FACTORS AFFECTING UGANDA’S ECONOMIC GROWTH: AN
AUTOREGRESSIVE DISTRIBUTED LAG APPROACH

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A RESEARCH REPORT SUBMITTED TO THE COLLEGE OF BUSINESS AND
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IN ECONOMIC POLICY MANAGEMENT, MAKERERE UNIVERSITY KAMPALA

October 2018
DECLARATION

I, Jackline Kenganzi Birungi, declare and confirm that this research project is my original work and has never been presented to any institution of higher learning for any award.

Jackline Kenganzi Birungi

Sign .................................. Date 12th October 2018
APPROVAL

This is to confirm that this thesis has been submitted with my approval as a university supervisor.

Dr. Gertrude Sebunya Muwanga (PhD)

Signed: [Signature] Date: 12/10/2018
DEDICATION

This report is dedicated to my husband Mr. Tonny Birungi Mukasa, my mother Mrs. Jane Rubahika, my children, Rachel, Jesse, Jaden and Jason Birungi and my supervisor Dr. Gertrude Sebunya Muwanga. In their different capacities, they have offered their continual support selflessly during my journey of completion of this master’s program. To my supervisor, I am grateful for dedicating your most valuable time to empower me with skills and knowledge, to challenge and inspire me towards becoming an economist and a true academic.
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I, Jackline Kenganzi Birungi, a student of economics from College of Business and Management Sciences Makerere University, confirm that the views expressed in this study are my own, the author of the research paper. I wish to thank and acknowledge all the individuals who supported and assisted me in various ways towards completion of this research work.

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I am fully responsible for any errors that may appear in this research report and not the people acknowledged.
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<th>Full Form</th>
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<td>GOU</td>
<td>Government of Uganda</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
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<tr>
<td>AFDB</td>
<td>African Development Bank</td>
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<tr>
<td>RGDP</td>
<td>Real Gross Domestic Product</td>
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<tr>
<td>ARDL</td>
<td>Auto Regressive Distributed Lag</td>
</tr>
<tr>
<td>GARCH</td>
<td>Generalized Auto Regressive Distributed Lag</td>
</tr>
<tr>
<td>MAEPM</td>
<td>Masters of Economic Policy and Management</td>
</tr>
<tr>
<td>COBAMS</td>
<td>College of Business and Management Sciences</td>
</tr>
<tr>
<td>UBOS</td>
<td>Uganda Bureau Of Statistics</td>
</tr>
<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct Investment Inflows</td>
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<tr>
<td>UIA</td>
<td>Uganda Investment Authority</td>
</tr>
<tr>
<td>EGARCH</td>
<td>Exponential Generalized Auto Regressive Distributed Lag</td>
</tr>
<tr>
<td>OLS</td>
<td>Ordinary Least Squares</td>
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<tr>
<td>OPN</td>
<td>Trade Openness</td>
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<tr>
<td>GOVEXP</td>
<td>Government Expenditure</td>
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<td>MS</td>
<td>Money Supply</td>
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ABSTRACT

This study investigated factors influencing Uganda’s economic growth measured by real gross domestic product (RGDP). These factors included foreign direct investment inflows, foreign direct investment volatility, government expenditure, money supply and trade openness. Autoregressive Distributed Lags Model (ARDL) was adopted using quarterly data collected from 1985 – 1993.

Trade openness and money supply had a positive and significant effect on economic growth, whereas, foreign direct investment inflows, foreign direct investment volatility and government expenditure had a negative effect.

The elasticity of RGDP to money supply was 0.59 in the short run and 1.59 in long run at the 1% percent level of significance. The findings are similar to Siyasanga (2017) who found a positive relationship of money supply to economic growth. Although the elasticity of RGDP to money supply was smaller at 0.58, the direction was the same.

The elasticities of real gross domestic product to trade openness were 0.38 in the short-run at the 1% level of significance and 0.34 in the long-run, at the 10% level of significance. The positive direction is similar to the findings of Yeboah (2012), and Andersen and Babula (2008), Were (2015), who found a positive effect of trade openness on economic growth.

The elasticity of RGDP to foreign direct investment inflows was -0.14 in the short run and -0.13 in the long run at the 1% level of significance, implying that foreign direct investment inflows deters economic growth in Uganda. The findings are similar to those of Derirhan & Masca (2008) who found a negative elasticity of -1.47 of RGDP to economic growth but contrary to
some studies who found a positive effect of FDI to economic growth (Ngugi, 2013, Muhammad et.al, 2012, Lensik and Morrissey, 2000).

The elasticity of RGDP to foreign direct investment volatility was -0.03 in the short run and -4.02 in the long run at the 5% level of significance implying that, a 1% increase in foreign direct investment volatility leads to a 4.02% decline in the long run.

The elasticities of RGDP to government expenditure in the short run and long run are -0.19 at the 5% level of significance and -1.60 at the 1% level of significance, respectively. The findings are contrary to those of other researchers who found a positive relationship of government expenditure to economic growth, (Gisore et. Al, 2014, Hasnul, 2015).

The government should investigate why the effect of foreign direct investment inflows and government expenditure on economic growth was negative. Foreign direct investment volatility had a negative effect on economic growth, making it undesirable for economic growth. It is therefore, critical for the government to address the factors causing the volatility and put in place strategies accordingly. The Central Bank should increase money supply to boost economic growth, but being mindful of the real growth in RGDP to avoid unnecessary inflationary pressures. Although the impact of trade openness on economic growth is minimal, it is positive both in the short run and long run, thus, the government should open the economy further, and make attempts to increase the elasticity of RGDP in relation to trade openness such as signing trade agreements with larger economies with an aim of increasing Uganda’s market for exports, increasing the export base and focusing on value addition to increase competitiveness on the world market.
**Key Words:** Foreign direct investment inflows (FDI), Real gross domestic product (RGDP), Auto Regressive Distributed Lag (ARDL), Generalized Autoregressive Conditional Heteroscedasticity (GARCH)
CHAPTER ONE:

INTRODUCTION

1.0 Background

In the years, between 2000 and 2010, Uganda’s real gross domestic product (RGDP) grew at an average rate of 7.3%, this growth rate compared with other economies, placed Uganda amongst the fastest growing economies in the world (Uganda Investment Authority, 2010). However, in the recent years, the growth rate has reduced. In the year 2016, Uganda’s real gross domestic product growth rate was 2.3%, it increased to 4.8% in 2017 and it is projected to reach 5.9% in the year 2018 (Afdb, 2018). This projection is still lower that the average rate of 7.3% registered in the 2000 and 2010 period.

Further, in the 1960’s Uganda’s RGDP per capita was at US $260 and has only grown to US $580 as at 2016. For some other African countries, RGDP per capita has grown significantly since the 1960s. For example, Botswana’s RGDP per capita grew from $290 in 1960 to $7,000 in 2015, Tanzania’s RGDP per capita grew from $280 in 1960 to $960 in 2015, and Kenya’s RGDP per capita grew from $290 to $1,290 in 2015. Further, in 1960, Uganda’s RGDP per capita was 67% of that of Singapore and as at 2015, Uganda’s RGDP declined to only 1% that of Singapore (Daron and James, 2012, World Bank 2015). The per capita income for Uganda in real terms was USD 580 in 2016 (Budget Speech, 2017/18). The trend for per RGDP capita income has also registered a downward trend in the past three years, from 702$ in 2014 to 674$ in 2015 to 580$ in 2016 (World Bank, 2015).
According to African Development Bank, RGPD is projected to reach 5.9% in 2018 and that it will be driven by improvements in the services sector, such as banking, transport, trade, information and technology services, public infrastructure investment and recovery in manufacturing and construction. This projection is below the high levels registered in the earlier years, the RGDP per capita is not only low but has registered a decline over the past three years. Uganda is clearly still lagging behind, and something needs to be done so that the country can attain sustainable economic growth. Below in figure 1.1, is a trend of RGDP growth rate over the years.

**Figure 1.1: Real GDP Growth Rate in Uganda**

![GDP Growth Rate in Uganda](image)

*Source: Author*

As illustrated above, the growth rate has been fluctuating from 1993 to 2015 and overall, it shows a decline over the same period. The highest RGDP growth rate was registered in the year 1995 while the lowest growth rate was registered in the year 2000.
The Government has attempted to boost its economic performance and to increase its gross domestic product. First, the Government has tried to contain inflation to single digits, Alexis (2018). Inflation has reduced from 5.6 in 2016 to 5.5 in 2017 and for 2018 is projected at 5.1%. Reduced inflation is expected to increase private sector spending leading to an increase in RGDP.

Infrastructure development also continues to be a prime strategy to boosting economic growth in Uganda. The Government has also focused on heavy public infrastructure development and is committed to completing key projects including the Karuma power project and the Kampala Entebbe expressway, and to kick start oil-related infrastructure, Kampala – Jinja express highway, to mention a few. The significant allocations in the 2018/19 budget directed towards infrastructure development also confirm this strategy (Budget, 2018/19).

As much as there have been strategies by the government to boost economic growth, the RGDP growth is not desirable, and, discussed here below are, potential factors that affect Uganda’s economic growth. These are, among others, government expenditure, trade openness, money supply, foreign direct investment inflows, and foreign direct investment volatility. These factors have been researched by other researchers like Reidl’s (2005), Mitchell (2005), World bank (2017), Dhanya, (2015) and (Musyoka, 2014), in other countries and have been found to be significant in influencing economic growth.

Investing in large public-sector infrastructure projects has been a priority in the Uganda’s both the first and second National Development Plan (NPA 2015/16), primarily to unlock the growth potentials of the Country. Special emphasis has been given to the transport and communication sector, energy and minerals, and most of the funds, especially externally borrowed funds, have been allocated to finance these key critical sectors for the past 5 financial years from 2013/14 to
2017/18 (Budget speech, 2017/18, UBOS 2010, UBOS 2015). The development of the infrastructure is presumed as a crucial strategy to ensure economic growth given its benefits in lowering the cost of doing business and thus firms can easily maximize profits through the reduced costs of electricity, transport, water bills, to mention but a few (State of the Nation Address, Uganda 2017).

Figure 1.2 below shows the trend for government expenditure in Uganda, presenting an upward trend since the 1993.

**Figure 1.2: Trend for Government Expenditure**

![Graph showing government expenditure trend](image)

*Source: World Bank, 2017*

In recent years, the government of Uganda has increased its capital investments, which nearly doubled from 4.3% to 7.6% of RGDP in the last four years, (World Bank, 2017). Government of Uganda continues to allocate a significant budget to investment in infrastructure every year. For example, in this new financial year 2018/19, shs 607 billion has been budgeted to cater for maintenance for national district, urban and community roads; shs 4.8 trillion to the works and
transport sector primarily for revival of the national airline, which is up to 17% of the total national budget (Budget speech, 2018/19). Total government expenditure during the financial year 2018/19 is estimated to amount to Shs. 27 trillion, which is equivalent to 26.5% of RGDP. Excluding domestic refinancing, development expenditure in the year 2018 amounted to 44% of the budget, with up to US$9 billion worth of investment is expected in Uganda's oil sector over the next two to three years (World Bank, 2017). The purpose of these infrastructure developments is to enhance the country’s competitiveness by reducing transport costs and harnessing opportunities in tourism, agriculture, minerals and oil and gas. Such investments are expected to boost Uganda’s economic growth and meet the desired transformation stated in the National Development Plan and the National Vision 2040 (World Bank, 2017).

