Foreign direct investors in the long run.

5.1.3 Long run relationship between foreign direct investments and economic growth of Uganda

Results indicate that there exist a long run relationship between foreign direct investments and economic growth of Uganda. The study F- statistic is 4.892640, which is greater than the upper bounds of all significant levels of 10%, 5% and 2.5%. The study recommendations are hereby provided;-

Since FDI increases economic growth in the long run, government should create secure and safe environment like security, macroeconomic stability through proper policies among others all these will attract FDI's. Secondly there is need for government to put in place measures to limit FDI's from coming along with experts from their home countries but rather employ the local people this will reduce problems of retrenchment or lay off some workforce that comes along with privatization. Furthermore profit repatriation can be controlled through encouraging profit re-investment in Uganda in order to reduce the existence of money flight and loss of foreign exchange which is significant in measuring the country's financial health.

5.4 Areas for Further Research

During this study, the researcher learnt that no single study is exhaustive enough to show the effect of foreign direct investments on economic growth in Uganda; therefore future researches can be conducted to explain the degree of FDI on economic growth. Government Policy and FDI drive for GDP growth rate. Domestic Investments and economic growth of Uganda (1988-2021).

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APPENDIX I: DATA FOR ANALYSIS

Year	FDI	Labour	Capital	Exchange	Interest	Economic
1988	-3.76	3.5	10.8	106	-35.01	8.30
1989	-2.14	3.5	11.1	223	-3.95	6.40
1990	-1.13	3.4	12.7	428	6.66	6.50
1991	0.03	3.3	15.2	734	-4.10	5.60
1992	0.10	3.3	15.9	1133	5.43	3.40
1993	1.69	3.2	15.2	1195	13.02	8.30
1994	2.21	3.1	14.6	979	9.86	6.40
1995	2.10	3.1	16.4	968	9.86	11.50
1996	2.00	3.0	17.0	1046	15.03	9.10
1997	2.79	3.0	16.9	1083	17.72	5.10
1998	3.18	3.0	15.9	1240	11.10	4.90
1999	2.33	3.0	19.3	1454	11.10	8.10
2000	2.59	3.1	19.2	1644	21.68	3.10
2001	2.59	3.2	19.0	1755	10.62	5.20
2002	2.98	3.3	20.0	1797	17.33	8.70
2003	3.06	3.3	20.7	1963	22.99	6.50
2004	3.70	3.4	19.9	1810	10.39	6.80
2005	4.11	3.4	22.2	1780	4.33	6.30
2006	6.45	3.4	20.9	1831	21.79	10.80
2007	6.65	3.4	21.9	1723.49	15.90	8.40
2008	5.04	3.4	22.7	1720.44	10.98	8.70
2009	3.34	3.3	24.7	2030.48	13.24	6.80
2010	2.03	3.3	25.2	2177.557	-34.74	5.60
2011	3.20	3.3	26.8	2522.80	13.76	9.40
2012	4.41	3.3	26.5	2504.56	11.37	3.80
2013	3.79	3.3	27.5	2586.88	21.48	3.50
2014	3.24	3.3	26.4	2599.78	19.01	5.10
2015	2.27	3.5	27.6	3240.64	15.67	5.18
2016	2.14	4.3	23.6	3420.09	16.55	4.78
2017	2.61	3.1	22.8	3611.22	18.23	5.79
2018	3.20	4.2	24.5	3727.06	15.89	6.18
2019	3.60	4.3	25.3	3704.04	14.74	6.80
2020	2.32	3.9	24.10	3718.24	15.87	6.50
2021	2.98	4.8	23.30	3750.65	16.43	5.80

Source: World Bank data, 2022