Further, the infrastructure projects in Uganda, are largely financed using external debt. Any strategy that relies on external debt to finance infrastructure development is unreliable in the long run (IMF, Christine Lagarde, 2017). Uganda's total public debt stood at 31.2 percent of real gross domestic product (RGDP) in 2015 and rose to 33.8 percent of RGDP in 2018, (BOU, World Bank, 2018). This debt burden is growing faster than the government resources; the total revenue to RGDP of 14% much lower than the level of investment that Uganda aspires to achieve. This poses potential economic risk if investments do not generate sufficient revenues to service the debt (World Bank, 2016, Afdb, 2018).

The increased investment activity is expected to stimulate productivity leading to increased economic growth (World Bank, 2017). Government expenditure can boost manufacturing, as well as the services sector, notably tourism and as a result the spillover effects from these investments will boost private consumption which is one of the key drivers for growth (Afdb,
If the economy is in recession, and the government borrows from the private sector, it can act as expansionary fiscal policy to boost economic growth.

On the contrary, there is a risk of crowding out private investment if the governments increase its borrowing to fund its increased appetite for infrastructure projects, this borrowing can lead to increase in real interest rates and thus discouraging businesses from making capital investments because the opportunity cost of borrowing has risen. Further, private companies may be discouraged from taking part in these projects such as roads, power dams by making it undesirable or even unprofitable. Increased government spending may also insert pressure on inflation and this will lead to little or no increase in real GDP. It is important therefore to investigate what the impact of government expenditure has been to Uganda’s economic growth.

There are mixed findings about the impact of trade openness on economic growth. Some studies have found trade openness to have a positive impact to economic growth while others have found it to have a negative relationship with economic growth (Lil and Wakye 2008), (Were 2015), and (Kirwa and Mutuku 2014).

Below is figure 1.3, showing trade openness in Uganda. The trend is upward from 1993 to 1997 and it is seen to take a downward trend up to 2001. From 2001, trade openness increased and began to decline again from 2012 to 2015.
Significant growth rates are often associated with countries embracing the ongoing globalization and increasing openness to the international exchange of goods and services as well as ideas and technologies (Andersen and Bubula 2008). In line with a strategy of opening this economy to trade, Uganda is a member and signatory to several regional trade agreements like East African community, Common Market Protocol, Common Markets for Eastern and Southern Africa. Uganda’s exports have also significantly increased fourfold to Usd 667.5Mn (Alexis, 2018). As a land-locked country, Uganda has heavily invested in regional road and rail transport to facilitate regional trade and reduce trade costs across borders (Rwabiza 2018). Ugandan government also established a one-stop border post at Malaba with an objective of speeding up the clearing process for both exports and imports.

Whereas significant growth rates are often associated with increasing openness to trade (Andersen and Babula 2008), a trade policy with outward orientation could also retard economic growth. When imports exceed exports, the country will be in trade deficit, which directly reduces a country’s GDP, there will be a shortfall of foreign currency inflows, which will assert
pressure on the local currency leading to depreciation of the shilling. Further, because imports are from countries, which are industrialized and have cheaper costs of production, the imports could outcompete the local goods in market prices and lastly, the open trade policy could lead to damping where we become a destination for second hand and poor-quality products. It is critical therefore to investigate the impact of trade openness to Uganda’s economic growth. In addition, countries focused on growth attract imports to create competition in the market, which will control prices and in turn reduce inflation.

Further, in line with its monetary policy the bank of Uganda has also gradually increased money supply in the economy over the years geared towards improving economic growth (World Bank, 2015). Below is figure 1.4 showing the trend of money supply in Uganda, it is presented that money supply has a linear upward trend.

**Figure 1.4: Trend for Money Supply in Uganda**

![Figure 1.4: Trend for Money Supply in Uganda](image)

*Source: World Bank indicators, 2017*
According to general macro-economic theory, an increase in money supply should lower interest rates in an economy resulting into increased borrowing and consumption. Whereas this should increase total output and RGDP in the short run, it does not always do. This creates a gap on the relationship between this obvious increase of money supply to a low RGDP growth, which needs to be investigated. Increased money supply leads to high inflation, which in turn retards economic growth if it is not increasing in tandem with RGDP.

Currently, Uganda has one of the lowest savings rates in Sub-saharan Africa at 10% of RGPD which is not commensurate with the investment needs at 25% of RGDP, yet according to Wollasa, (2011), the accumulation of fixed capital and/or investments can only be possible through sufficient savings.

Uganda’s tax revenue was only 13.4% of RGDP in 2016/2017 financial year, it increased to 14% of RGDP in 2017/18, which is still too low to finance her development needs. This raises a savings gap, which must be financed through foreign savings, domestic borrowing, budget support, external financing debts and/or grants (Budget Speech, 2017/18, Lagarde, IMF 2017).

In most cases, foreign savings will only result in increased consumption and in increased financial or equity indebtedness without an increase in the country's ability to invest and export (CARLOS, 2007).

Capital inflows or more precisely foreign savings tend to produce domestic exchange rate appreciation, increase in real wages and imports, (CARLOS, 2007). Foreign savings will, from the demand side perspective, tend to reduce exports, investments, and domestic savings; thus, a significant substitution of foreign for domestic savings (CARLOS, 2007). Uganda has also experienced high debt levels at 33.8% of RGDP, reduced domestic revenue mobilization at 14%
of RGDP, tax collections were at 3.57BN$ compared with Kenya which collected 14Bn$ per annum in 2017.

Savings are needed to provide finance for capital investment. In many smaller low-income countries, high levels of poverty make it almost impossible to generate sufficient savings to provide the funds needed to fund investment projects thus creating the savings gap. This increases reliance on tied aid and debt (CARLOS, 2007). Low savings rates and poorly developed or malfunctioning financial markets make it more expensive for African public and private sectors to get funds for investment. Higher borrowing costs impede capital investment. Due to the low domestic savings, foreign savings are left as the only alternative to fund private physical investments. The various forms of inflow of foreign capital are loans, grants, portfolio investment and foreign direct investment inflows (CARLOS, 2007).

According to the latest monetary policy statement for Uganda, economic growth is estimated to strengthen to 5.8% growth supported by foreign direct investment inflows among others (BOU, 2018).

Figure 1.5 below presents the trend for foreign direct investment inflows in Uganda. The amount of FDI inflow into Uganda has had generally an increasing trend from 2000 to 2007 after which it is seen to fluctuate up to 2012. Since 2013, the flows have continuously declined from as high as 1.2M$ in 2012 to levels of 1.096M$ in 2013 and to 1.057 in 2015.
The current Government has focused on aggressively attracting FDI (Foreign direct investment inflows) because they (FDIs) have resources (money), the technology and the contacts for the markets (Budget Speech, 2017/18). To create a more competitive environment for FDIs in Uganda, the NRM Government is now working to solve the issue of the high price of electricity, the landing fees for aircrafts at Entebbe and the ground handling fees.

One of the major reforms in Uganda geared towards attracting FDIs, included establishment of the Uganda Investment Authority in 1991 to ensure that FDI promote activities that encourage exports, utilization of local materials, supplies, local services; and to promote; creation of employment opportunities, introduce advanced technology or upgrade indigenous technology and contribute to locally or regionally balanced socioeconomic development (UIA, Investment code 2015). Other reforms have been through tax exceptions, tax holidays and zero-rated tax options to further promote Foreign direct investment inflows (UIA, 2015). Because of the above
reforms, FDI inflows are expected to increase and even further following issuance of exploration licenses (AEO, 2018), and subsequently lead to economic growth.

Ugandan policies, laws, and regulations are generally favorable towards foreign investors (UIA, 2015). Ugandan law allows for 100 percent foreign-owned businesses and foreign businesses can partner with Ugandans without restrictions. The GOU offers incentives for industrial investments including: a 75 percent import duty reduction on factory equipment, depreciating start-up costs over four years, and a 100 percent tax deduction on research and training costs as well as mineral exploration costs (UIA, 2015).

Foreign direct investment inflows have in some settings led to reduced economic growth according to some studies. Foreign direct investment inflows can lead to crowding out of local firms, the local firms may be competed out of business because foreign firms come with capital, advanced technology, and contacts for international markets where local firms may not be privileged. The foreign firms could also expatriate capital and profits back home leading to less investment. The Government has also been seen to give incentives like free tax holidays, free land, to mention a few. This makes local firms unable to compete because they operate within different economic conditions. Foreign direct investment inflows if volatile will further retard economic growth. In addition, FDI could further retard growth if the investors import labor, and there are no employment opportunities for the nationals.

In summary, the government programs are that have been undertaken have once common agenda of increasing economic growth. For example, attracting FDI is a prime strategy by the government to drive economic growth by attracting the resources, technology and open international trade markets. In addition, the Central bank using its monetary policy has reduced central bank rate to reduce the cost of borrowing. Reduced cost of borrowing will lead to
increased private sector borrowing leading to increased investment and eventual increased economic growth. Further, the Government has embarked on development of infrastructure, which is expected to boost manufacturing, the services sector, and tourism which are critical sectors for growth. We also note that investing in large public-sector infrastructure projects has also been a prime strategy to unlock the growth potentials of the Country. Despite all this, the country is still faced with a very low RGDP growth rate, which, also, hazardously has a historical declining trend. This must be corrected before the economy faces a recession.

1.1 Problem Statement

Uganda has experienced very low economic growth in the recent years. RGDP in 2016 reached levels of 2.3% and 4.8% in 2017. Whereas the projection for the year 2018 is 5.9%, this is far from reach and still lower than desired. The economic growth, as measured by real gross domestic product was at 9.39% in 2011 but declined to low levels of 5.14 in 2015. The low economic growth has adverse effects on citizens if it is not corrected including but not limited to high inflation rates, high government debt, high levels of unemployment, low private sector growth, high poverty levels, among others. Whereas Uganda government has attempted to put in place strategies to correct this trend, including but not limited to, special focus on infrastructure development to boost economic activity and attract foreign direct investment inflows; adaptation of the open trade policy through subscription to international markets and trade agreements; and use of monetary policy (reduction of the central bank rate, increase money supply and containing inflation rates to single digits), the desired results have not yet been achieved and the impact of the government strategies has not yet been established. This research, therefore, seeks to find the impact of the various strategies adopted by government on economic growth.
1.2 Objectives of the Study

The main objective of this study is to investigate factors that influence economic growth in Uganda including but not limited to foreign direct investment inflows, foreign direct investment volatility, money supply, government expenditure and trade openness.

1.3 Research Questions

i. What factors stimulate economic growth in Uganda?

ii. What is the short run and long run relationship between study variables and economic growth in Uganda?

1.4 Study Hypothesis

i. There is a negative relationship between economic growth, measured by RGDP, on one hand and foreign direct investment (FDI) volatility on the other.

ii. There is a positive relationship between economic growth on one hand and foreign direct investment inflows and trade openness;

iii. There is a positive relationship between economic growth on one hand and government expenditure and money supply on the other.

1.5 Scope of the Study

The study aims to investigate factors that stimulate economic growth in Uganda. The study will utilize the World Bank Development Indicators’ data base for the period 1993 to 2015. We used quarterly data for suitability of time series analysis.
1.6 Significance of the Study

This study will be useful in adding to the existing stock of knowledge, policy analysis and review, raise Government awareness on what factors to focus on for stimulating economic growth. For example, the study will indicate whether FDI should remain a prime strategy for driving economic growth in Uganda and whether its volatility has any significant effects on growth or economic outlook for Uganda.
CHAPTER TWO:

LITERATURE REVIEW

2.1 Theoretical Framework

2.1.1 Neoclassical Growth Theory

Theories on economic growth date as far back as the classical economists of the eighteenth and nineteenth century. The basic neoclassical growth model was first developed by Solow (1956) and Swan (1956) to show how a steady economic growth rate can be achieved by proper amounts of three driving forces of labour, capital and technological progress.

According to the neoclassical growth theory, which was introduced by Harrod-Domar (Harrod, Roy (1939)), it assumes fixed proportions of labour and capital as the cause of equilibrium. Later, Solow (1956) and Swan (1956) diverged from this school of thought and maintained that long-run economic equilibrium can be achieved with varying amounts of labour and capital inputs. The Solow model focuses on a closed economy where output $Q$ is produced by the factors labour, $L$, and capital, $K$ and the production function takes the form $Q_t = f(K_t, L_t)$ where $t$ denotes time.

The neoclassical production function is homogenous of degree one implying that both factors must be available, and with unlimited substitutability between either capital or labour. Later advancement of the Solow model (Solow (1956)) states that in the long run economic growth can be attained from all three exogenous factors; capital, labour and technological progress. Technological progress simply multiplies the production function by an increasing scale factor such that $Q_t^*/A_t = f(K_t, L_t)$ (S. Sardadvar 2011).
2.1.2 Endogenous Growth Theory

This theory (Romer (1986)) came up to address the shortfalls in the neoclassical theory, for example, the model could not explain changes in technological progress growth rate and could not be used to explain the mechanism by which the saving and investment rate (or government policies directed at influencing it) can affect the steady-state growth rate. This model (Romer (1986)) stipulated that economic growth is a result of endogenous forces and not external forces. The theory broadens definition of capital to include human capital, and that equilibrium can be achieved from human capital, innovation (Research and development) and knowledge capital (Romer, 1986). The theory focuses on positive externalities and spillover effects of a knowledge-based economy which will in turn lead to development.

2.1.3 The Two Gap Model of Economic Growth

This model assumes that, one of the ways to increase the rate of economic growth has been foreign aid, that higher aid is associated with higher levels of growth. The model is based on Harrod Domar model of growth, which determines the capital requirement (Cr) for a country to reach the targeted rate of growth. Harrod Domar model basic equation is \( G C = s \), where \( G \) is the growth during a unit of time \( \left( \frac{Y}{Y} \right) \), \( C \) is the capital formation in the period divided by the increase in the output in the same period \( \frac{I}{Y} \), and \( s \) is the average propensity to save \( \frac{S}{Y} \). The basic equation of the model is obtained by equalizing ex-post saving and ex-post investment, thus:

\[
\frac{Y}{Y} \times \frac{I}{Y} = \frac{S}{Y} \quad \text{or} \quad \frac{I}{Y} = \frac{S}{Y} \quad \text{or simply} \quad S = I
\]
The two gap model functions under conditions where the two ex-post saving and ex-post investment are not equal and specially if ex-post saving is less than the ex-post investment and attempts to find a way out to fill the gap by equalizing the two. This analysis arises from the fact that growth requires investment. Investment in turn requires saving, which may be domestic and/or foreign. The foreign exchange gap arises when investment has an import content then domestic savings is not sufficient to guarantee growth, since the saving may not be exchangeable into foreign exchange earnings with which to acquire imports (Chenery and Strout, 1962).

These two gaps are known as the savings gap and the foreign exchange gap. Whichever of the two gaps is binding (or is the greatest) will constrain the amount of investment and capital formation, which can be undertaken. The savings gap is where savings fall short of what can be effectively and productively invested while the foreign exchange gap is where earnings of foreign exchange fall short of the amounts needed to purchase the necessary foreign materials and components (Chenery and Strout, 1962).

According to the theory, the gaps are not equal, the inflow of foreign aid is supposed to have a dual role as to fill the gap between the "saving" and trade gap which are ex-post equal (Chenery and Strout, 1962). While the two gaps are distinct and separate ones, international transfers can, in fact, be used to fill both. For example, a machine given to a country represents both an import for which no resources need to be exported (thus alleviating the foreign exchange gap) and an investment good which does not have to be offset by domestic saving (thus alleviating the savings gap). Foreign direct investment inflows would therefore come in to fill the savings gap.
if foreign companies invest locally in a situation where savings are not sufficient to meet the investment requirements of a country.

2.2 Empirical Literature Review

Jordan (2007), using translog and cob-douglas models found a positive relationship between FDI and economic growth. This study found that the significant determinants of economic growth were foreign direct investment inflows, labour, and domestic capital. The elasticities of real gross domestic product in relation to foreign direct investment inflows, labour, and domestic capital, were 2.56, 1.06 and 0.14, respectively at the 5% level of significant.

Kirwa and Mutuku, (2014) using the endogenous model and OLS found that FDI volatility retards the long run growth of Kenya. The study found that FDI has a positive effect on economic growth, however, FDI volatility negatively affects economic growth. The same study found that trade openness is not an incentive to FDI inflows and that human capital endowment has a positive impact on growth. Although the overall effect of FDI on economic growth is positive, the volatility of capital inflow may make it harder for inference of stable and predictable macroeconomic policies. Therefore, unstable inflows may dampen investment, hence adversely negatively affecting economic growth.

Ngugi (2013) using the EGARCH methodology, ARDL, and bound testing approach, found that foreign direct investment volatility has a long run relationship with economic growth in Kenya and that FDI volatility retards economic growth in the long run. Her findings are similar to those of Kirwa and Mukutu (2014).
Choong et. al (2014) examined the long run relationship of foreign direct investment volatility and economic growth in the Association of the South East Asian Nations (ASEAN) using the ARDL cointegration testing procedure proposed by Pesaran, Renelt and Smith, (2001). The study revealed that countries with higher FDI volatility have a lower economic growth and that FDI volatility is significantly harmful for developing countries in the long run. The estimated bound test indicated existence of the long run relationship between FDI volatility and economic growth.

Lensink and Morrissey (2001/2) using cross-sectional panel data and instrumental variables found that FDI positively affects economic growth in the long run while the FDI volatility retards growth in the long run. The elasticity of RGDP in relation to FDI was 0.3 and the elasticity of RGDP to FDI volatility was -2.4 in the long run.

Ayanwale (2017), using ordinary least squares regression techniques found a positive relationship between foreign direct investment inflows and economic growth, although it was insignificant. The elasticity of GDP to foreign direct investment inflows was 0.033.

Dollar (1992) investigated the sources of economic growth in 95 developing countries, covering the period 1976-1985 using a cross-sectional regression analysis, and revealed that real exchange rate variability and the index of exchange rate distortion were significantly negatively associated with long run economic growth while investment rate positively and significantly impacted economic growth.

Fischer (1992) who investigated macroeconomic stability and economic growth in Sub-Saharan Africa (SSA) and Latin America and the Caribbean (LAC) countries revealed that human capital, investment and budget surplus were positively and significantly associated with economic
growth. He concluded that a reasonable level of macroeconomic stability is necessary for sustained economic growth.

Knight, Loayza, and Villanueva (1993) extended the Mankiw, Romer, and Weil (1992) model by examining the relationship between economic growth and investment, human capital, public investment and trade openness in 98 countries. They used a panel regression method and two sub-samples of 81 developed countries and 59 developing countries. Trade openness had a significantly negative relationship with economic growth in developing countries. They concluded that openness to trade was an important determinant of economic growth.

Most and Vann de Berg (1996) investigated the determinants of economic growth in eleven Sub-Saharan Africa countries using country-specific time series growth models. Their results revealed mixed results for most of the variables studied. Foreign aid was found to be negatively and significantly associated with economic growth in Togo, Ivory Coast, Nigeria, Zambia, Rwanda, and Botswana: on the other hand, it was positively and significantly associated with economic growth in Niger, Senegal and Mauritius. Domestic savings were found to be positively and significantly associated with economic growth in Togo, Senegal, Ivory Coast, Nigeria, Cameroon, and Kenya, but negatively and significantly associated with economic growth in Mauritius and Zambia. Foreign direct investment inflows had a significant positive relationship with economic growth in Ivory Coast, Niger, Kenya and Togo, while it was the opposite for Mauritius and Rwanda. Population growth was also significantly and negatively correlated to economic growth in Senegal, Mauritius and Niger.
Gisore et al (2014) investigated the contribution of government expenditure on economic growth in East Africa and indicated that whereas expenditure on education and agriculture were insignificant in terms of their contribution to economic growth, expenditures on health, and defense had a positive and statistically significant effect on economic growth. The results revealed that a 1-percentage increase in expenditure on health sector increased real gross domestic product by about 0.75% and that a 1% increase in defense expenditure will lead to a 0.72% increase in real gross domestic product. The elasticity of GPD in relation to total government spending at the 1% level of significance was 0.8, suggesting that if appropriately managed total government spending has significant positive effect on economic growth, especially in less developed countries.

Siyasanga (2017) adopted the auto regressive conditional lag model (ARDL) and bound test approach to cointegration to investigate the factors influencing economic growth in South Africa. They found a positive and significant relationship between money supply and economic growth measured by GPD per capita both in the short run and long run. The other independent variables were inflation, interest rate and broad money supply. The long run elasticity of GDP to money supply was 0.58, which implied that a 1% increase in money supply led to about 0.58% increase in economic growth. The long run elasticities of GDP to inflation and interest rates were negative 0.066% and negative 0.055%, respectively, implying that a one percent increase in inflation or interest rate led to 0.066% and 0.055% decrease in economic growth, respectively.

Ahmed (2011) studied the long–run relationship between money supply, real GDP, and price level in Sudan, using Granger causality test. He found that money supply, real GDP, and price level were cointegrated, implying existence of a long run equilibrium relationship between these
variables. Further, the elasticities of GDP in relation to money supply and consumer price index were -0.33 and 2.3, respectively.

Were (2015) using ARDL bound test to cointegration found that trade openness had a positive relationship with economic growth in developed and developing countries, however, it was insignificant for least developed counties. Further, this study suggested that trade was a key determinant of foreign direct investment inflows within developed nations, developing counties and least developed nations and therefore, transformation of trade in these countries is critical to drive increased FDI and other benefits of FDI such as new technologies.

Hasnul (2015) found a negative correlation between government expenditure and economic growth in Malaysia for the past 45 years, that is, from 1970 to 2014. Economic growth was measured as the growth rate of real GDP. Government expenditure was split into 2 categories of development expenditure and operating expenditure. The elasticity of development expenditure to real gross domestic product was 0.196 while operating expenditure was insignificant.

Demirhan and Masca (2008) using cross sectional econometric data on 38 developing countries, revealed that better infrastructure, trade openness has a positive effect on foreign direct investment inflows. They found that the elasticity of foreign direct investment inflows to trade openness was 0.0179.

Tabyya (2018), using multiple regression techniques found that there was a negative and insignificant relationship between foreign direct investment inflows and real gross domestic product in Pakistan. The elasticity of GDP in relation to FDI was -1.47, implying that a one percentage change in FDI led to a 1.47% decline in GDP.
Muhammad et. al (2012), using multiple repressors models found that FDI was essential for growth. The study found that FDI contributed to transfer of technology, human capital development and eventual increase in taxation. The elasticity of GDP in relation to FDI was 0.3947, implying that an increase in FDI by one percent increased GDP by 0.39%.

Malefane and Odhiambo (2018) using autoregressive distributed lag (ARDL) bound testing approach found a significant and positive impact of trade openness to economic growth. The elasticity of GDP in relation to trade openness was 0.188. A one percent increase in trade openness increased economic growth by 0.188%.

Andersen and Baluba (2008) found that significant growth rates are often associated with countries embracing the ongoing globalization and increasing openness to the international exchange of goods and services as well as ideas and technologies. Trade openness was found to have a positive impact on increasing a country’s total productivity.

Yeboah (2012) using a Cobb-Douglas production function, found trade openness to have a positive relationship with GDP. The elasticity of GDP with respect to trade openness was 0.69, implying that a one percent increase in trade openness increases economic growth by 0.69%. These findings are like those of Andersen and Babula 2008 that there is a positive relationship between international trade and economic growth.

According to Mitchell (2005), most government spending has a negative economic impact. This is not only because the various ways of financing government – taxes, borrowing and printing money have harmful effects but because of several other reasons like costly financing choices, possibility is crowding out private sector, to mention but a few (Mitchell (2005)). Bigger government spending is also associated with unequal economic performance (Reidl, 2005).
There is considerable literature suggesting that foreign direct investment inflows (FDI) has a positive impact on economic growth of least developed countries (Lensink and Morrissey, 2000). This is normally achieved via increasing the capital stock and channeling international technology transfer (Ngugi, 2013). The ‘traditional’ argument is that an inflow of FDI improves economic growth by increasing the capital stock, whereas recent literature points to the role of FDI as a channel of international technology transfer. FDI enhances technological change through technological diffusion. Multinational firms tend to be concentrated in industries with a high ratio of research and development relative to sales and a large share of technical and professional workers thus leading to technological diffusion (Markusen, 1995). Multinational corporations are probably among the most technologically advanced firms in the world. Moreover, FDI not only contributes to imports of more efficient foreign technologies, but also generates technological spillovers for local firms.

FDI contributed substantially to the recovery of the Ugandan economy in the late 1990s, especially in terms of additional private capital flows, employment creation, technology transfer and market development (UNCTAD, 1999). In the late nineties, FDI helped broaden the financial base of the Ugandan economy, which had been heavily dependent on official transfers, FDI also contributed to employment and transfer of skills and technology (UNCTAD, 1999).

Many researchers believe that participation in the international economy was the primary source of growth in many East Asian countries that have experienced fast economic development during the past 50 years (World Bank 1993).
2.3 Summary of the Literature

Existing empirical evidence shows a mixture of results about the relationship of different variables to economic growth of the host country. The direction of the impact/effect of FDI on economic growth is not clear, some studies portray increased FDI as a trigger to economic growth especially in the long run see (Kirwa and Mutuku, (2014), Ngugi, (2013), whereas other studies found it with a constraining economic growth especially when its highly volatile see (Alpsalan (2011), Lensink and Morrissey (2001, 2002). Findings on FDI volatility on economic growth, have been consistent in several studies, having negative impacts on economic growth. What is also noted from the literature review is that, money supply and trade openness have significant and positive relationship on economic growth. Foreign direct investment inflows and government expenditure on the contrary can have either a positive or negative impact on economic growth. In some countries, FDI has contributed positively to growth but is not always the case with other countries and government expenditure does not always contribute to growth.

Empirical studies also show several approaches used for analysis ranging from translog and cob-douglas models, endogenous model and OLS, EGARCH methodology, ARDL and bound testing approach, multiple regression techniques, vector auto regression (var) approach, cross-sectional regression analysis, granger causality test and error correlation model (ECM). Our study will adopt the autoregressive distributed lag and bound testing approach because is it superior to other approaches and has several advantages over other approaches to cointegration. First, it is suitable for a small sample size of data, second, it can be used when variables are of integration of order zero I(0) or I(1) of both while other approaches require same order of integration, thirdly, it estimates both the short run and long run coefficients simultaneously.
CHAPTER THREE:

METHODOLOGY

This chapter presents the methodology that has been used to investigate the factors that affect Uganda’s economic growth. The chapter is divided into four sections, that is theoretical framework, data sources, operational definitions of the variables and empirical testing procedures.

3.1 Theoretical Framework

Economic growth measured by real gross domestic product (RGDP) can be influenced by many factors in an economy. According to the extended neoclassical growth model, the growth rate of per capita output $Dy$ is influenced by the current level of per capita output $y$ and the long-run steady state level of output $y^*$ (Barro, 1996). The model is given by, $Dy = f(y, y^*)$, where, $Dy$ is negatively related to $y$ for a given $y^*$ but positively related to $y^*$ for a given level of $y$. This is because any increase in per capita output $(y)$ when the steady state level of output $(y^*)$ is constant would reduce the gap between the two and hence reduce the growth rate but an increase in $y^*$ at constant $y$ would increase the gap and hence lead to higher growth rate.

The model is thus based on the notion that economies grow slower as the level of per capita output $(y)$ approaches its long run steady state. The key to generating higher growth is to influence this growth gap using variables which determine $y$ and $y^*$. According to Barro (1996), $y^*$ depends on an array of choice and environmental variables while $y$ depends on factors of production which directly determine output, including choice and environment variables.
Environmental variables include, FDI flows, FDI volatility, among others. The choice variables include government spending, and money supply. In addition, trade openness has been included as an external environmental factor that also affects economic growth. According to the endogenous growth models developed by Paul Romer and Robert Lucas, they place emphasis on free markets, reducing regulation and subsidies. They argue that open economies are a driver for economic growth. Also, according to monetary theory, expansion of the money supply will end recessions and boost growth.

Figure 5 below, shows the potential determinants of economic growth in Uganda. These are, foreign direct investment inflows, FDI volatility, trade openness, government spending, and money supply.
The choice variables and environmental variables are both expected to affect economic growth either positively or negatively.

According to Keynesian theory, fiscal policy plays a significant role in stabilizing the economy. The theory advocated for high government spending as a stimulus for economic growth. Keynesian theory suggests that higher government spending in a recession can enable a quicker economic recovery. That in a recession, government should borrow more to offset a fall in private spending and there will be no crowding out in a recession, Keynes (1936).

Similarly, Keynesian economists also advocate for increased government spending in a recession to stimulate aggregate demand – expansionary fiscal policy. Keynes argued that in a recession,
people responded to the threat of unemployment by increasing saving and reducing their spending, although this contributes to an even bigger decline in aggregate demand and gross domestic product; therefore, government intervention may be needed Keynes (1936).

Monetarists on the other hand are generally critical of expansionary fiscal policy because they believe that expansionary fiscal policy causes inflation or crowding out. In other words, increased government spending during a recession will not necessarily increase aggregate demand but may cause an equivalent fall in private sector spending and investment. They emphasize the importance of controlling money supply to control inflation. Those governments should seek to run balanced budgets. Monetarists claim that monetary policy is the real driver of the business cycle. They believe expansion of the money supply will end recessions and boost growth.
Government spending can have adverse effects including crowding out of private sector, high interest payments on loans, may need to increase taxes in future to meet loan obligations and increase inflation. That during a recession, the government will borrow money from the private sector by selling bonds and because private sector lends money to government they will not have money to spend or invest. Private spending falls and there is no overall growth in RGDP. Classical economic theory advocates for a limited government. It should have a balanced budget and incur little debt. Government spending is dangerous because it crowds out private investment. But that only happens when the economy is not in a recession. In that case, government borrowing will compete with corporate bonds. The result is higher interest rates, which make borrowing more expensive. If deficit spending only occurs during a recession, it will not raise interest rates. For that reason, it also won't crowd out private investment.

According to neoclassical economists (Solow, 1956), foreign direct investment inflows leads to economic growth through absolute cost advantages product differentiation and economies of scale. Neo-Classical model of Solow/Swan advocates for technological progress which increases productivity of capital and labour. These can be achieved through foreign direct investment inflows.

According to the Harrod-Domar model (Harrod, 1939), a type of neo-classical model, economic growth rate depends on the savings rate with specific emphasis on domestic savings. They argue that savings provide the necessary funds to finance investment which breeds further growth. However, there is a reverse side to this growth principal. If savings are too high, economic growth cannot be attained because people cannot consume.
Classical economic theory promotes laissez-faire policy. It says the free market allows the laws of supply and demand to self-regulate the business cycle. It argues that unfettered capitalism will create a productive market on its own. It will enable private entities to own the factors of production. These four factors are entrepreneurship, capital goods, natural resources, and labour. In this theory, business owners use the most efficient practices to maximize profit.

Classical economists focus on supply-side theories, which emphasise the need for incentives to save and invest if the nation's economy is to grow, Mini (2016). The Classical theory suggested that any fall in investment would lead to lower interest rates. Lower interest rates are not an incentive for savings therefore the savings reduce, and investments increase leading to equilibrium of full employment.

The World Bank and Internationally monetary fund are generally supportive of Foreign direct investment inflows on its impact on economic growth and most economists would probably say it does more good than harm. According to the World Bank (2014), FDI is responsible for creating around two million new jobs a year in developing countries; however, there are other examples of foreign direct investment inflows gone wrong. Given appropriate host policies and basic level of development, FDI triggers technology spillovers, assists human capital formation, contributes to international trade integration, helps create a more competitive business environment and enhances enterprise development. All of these contribute to higher economic growth, which is the most potent tool for alleviating poverty in developing countries, (OECD, 2002). FDI also leads to an improvement of environmental and social conditions leading to more socially responsible corporate policies through adaptation of international best practices on environment and safety standards. According to the OECD (2002), potential drawbacks include repatriation of profits leading to deterioration of balance of payments, lack of positive linkages
with local communities, harmful environmental impact from heavy industrialisation, and competition in national markets.

**Functional Form of the Model**

The functional relationship between RGDP as the dependent variable and FDIVOL, OPN, GOVEXP and MS as the independent variables could be expressed as:

\[ RGDP = f(FDI, FDIVOL, OPN, GOVEXP, MS) \]  

\[ \text{(1)} \]

Where:

- **RGDP** = Real gross domestic product
- **FDI** = Foreign direct investment inflows
- **FDIVOL** = Foreign direct investment volatility
- **OPN** = Trade openness (Imports and Export volumes)
- **GOVEXP** = Government total expenditure
- **MS** = Money supply, as an aggregate of both M1 & M2

**Empirical Form of the Model**

The empirical form of this model will then be expressed as:

\[ RGDP_t = \beta_0 + \beta_1 FDI_t + \beta_2 FDIVOL_t + \beta_3 OPN_t + \beta_4 GOVEXP_t + \beta_5 MS_t + \epsilon_t \]  

\[ \text{(2)} \]

where, \( \beta_1, \beta_2, \beta_3, \beta_4 \) and \( \beta_5 \) are the regression coefficients for the specified variables in the model, \( \beta_0 \) is a constant while \( \epsilon_t \) is the error term.
Based on theory and empirical findings, the expected sign for $\beta_1, \beta_3, \beta_4$, and $\beta_5$ can be either positive or negative while the expected sign for $\beta_2$ is a negative. In other words, from the literature review, foreign direct investment inflows, trade openness, government expenditure and money supply could have either a positive or negative relationship with real gross domestic product while foreign direct investment volatility will have a negative relationship with gross domestic product.

To determine the long-run relationship among the variables of the study, the ARDL bound to test for cointegration developed by Pesaran et al. (2001) was used. The error correction version of ARDL model is presented in equation (3):

$$\Delta \text{LN RGDP}_t = \alpha_0 + \alpha_1 \text{LN FDI}_{t-1} + \alpha_2 \text{FDI VOL}_{t-1} + \alpha_3 \text{LN GEXP}_{t-1} + \alpha_4 \text{LN MS}_{t-1} +$$
$$\alpha_5 \text{LN OPN}_{t-1} + \sum_{i=1}^{n} \delta_i \Delta(\text{LN FDI})_{t-1} + \sum_{i=0}^{n} \theta_i \Delta(\text{LN FDI VOL})_{t-1} +$$
$$\sum_{i=1}^{n} \vartheta_i \Delta(\text{LN GOV EXP})_{t-1} + \sum_{i=0}^{n} \theta_i \Delta(\text{LN OPN})_{t-1} +$$
$$u_t$$

...(3)

Where:

- $\text{LN RGDP}$ = natural log of real gross domestic product
- $\text{LN FDI}$ = natural log of foreign direct investment inflows
- $\text{LN FDI VOL}$ = natural log of foreign direct investment volatility
- $\text{LN OPN}$ = natural log of trade openness (Imports and Export volumes)
- $\text{LN GOV EXP}$ = natural log of government total expenditure
- $\text{LN MS}$ = natural log of money supply
- $u_t$ = white-noise error term
- $\alpha$ = the short-run coefficients
- $\vartheta$ = long-run coefficients of the model
All of variables will be estimated in logarithm. The estimation of variables using logarithm not only makes the variables normal but also makes the errors or estimated residuals normal prior to analysis. The transformation also makes variables uniform in terms of measurement units and interpretation of findings. FDI volatility will be computed by estimating a regression equation using autoregressive conditional heteroscedasticy (ARCH) with LNFDI specified as the only variance regressor. The FDI volatility will then be estimated using GARCH variance series and finally transformed into natural logarithm. The model will be estimated using e-views.

The hypothesis to be tested will be as follows;

i. Foreign direct investment inflows (FDI): $\beta_1 > 0$

ii. Foreign direct investment inflows volatility (FDIVOL): $\beta_2 < 0$

iii. Trade openness - Imports and Export volumes; (OPN): $\beta_3 > 0$

iv. Government total expenditure (GOVEXP): $\beta_4 > 0$

v. Money supply (MS): $\beta_5 > 0$

### 3.2 Data and Source

The study employs secondary data obtained from World Bank Development indicators (World Bank, 2016). The data is quarterly from the year 1993 to 2015.
3.3 Empirical Testing Procedures

This study examines factors affecting Uganda’s economic growth. The study applies Autoregressive Distributed Lag (ARDL) model procedure proposed by Pesaran and Shin (1999) and Pesaran et al. (2001). The ARDL procedure has been increasingly used due to the following reasons. First, the technique is more appropriate to be used in testing the long run relationship between variables when the data are of a small sample size (Pesaran et al., 2001), in this case we have 92 observations. Second, there is no restriction imposed on the order of integration of each variable under study. To be specific, the test allows testing for the existence of a cointegrating (implying long run equilibrium relationship) relationship between variables in levels irrespective of whether the underlying variables are I(0) or I(1). This is different from the general bivariate and multivariate cointegration frameworks, which require that time series to be integrated of the same order such as Vector Error correlation model (VEC).

The long run relationship will be examined by imposing the restriction that all estimated coefficients of lagged-one level variables equal to zero. That is, the null hypothesis is $\beta_0 = \beta_1 = \beta_2 = \ldots = 0$, (no long run relationship) is tested against the alternative hypothesis of $\beta_0 \neq \beta_1 \neq \beta_2 \neq \ldots = 0$, implying the existence of long run relationship.

To ascertain this with clarity, the F test of restriction is undertaken. If the F-statistic obtained from the restriction is higher than the lower and upper bound critical values, it is concluded that there appears a steady state of long run equilibrium between the variables under study and implying that the ARDL model, can be estimated.
However, if the F-statistic falls within lower and upper bound critical values, then the results are inconclusive, and the stationarity of the series must be examined and investigated for confirmation.

The four assumptions of using ARDL model will also be tested: the first requirement is the absence of autocorrelation; second is the that there should not be any occurrence of heteroscedasticity in the data; thirdly, the data should be normally distributed; and lastly, the data should be integrated either on order one I(1) of zero I(0) or both.

3.4 Diagnostic Tests to Check Suitability of the Model

3.4.1 Augmented Dickey-Fuller (ADF), Durbin Watson, Heteroscedasticity and Normality Tests and Cointegration Tests:

The starting point to meticulously following the Bounds procedure Persaran and Shin (1999) and Persaran, et al., (2001) is the testing for unit root. This is because the bounds approach is not applicable if any of the variables happens to be integrated of order two I(2). Therefore, Augmented Dickey Fuller unit root tests will be conducted (Dickey and Fuller (1979)) on each variable to test for both unit root. This is because if any of the variables in the data has stationary at I(2), ARDL model cannot run.

The Augmented Dickey-fuller (ADF) test by Dickey and Fuller (1979), will be used to test for stationarity of variables and order of integration, that is the data should be integrated either of order zero I(0) or of order one I(1) or both. The Augmented Dicker-Fuller (ADF) test will be used to test for the order of integration of variables in fulfillment of one of the conditions for ARDL. The ADF test will be used to test for both unit root and order of integration at the same time although it is not a pre-requisite for ARDL estimation. It is, however, critical to test since
we are dealing with time series data and rule out the existence of unit roots which could bias our model estimates.

The Durbin Watson test will be used to test for absence of autocorrelation of the data. The durbin-watson test was developed by Durbin and Watson in 1950 & 1951. The test statistic $d$ will be compared against the lower and upper critical values $(d_{L,\alpha} \text{ and } d_{U,\alpha})$ at a level of significance, $(\alpha)$. If $d < d_{L,\alpha}$ then there is evidence that the error terms are positively autocorrelated, if $d > d_{U,\alpha}$ there is no evidence that the error terms are positively auto correlated and results will be inconclusive if $d_{L,\alpha} < d < d_{U,\alpha}$.

The Heteroscedasticity test will be done to fulfill assumptions for the ARDL model which assumes that heteroscedasticity should not exist in the data. The Breush-Godfrey test (Breush and Pagan (1979)) will be adopted. This test is used to test for heteroscedasticity in a linear regression model such as ours. If the computed value of the Breusch-Godfrey is above 0.005, we conclude the model has no heteroscedasticity and that the model is suitable for economic analysis.

For the ARDL model to apply, the data should be normally distributed. The jarque-bera procedure will be adopted to estimate the P value which will be compared against the probability of 0.005. If the P value is above 0.005, we conclude that the residues are normally distributed. The above four tests will be used to determine whether the ARDL model is suitable for analysis.
Bounds Test for Long Run Relationship

According to Persaran and Shin (1999), the estimated ARDL model can be used to test for cointegration or the existence of a long-run equilibrium relationship among the variables in the model. The null hypothesis will be that there is no long-run relationship among the variables in the model. The null hypothesis is rejected if the generated Wald-test (F-statistic) is greater than the upper bounds critical values given by Persaran, et al. (2001). If the F-Statistic is less than the lower bound critical values, the null is not rejected and if it is in between the lower and upper bound critical values, the test becomes inconclusive. This approach has the following advantages over other approaches to cointegration:

(a) Unlike multiple equation approaches like the Johansen approach, the Bounds test approach is a single equation approach and can thus be applied when there is limited degree of freedom.

(b) Bounds procedure is applicable even when time-series variables have ambiguous order of integration. This means the approach can be used when the variables are all I(0), all I(1) or a combination of both. Other approaches require the variables to be integrated of the same order.

(c) This approach to cointegration is simple because it performs a simultaneous estimation of both the short-run and long-run coefficients.

The application of ARDL approach to cointegration will give realistic and efficient estimates and helps in identifying the cointegrating vector(s). Each of the underlying variables will stand as a single long run relationship equation, therefore, it is possible to appropriately investigate the existence of a long-run relationship among the variables in the model.
The short run relationship between variables will be estimated using error correlation model where the error term (ECM (−1)) must be negative and statistically significant at a probability <0.05. Also the error term (ECM (−1)) must be within a range of zero (0) and negative one (−1). This will inform us of the speed of adjustment to equilibrium. This will inform us of the speed of adjustment of RGDP to equilibrium after the independent variables change.

### 3.4.2 Lag Selection

To use the ARDL model, we shall first determine the lag structure and know the number of lags in the model. There are number of criteria used in selecting lags which include, likelihood ratio (LR) test, the Schwarz criterion (SC), the final prediction error (FPE), the Hannan-Quinn (HQ) criterion, and the Akaike information criterion (AIC) Akaike (1974). It is required that to have a suitable number of lags, select the number of lags that has been accepted by most of the criteria used. Selection of appropriate lag length is a crucial step in estimating the ARDL model Persaran, et al. (2001). Furthermore, the tests are conducted with automatic lag selection using the Schwarz Information criteria (SIC).

### 3.4.3 Tests for Suitability of the Data

The study employed several tests to check for the suitability of the model including the R-Adjusted statistic ($R^{-1}$) for suitability of fit. I will help us to explain is the proportion of the variance in the dependent variable that is predictable from the independent variables; and Ramsey reset test as developed by Ramsey (1968). The Ramsey test will help us to test whether non-linear combinations of the fitted values help to explain the response variable. It will also help to test whether there exist some significant non-linear relationships in a Linear Regression
Model. In order to run the Ramsey Reset test, we estimate a linear regression model, for example:

\[ y_i = \beta_1 + \beta_2 x_{2i} + \beta_3 x_{3i} + \ldots + \beta_k x_{ki} + \epsilon_i \] \hspace{1cm} (4)

where \( i = 1, \ldots, n \).

Adding a square of the fitted values \( \hat{y}_i^2 \), and re-estimating the model.

\[ y_i = \beta_1 + \beta_2 x_{2i} + \beta_3 x_{3i} + \ldots + \beta_k x_{ki} + \gamma \hat{y}_i^2 + \epsilon_i \] \hspace{1cm} (5)

The null hypothesis to be tested, \( H_0: \gamma = 0 \). If the null is rejected, it indicates signs of misspecification, particularly non-linearity in the data. If the null is accepted, it indicates that the model is correctly specified.
CHAPTER FOUR:

PRESENTATION AND DISCUSSION OF RESULTS

This chapter presents the results, major findings of this research and corresponding discussions. The descriptive section highlights some of the salient points concerning the statistical properties of the variables of interest and is followed by the analysis and results section. It also provides a comprehensive discussion of the findings from the study.

The study established the effects of both the choice variables and the environmental variables on the economy using ARDL approach to cointegration also known as the bounds testing approach. The short run and long run equations will also be estimated.

4.1 Descriptive Statistics

The descriptive statistics help us to present and summarize data in a more meaningful way by way of its distribution, measures of central tendency like the mean and measures of spread like standard deviation. Table 4.1 below shows the descriptive statistics of the variables under study.
Table 4.1: The Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>LNGDP</th>
<th>LNFDI</th>
<th>GARCH01</th>
<th>LNGVEXP</th>
<th>LNMS</th>
<th>LNOPN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>23.02</td>
<td>19.64</td>
<td>0.01</td>
<td>28.32</td>
<td>8.58</td>
<td>21.79</td>
</tr>
<tr>
<td>Median</td>
<td>22.81</td>
<td>19.54</td>
<td>0.00</td>
<td>28.40</td>
<td>8.51</td>
<td>21.54</td>
</tr>
<tr>
<td>Maximum</td>
<td>24.05</td>
<td>20.91</td>
<td>0.12</td>
<td>29.57</td>
<td>10.27</td>
<td>22.81</td>
</tr>
<tr>
<td>Minimum</td>
<td>21.89</td>
<td>17.82</td>
<td>0.00</td>
<td>26.79</td>
<td>6.61</td>
<td>20.34</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.62</td>
<td>0.89</td>
<td>0.02</td>
<td>0.78</td>
<td>1.07</td>
<td>0.74</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.31</td>
<td>-0.07</td>
<td>2.63</td>
<td>-0.25</td>
<td>-0.01</td>
<td>0.16</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>1.75</td>
<td>1.60</td>
<td>12.22</td>
<td>2.01</td>
<td>1.77</td>
<td>1.49</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>7.49</td>
<td>7.59</td>
<td>432.59</td>
<td>4.70</td>
<td>5.80</td>
<td>9.13</td>
</tr>
<tr>
<td>Probability</td>
<td>0.02</td>
<td>0.02</td>
<td>0.00</td>
<td>0.10</td>
<td>0.06</td>
<td>0.01</td>
</tr>
<tr>
<td>Sum</td>
<td>2,117.70</td>
<td>1,807.16</td>
<td>1.12</td>
<td>2,605.65</td>
<td>789.58</td>
<td>2,004.42</td>
</tr>
<tr>
<td>Sum Sq. Dev.</td>
<td>35.08</td>
<td>72.24</td>
<td>0.04</td>
<td>55.04</td>
<td>104.85</td>
<td>49.40</td>
</tr>
<tr>
<td>Observations</td>
<td>92.00</td>
<td>92.00</td>
<td>92.00</td>
<td>92.00</td>
<td>92.00</td>
<td>92.00</td>
</tr>
</tbody>
</table>

*Note: Authors’ calculations*

The Jarque-Bera normality test indicates that all the variables were normally distributed except for government expenditure and money supply. It is also shown that all the variables have non-zero standard deviations with a maximum from money supply and the minimum from FDI volatility. Non-normality of data will not affect the outcome of our results since our sample size is large enough and above 20 at least. In addition, nonparametric tests will be adopted, such as histogram, autoregressive distributed lag, to mention a few, which do not assume normality of all the data.
Figure 4.1 below shows the trend of the variables under study.

**Figure 4.1: Trend of the Dependent and Independent Variables**

Note: Authors’ calculations

FDI shows an upward trend from 1993 to 1998; the trend begins to decline from 1999 to 2008. It is seen to increase again up to 2006 and then becomes flat up to 2009. Another decline is seen between 2010 and 2011, it remains flat again and declines in 2015. RGDP shows an upward
trend from 1993 to 1995 and thereafter, it remains flat until 2003. The trend generally takes an upward trend from 2004 to 2014 (but with several fluctuations) and declines again in 2015. Trade openness is seen to take an upward trend from 1993 to 1995 and thereafter remains flat until 2003. After the constant trend, trade openness takes a linear upward trend from 2003 to 2012 and gradually declines up to 2015. Government expenditure and money supply have generally an upward trend from 1993 to 2015.

4.2 Presentation of Results

4.2.1 Correlation Matrix

Basically, the intuition in the correlation analysis is to ascertain how the different variables are related to one another and more specifically the dependent and explanatory variables.

The correlation matrix is to quantify the strength and direction of the linear association between two variables. The correlation between two variables may be either positive or negative where the value is always between -1 and +1. The correlation between two variables may be either strong or weak linear relationship. A perfect linear relationship is depicted by the value being 1 and 0 represents no linear relationship.

Table 4.2 below shows the correlation relationship between RGDP and each of the explanatory variables and between the explanatory variables.
Table 4.2: Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>LNREGDP</th>
<th>LNFDI</th>
<th>LNFDIVOL</th>
<th>LNGVEXP</th>
<th>LNMS</th>
<th>LNOPN</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNREGDP</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNFDI</td>
<td>0.96</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNFDIVOL</td>
<td>0.09</td>
<td>0.03</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNGVEXP</td>
<td>0.93</td>
<td>0.94</td>
<td>0.01</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNMS</td>
<td>0.97</td>
<td>0.96</td>
<td>0.10</td>
<td>0.99</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>LNOPN</td>
<td>0.99</td>
<td>0.98</td>
<td>0.07</td>
<td>0.92</td>
<td>0.95</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Note: Authors’ calculations*

There is a strong linear relationship between RGDP and all the explanatory variables except for FDI volatility. Foreign direct investment inflows (FDI), real gross domestic product (RGDP), government expenditure (GOVEXP), money supply (MS), and trade openness (OPN) all have a strong linear relationship given the value is tending to 1. Contrary, FDI volatility has no strong linear relationship with Foreign direct investment inflows (FDI), real gross domestic product (RGDP), government expenditure (GOVEXP), money supply (MS), and trade openness (OPN). Foreign direct investment volatility has a weak positive linear relationship with all the explanatory variables as the correlation value is tending to zero for all the explanatory variables.

### 4.2.2 Unit Root Test

Augmented dickey fuller (ADF) test has been employed to test whether the variables have a unit root. To estimate an ARDL model, it is presumed that all the variables are integrated of either order zero $I(0)$ or integrated of order one $I(1)$ or both.

Table 4.3 below shows the summary results from the Augmented Dickey Fuller tests for stationarity.
Table 4.3: Unit Root Tests and Order of Integration of Variables

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>ADF t statistic</th>
<th>At level</th>
<th>I(^{st}) difference</th>
<th>Order of integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNFDIVOL</td>
<td>4.194*</td>
<td>10.381*</td>
<td></td>
<td>I(0)</td>
</tr>
<tr>
<td>LNFDI</td>
<td>1.699</td>
<td>13.070*</td>
<td></td>
<td>I(1)</td>
</tr>
<tr>
<td>LNGDP</td>
<td>1.629</td>
<td>8.626*</td>
<td></td>
<td>I(1)</td>
</tr>
<tr>
<td>LNGVEXP</td>
<td>2.315</td>
<td>9.353*</td>
<td></td>
<td>I(1)</td>
</tr>
<tr>
<td>LNMS</td>
<td>2.093</td>
<td>10.099*</td>
<td></td>
<td>I(1)</td>
</tr>
<tr>
<td>LNOPN</td>
<td>1.295</td>
<td>4.476*</td>
<td></td>
<td>I(1)</td>
</tr>
</tbody>
</table>

Note: Authors’ calculations; *represents significant level of 0.1(10%), ** significance level of 0.05(5%) and *** as the significance level of 0.01(1%). ADF represents the Augmented Dickey Fuller tests for stationarity with intercept only at level and first difference.

The Augmented Dickey-Fuller tests results for unit roots indicate that all variables are integrated of either order zero I(0) or the first order I(1). This confirms that there are no variables integrated of order two I(2). There is also statistical evidence in favor of using the Autoregressive distributed lags model (ARDL) model.

4.2.3 Lag Selection

Table 4.4 below presents the optimal lag length based on the five criteria, including the SC, FPE, HQ and the AIC.
Table 4.4: Lag Selection Results

<table>
<thead>
<tr>
<th>Lag</th>
<th>LogL</th>
<th>LR</th>
<th>FPE</th>
<th>AIC</th>
<th>SC</th>
<th>HQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>162.72</td>
<td>NA</td>
<td>0.00</td>
<td>-3.52</td>
<td>-3.29</td>
<td>-3.43</td>
</tr>
<tr>
<td>1</td>
<td>700.63</td>
<td>965.79</td>
<td>0.00</td>
<td>-14.29</td>
<td>-12.26015*</td>
<td>-13.47</td>
</tr>
<tr>
<td>2</td>
<td>819.03</td>
<td>191.05</td>
<td>0.00</td>
<td>-15.52</td>
<td>-11.69</td>
<td>-13.98</td>
</tr>
<tr>
<td>3</td>
<td>873.13</td>
<td>77.47</td>
<td>0.00</td>
<td>-15.30</td>
<td>-9.67</td>
<td>-13.03</td>
</tr>
<tr>
<td>4</td>
<td>1,107.65</td>
<td>293.1437*</td>
<td>8.85e-19*</td>
<td>19.17379*</td>
<td>-11.74</td>
<td>-16.17961*</td>
</tr>
</tbody>
</table>

Note: Authors’ calculations

* indicates lag order selected by the respective criteria at 5 percent level.

Given the result from the table 4.4 above, the optimal lags to be used for the ARDL model will be 4 lags since it is the optimal for four out of five criteria (LR, FPE, AIC, HQ).

4.3 ARDL Model for Dependent and Independent Variables

The dependent variable is real gross domestic product while the independent variables include foreign direct investment inflows, foreign direct investment volatility, government expenditure, money supply and trade openness. Four lags were selected, and the model selects the optimal lags for each variable. Table 4.5 below presents the results of the ARDL model for all the study variables.
Table 4.5: ARDL Model Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNRGDP(-1)</td>
<td>0.07</td>
<td>0.10</td>
<td>0.70</td>
<td>0.48</td>
</tr>
<tr>
<td>LNRGDP(-2)</td>
<td>0.32</td>
<td>0.10</td>
<td>3.10</td>
<td>0.00</td>
</tr>
<tr>
<td>LNRGDP(-3)</td>
<td>0.24</td>
<td>0.11</td>
<td>2.11</td>
<td>0.04</td>
</tr>
<tr>
<td>LNFDI</td>
<td>0.11</td>
<td>0.06</td>
<td>1.88</td>
<td>0.06</td>
</tr>
<tr>
<td>LNFDI(-1)</td>
<td>0.01</td>
<td>0.05</td>
<td>0.14</td>
<td>0.89</td>
</tr>
<tr>
<td>LNFDI(-2)</td>
<td>0.00</td>
<td>0.05</td>
<td>0.08</td>
<td>0.93</td>
</tr>
<tr>
<td>LNFDI(-3)</td>
<td>-0.03</td>
<td>0.05</td>
<td>-0.54</td>
<td>0.59</td>
</tr>
<tr>
<td>LNFDI(-4)</td>
<td>-0.14</td>
<td>0.05</td>
<td>-2.71</td>
<td>0.01</td>
</tr>
<tr>
<td>GARCH01</td>
<td>-0.03</td>
<td>0.66</td>
<td>-0.05</td>
<td>0.96</td>
</tr>
<tr>
<td>GARCH01(-1)</td>
<td>1.12</td>
<td>0.78</td>
<td>1.44</td>
<td>0.16</td>
</tr>
<tr>
<td>GARCH01(-2)</td>
<td>-0.58</td>
<td>0.95</td>
<td>-0.60</td>
<td>0.55</td>
</tr>
<tr>
<td>GARCH01(-3)</td>
<td>-0.87</td>
<td>0.88</td>
<td>-0.99</td>
<td>0.32</td>
</tr>
<tr>
<td>GARCH01(-4)</td>
<td>-1.12</td>
<td>0.80</td>
<td>-1.41</td>
<td>0.16</td>
</tr>
<tr>
<td>LNGVEXP</td>
<td>-0.19</td>
<td>0.09</td>
<td>-2.03</td>
<td>0.05</td>
</tr>
<tr>
<td>LNGVEXP(-1)</td>
<td>-0.07</td>
<td>0.06</td>
<td>-1.28</td>
<td>0.21</td>
</tr>
<tr>
<td>LNGVEXP(-2)</td>
<td>-0.06</td>
<td>0.06</td>
<td>-0.99</td>
<td>0.32</td>
</tr>
<tr>
<td>LNGVEXP(-3)</td>
<td>-0.03</td>
<td>0.06</td>
<td>-0.55</td>
<td>0.58</td>
</tr>
<tr>
<td>LNGVEXP(-4)</td>
<td>-0.24</td>
<td>0.07</td>
<td>-3.51</td>
<td>0.00</td>
</tr>
<tr>
<td>LNMS</td>
<td>0.59</td>
<td>0.10</td>
<td>5.74</td>
<td>-</td>
</tr>
<tr>
<td>LNOPN</td>
<td>0.38</td>
<td>0.10</td>
<td>3.77</td>
<td>0.00</td>
</tr>
<tr>
<td>LNOPN(-1)</td>
<td>-0.03</td>
<td>0.10</td>
<td>-0.26</td>
<td>0.79</td>
</tr>
<tr>
<td>LNOPN(-2)</td>
<td>-0.20</td>
<td>0.09</td>
<td>-2.21</td>
<td>0.03</td>
</tr>
<tr>
<td>LNOPN(-3)</td>
<td>-0.22</td>
<td>0.10</td>
<td>-2.16</td>
<td>0.03</td>
</tr>
<tr>
<td>LNOPN(-4)</td>
<td>0.20</td>
<td>0.07</td>
<td>2.90</td>
<td>0.01</td>
</tr>
<tr>
<td>C</td>
<td>18.32</td>
<td>3.15</td>
<td>5.81</td>
<td>-</td>
</tr>
</tbody>
</table>

R-squared 0.996  Mean dependent var 23.07
Adjusted R-squared 0.995  S.D. dependent var 0.59
S.E. of regression 0.042  Akaike info criterion -3.26
Sum squared resid 0.112  Schwarz criterion -2.56
Log likelihood 168.50  Hannan-Quinn criter. -2.98
F-statistic 713.32  Durbin-Watson stat 1.93
Prob(F-statistic) -

Note: Authors’ estimates
4.4 Diagnostic Tests

a) R-squared

The adjusted R-squared ($R^{-1}$) is 0.995 implying that the selected variables can explain up to 99.5% of the variation in the dependent variable. The model is good, and data is fitted very well.

b) Heteroscedasticity

Based on the results in table (I) in the appendix, the Breush-Godfrey test statistic for heteroscedasticity is 0.8865, which is above 0.005. This implies that the model has no heteroscedasticity and we can reject the null hypothesis thus the model is valid for economic analysis.

c) Ramsey Reset Test

This is a test for the number of omitted variables. The results in the table (II) in the appendix show a probability of 0.0790 which is higher than 0.005, therefore the null hypothesis is rejected implying no omitted variables in this model estimation.

d) Residual Normality Test

The generated P-Value by the jarque-bera procedure is 0.581 which is above 0.005 implying that residues are normally distributed. See figure (I) in the appendix.

In conclusion, from all the diagnostic tests undertaken above, results indicate that the estimated ADRL Model passed the major econometric diagnostic tests. Specifically, the results are not being affected by heteroscedasticity or autocorrelation, the data is normally distributed, and the variables are stationary (I(0) or I(1)) which makes ARDL the most suitable model to use. The
R-adjusted of 0.995 implies that the regressors in the model are adequately able to explain Uganda’s economic growth measured by RGDP. The Ramsey RESET test and the normality test suggest that there is no model mis-specification thus the results can be relied on for policy recommendations.

4.5 Bound Test

The bound test will be used to test for existence of a long run relationship amongst the variables under study. The Wald-test (F-statistic) will be generated together with the upper and lower critical values at different levels of significance. Table 4.6 below presents the findings from this test.

Table 4.6: Bound Test Results for the ARDL Model

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>Value</th>
<th>K*</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>12.7476</td>
<td>5</td>
</tr>
</tbody>
</table>

**Critical value bounds**

<table>
<thead>
<tr>
<th>Significance</th>
<th>10 Bound</th>
<th>11 Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>2.12</td>
<td>3.23</td>
</tr>
<tr>
<td>5%</td>
<td>2.45</td>
<td>3.61</td>
</tr>
<tr>
<td>2.5%</td>
<td>2.75</td>
<td>3.99</td>
</tr>
<tr>
<td>1%</td>
<td>3.15</td>
<td>4.43</td>
</tr>
</tbody>
</table>

*Note: Authors’ calculations. K* is the number of independent variables in the model*
The test generated F-statistic in Table 4.6 of 12.7476 is greater than all the upper bound critical values which implies that the null hypothesis of no long-run relationship is rejected. It is concluded that a long run equilibrium relationship exists amongst the variables, and thus both the short run and long-run form of the ARDL model can be estimated.

4.6 Short Run Estimates of the ARDL Model

Table 4.7 below resents the short run results of the model.

Table 4.7: Cointegration Form (Error Correction Model) of the ARDL Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(LNRGDP(-1))</td>
<td>-0.56</td>
<td>0.12</td>
<td>-4.79</td>
<td>0.00</td>
</tr>
<tr>
<td>D(LNRGDP(-2))</td>
<td>-0.24</td>
<td>0.11</td>
<td>-2.11</td>
<td>0.04</td>
</tr>
<tr>
<td>Variable</td>
<td>Coefficient</td>
<td>Std. Error</td>
<td>t-Statistic</td>
<td>Prob.</td>
</tr>
<tr>
<td>D(LNFDI)</td>
<td>0.11</td>
<td>0.06</td>
<td>1.88</td>
<td>0.06</td>
</tr>
<tr>
<td>D(LNFDI(-1))</td>
<td>-0.00</td>
<td>0.05</td>
<td>-0.08</td>
<td>0.93</td>
</tr>
<tr>
<td>D(LNFDI(-2))</td>
<td>-0.03</td>
<td>0.05</td>
<td>0.54</td>
<td>0.59</td>
</tr>
<tr>
<td>D(LNFDI(-3))</td>
<td>-0.14</td>
<td>0.05</td>
<td>2.71</td>
<td>0.01</td>
</tr>
<tr>
<td>D(LNFDIVOL)</td>
<td>-0.03</td>
<td>0.66</td>
<td>-0.05</td>
<td>0.96</td>
</tr>
<tr>
<td>D(LNFDIVOL(-1))</td>
<td>0.58</td>
<td>0.95</td>
<td>0.60</td>
<td>0.55</td>
</tr>
<tr>
<td>D(LNFDIVOL(-2))</td>
<td>0.87</td>
<td>0.88</td>
<td>0.99</td>
<td>0.32</td>
</tr>
<tr>
<td>D(LNFDIVOL(-3))</td>
<td>1.12</td>
<td>0.80</td>
<td>1.41</td>
<td>0.16</td>
</tr>
<tr>
<td>D(LNGVEXP)</td>
<td>-0.19</td>
<td>0.09</td>
<td>-2.03</td>
<td>0.05</td>
</tr>
<tr>
<td>D(LNGVEXP(-1))</td>
<td>0.06</td>
<td>0.06</td>
<td>0.99</td>
<td>0.32</td>
</tr>
<tr>
<td>D(LNGVEXP(-2))</td>
<td>0.03</td>
<td>0.06</td>
<td>0.55</td>
<td>0.58</td>
</tr>
<tr>
<td>D(LNGVEXP(-3))</td>
<td>0.24</td>
<td>0.07</td>
<td>3.51</td>
<td>0.00</td>
</tr>
<tr>
<td>D(LNMS)</td>
<td>0.59</td>
<td>0.10</td>
<td>5.74</td>
<td>0.00</td>
</tr>
<tr>
<td>D(LNOPN)</td>
<td>0.38</td>
<td>0.10</td>
<td>3.77</td>
<td>0.00</td>
</tr>
<tr>
<td>D(LNOPN(-1))</td>
<td>0.20</td>
<td>0.09</td>
<td>2.21</td>
<td>0.03</td>
</tr>
<tr>
<td>D(LNOPN(-2))</td>
<td>0.22</td>
<td>0.10</td>
<td>2.16</td>
<td>0.03</td>
</tr>
<tr>
<td>D(LNOPN(-3))</td>
<td>-0.20</td>
<td>0.07</td>
<td>-2.90</td>
<td>0.01</td>
</tr>
<tr>
<td>CointEq(-1)</td>
<td>-0.37</td>
<td>0.09</td>
<td>-4.22</td>
<td>0.00</td>
</tr>
</tbody>
</table>

*Note: Authors’ calculations*
Cointegration equation/short run relationship

Cointeq = LN\(_{RGDP}\) - (-0.1265*LNFDI - 4.0203*GARCH01 - 1.5964*LNGVEXP + 1.5891*LNMS + 0.3388*LNOPN + 49.6708)………………………………………(6)

This equation has been generated based on the above ARDL model and the cointegrating term is then used as a variable in the cointegrating form of the model. The cointegrating form captures the short-run dynamics of the ARDL model and is thus an error correction model. This is because the error correction term (ECM (-1)) was both statistically significant and negative and the coefficient of the error correction term was − 0.36. This implies that the previous year’s deviation of real gross domestic product from long run equilibrium is corrected at a speed of 36%.

4.7 Long Run Estimates

Table 4.8 below presents the long run results of the model.

Table 4.8: Long-Run Coefficients of the ARDL Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNFDI</td>
<td>-0.13</td>
<td>0.14</td>
<td>-0.90</td>
<td>0.37</td>
</tr>
<tr>
<td>LNFDIVOL</td>
<td>-4.02</td>
<td>1.85</td>
<td>-2.17</td>
<td>0.03**</td>
</tr>
<tr>
<td>LNGVEXP</td>
<td>-1.60</td>
<td>0.40</td>
<td>-3.99</td>
<td>0.00***</td>
</tr>
<tr>
<td>LNMS</td>
<td>1.59</td>
<td>0.36</td>
<td>4.39</td>
<td>0.00***</td>
</tr>
<tr>
<td>LNOPN</td>
<td>0.34</td>
<td>0.20</td>
<td>1.70</td>
<td>0.09*</td>
</tr>
<tr>
<td>C</td>
<td>49.67</td>
<td>10.67</td>
<td>4.65</td>
<td>0.00***</td>
</tr>
</tbody>
</table>

Note: Authors’ calculations; *represents significant level of 0.1(10%), ** significance level of 0.05(5%) and *** as the significance level of 0.01(1%).
Long run relationship

\[ \text{LN} \text{RGDP} = -0.13*\text{LNFDI} - 4.02*\text{LNFDIVOL} - 1.60*\text{LNGVEXP} + 1.59*\text{LNMS} + \\
0.34*\text{LNOPN} + 49.67 \]

4.8 Discussion of Results

4.8.1 Economic Growth Dynamics

The results from the error correction model imply that Uganda’s economic growth had a long-run equilibrium relationship with foreign direct investment inflows, foreign direct investment volatility, government expenditure, money supply and trade openness. This is because the error correction term (ECM (-1)) was both statistically significant and negative. Furthermore, since the coefficient of the error correction term was -0.37, it can be inferred that; when economic growth deviates from its long-run equilibrium path, the previous year’s deviation from long run equilibrium is corrected at a speed of 37%.

4.8.2 Impact of FDI on Uganda’s Economic Growth

In the short run, FDI was negatively related to economic growth at the 1% level of significance. The elasticity of R\text{GDP} in relation to FDI was -0.14 in the short run and -0.13 in the long run, however it was not significant, implying that an increase in FDI reduces economic growth by 0.13%.

This could partly be attributed to Total Factor Productivity (TFP), as explained by the Solow-Swan Model and the absorption capacity of Uganda being a least-developed country. The reason for the negative results could be due to several reasons among them including the low absorptive capacity of the Uganda in terms of FDI inflows, crowding out local firms due to a lot of
attractive incentives given to foreign investor in terms of tax holidays, free land, among others and an accounted for capital flights. This can be further investigated to determine why it has not contributed to Uganda’s economic growth.

Whereas several studies demonstrate that increased FDI contributes to the growth of the economy, in this study the contribution of foreign direct investment inflows to Uganda’s economy was negative. The same results were noted by Athukorala (2003) on the impact of FDI on Sri Lanka’s economic growth. Kamal and Attaria (2011) also found a negative causal link between FDI inflows and economic growth in the Pakistani economy. According to Alfaro et al. (2004), FDI leads to economic growth in economies with developed financial markets only, that is, in first world countries. These first world countries exclude Uganda, a developing country.

4.8.3 Effects of FDI Volatility of Economic Growth

It was found that FDI volatility negatively influences economic growth in the short-run and long run. The elasticity of Uganda’s RGDP in respect to FDI volatility was -0.03 in the short run and -4.02 in the long run at the 5% level of significance. If foreign direct investment inflows become volatile by 1%, economic growth declines by up to 4.02% in the long run. Foreign direct investment volatility therefore has retarded Uganda’s economic growth.

This finding is in line with Kirwa et al (2014) study who found FDI volatility negatively influencing economic growth in Kenya. Further in their study, they noted that although the overall effect of foreign direct investment inflows on economic growth is positive the volatility of FDI flows makes it harder for the stable and predictable macroeconomic policies to be followed. Thus, unstable FDI inflows dampen investment, hence affecting economic growth.
The same results were obtained by Alpaslan (2011) in Czech Republic and Hungary who found that FDI volatility has a negative and statistically significant impact on economic growth of Czech Republic and Hungary. The negative and significant coefficient obtained for the variable of FDI volatility on economic growth in Uganda clearly supports the hypothetical prediction on the relationship between the FDI volatility and economic growth generally.

Also, it is noted that, the negative effect of foreign direct investment inflows on Uganda’s economic growth is further enhanced by the inherent volatility.

4.8.4 Effects on Money Supply on Economic Growth

Money supply was significant and positively influencing economic growth in both the short run and long run. The elasticity of RGDP in relation to money supply was 0.59 and 1.59 in the short run and long run, respectively, at the 1% levels of significance for both the short run and long run.

This finding is consistent with Cambodia who found that Money supply (M1) was a positively related with RGDP growth. Manoucher and Ahmad (2011) also found that money supply is positively and significantly related to economic growth in IRAN in the short run.

4.8.5 Effect of Government Expenditure on Economic Growth

Both short and long run results show that government expenditure was significantly negative in explaining Uganda’s economic growth. The elasticity of real gross domestic product in relation to government expenditure was -0.19 in the short run and -1.6 in the long run at the 5% and 1% levels of significance in the short run and long run, respectively.
This could be because of crowding-out the private sector investment when the economy is not in a recession as explained by classical economic theory. The findings are in line with Hasnul (2015) who found a negative correlation between government expenditure and economic growth in Malaysia for the past 45 years, that is, from 1970 to 2014. Some studies have found government expenditure to positively influence economic growth contrary to our findings. Ismaila and Imoughele (2016) found a positive relationship between government spending and economic growth in Nigeria. Gisore, et.al (2014) also found government expenditure on specific sectors like health, and defense to be positive and statistically significant on economic growth in East Africa.

4.8.6 Effect of Trade Openness on Economic Growth

The short run results showed a positive impact of trade openness on Uganda’ economic growth. The elasticity of RGDP to trade openness was 0.38 in the short run and 0.34 in the long run. Trade openness was significant at the 1% and 10% in the short run and long run, respectively.

This finding is consistent with that of Osei-Yeboah (2012) study who found trade openness having a positive relationship with RGDP. This is contrary to the findings by Knight, Loayza, and Villanueva (1993) extended the Mankiw, Romer, and Weil (1992) on 98 counties also revealed that trade openness had a significantly negative relationship with economic growth in developing countries.
CHAPTER FIVE:

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents a summary of all the major findings and policy implications of the results. It has been organized into four sections: Section 5.1 is a summary, Section 5.2 covers the conclusions, Section 5.3 presents the policy recommendations while section 5.4 highlights areas for further study.

5.1 Summary

This study found that Uganda’s economic growth is positively impacted by money supply and trade openness while the variables emphasized by government interventions, that is, government expenditure, and foreign direct investment inflows negatively impact economic growth. Foreign direct investment volatility also negatively affects economic growth.

5.2 Conclusions

The results of the study showed that foreign direct investment inflows, foreign direct investment volatility and government expenditure negatively affect economic growth in Uganda. Whereas the government, through the already established statutory bodies like Uganda investment authority, Uganda exporting and promotion authority, free-zones authority, Uganda revenue authority, among others; continues to strive to put a conducive climate to attract more foreign direct investment inflows in the country, creating tax free environment for investors, reducing the cost of electricity, landing fees, to mention a few, (Budget Speech, 2017/18), these have not yet delivered in terms of growing the economy. The Government needs to evaluate and
determine why these strategies have not yielded the much needed growth and based on this evaluation, they need to revise and/or change strategies for stimulating economic growth.

Since foreign direct investment volatility negatively affects economic growth, the government needs to further evaluate why FDI inflows are volatile and devise means of ensuring stability, this if done, could possibly cause FDI to stimulate growth, thus achieving the desired results.

Whereas government expenditure is one of the prime strategies this government has employed to stimulate economic growth, it has instead deterred economic growth, since it has a negative effect both in the short run (-0.19) and long run (-1.6). Such a strategy is in line with, African development and World Bank recommendations, (World Bank, 2017, Afdb, 2018, Budget speech, 2018/19) but, it has not contributed to economic growth in Uganda. The government needs to evaluate why this strategy has not yet contributed to growth and generate a basis for change which will result into economic growth.

This study showed that Uganda, as a member of East African Markets and COMESA, has benefitted from trade openness, but to a small extent, since the elasticity is very small both in the short run (0.38) and in the long run (0.34). This effect of trade openness could further be enhanced by government through signing trade agreements to trade with bigger economies to create market for Ugandans and increase the level of exports. The government could also focus on value addition to our exports such as coffee, cotton, and the like to increase our competitiveness on the global market. The government has also diversified from the traditional export commodities such as coffee and cotton to the non-traditional commodities like tea, copper, fish and could further enhance this diversification to widen the country’s export base.
The results of the study support the World Bank strategy of gradually increasing money supply to boost economic growth (World Bank, 2015) and also is in line with monetarists who believe that expansion of the money supply will end recessions and boost growth. Money supply is still viable strategy to induce demand in the economy which should, however, be applied in moderation to avoid inflationary pressures. The elasticity of real gross domestic product to money supply was 0.59 in the short run and 1.59 in the long run, it should be implied that a one percent increase in money supply increases economic growth by 1.59% and the money supply should be increased in tandem with economic growth otherwise it could lead to reduced prices and fall of the private sector.

5.3 Recommendations

When Ugandan economic growth falls below its long-run target; policy makers can respond by increasing money supply and open the economy to stimulate economic growth. Increased money supply will increase aggregate demand and will lead to higher RGDP. Also, trade openness should be adopted as long-term strategy to boost economic growth.

It should be strongly noted that whereas FDI has remained a prime strategy for driving economic growth in Uganda, it has not yet positively impacted Uganda’s economic growth. There is need for the Government to review this strategy and put in place policies that promote local investors for example, ‘Buy Uganda Build Uganda’ is a good policy which could yield positive results if properly implemented within Uganda’s structural framework. Government should also consider finding ways of reducing operating costs mainly energy so that the local investors can remain competitive both locally and in foreign markets. In terms of FDI, some policies must be put in place to ensure that Uganda gets real value from Foreign direct investment inflows. FDI has
been found to positively impact economic growth in some counties by solving the issue of unemployment, technology transfer (including human technology) and resources. Deliberate steps should be taken to assess the impact current FDI flows and how they have benefitted the economy. For example, the government should investigate whether any jobs have been created, if any technology has been transferred and other expected results from foreign direct investment inflows investigated.

Government expenditure should cease to be a prime strategy for inducing demand in the economy since it has not contributed to economic growth. The Government has continued to invest in all sectors like transport, security, agriculture, transport network, power generation, health, education facilities, among others, as a short term and long run strategy of stimulation of growth, however, this has not contributed to economic growth. This could be due to low absorption capacity of the citizens and crowding out of private sector investment. Further research is recommended to find out why government expenditure has not contributed to economic growth.

There is also need for government to assess the economic impact that key infrastructure projects have had on the economy before embarking on more. These projects have demanded for more government borrowing since the already low savings are not sufficient to finance Uganda’s investment needs. A number of projects have been undertaken already in energy sector, transport, aviation, to mention a few; it is therefore critical for Government to re-assess the economic impact these have had before increasing the size of its budget.

Uganda has also embraced an open trade policy. This trade openness has a positive impact in the short run and in the long run. Through Uganda export promotion board, the government should
find markets for our goods and services and target to grow our market share in the world market. The government should also be keen to negotiate trade agreements with larger economies with a purpose of increasing regional and global trade opportunities. Trade openness should therefore be adopted as a long-term strategy and consequently it should be impressed upon policy makers to put in place policies to increase our export market. Government should also support to create in-roads for export markets and encourage local quality production to meet the international demand. This will increase foreign inflows as well as our balance of payment statement. This will have a multitude of benefits including local currency appreciation, it will pose Uganda as a potential partner for trade to the rest of the world, domestic industries will appear more attractive internationally, to mention just a few. The government should therefore, continue to explore more open trade opportunities and also ensure that their local firms continue to thrive even with increased competition from foreign firms.

Lastly, money supply was found to significantly and positively contribute to economic growth. This is in line with the monetarists who agree that expansionary monetary policy boosts economic growth. This should therefore form a priority focus for government to stimulate economic activity, although, it should be applied in tandem with real growth to avoid the risk of inflation.

5.4 Areas for Further Study

The limitation of this study is that it has adopted World Bank statistics on Uganda. The validity of findings and conclusions in this study therefore are limited to the extent of correctness of this data. We therefore recommend that further research can be done using data collected by Bank of Uganda and Uganda Bureau of Statistics. We also recommend further research to investigate
why FDI and government expenditure have not contributed to economic growth in Uganda. Further research is also recommended to investigate the impact of savings economic growth.
REFERENCES


United Nations (1999). *Foreign direct investment inflows and the Challenge of Development*  


Uganda: World Bank groups.


APPENDICES

Appendix I: Diagnostic tests

Table I: Breush-Pagan- Godfrey Test Results for Heteroscedasticity

| Heteroscedasticity test: Breush-Pagan-Godfrey |  |
| F-statistic | 1.9986 | Prob. F (24,63) | 0.0150 |
| Obs*R-squared | 38.0387 | Prob. Chi-Square (24) | 0.0344 |
| Scaled explained SS | 16.0425 | Prob. Chi-Square (24) | 0.8865 |

*Note: Authors’ estimates*

Table II: Ramsey Test for Omitted Variables

<table>
<thead>
<tr>
<th>t-statistic</th>
<th>Value</th>
<th>df</th>
<th>Probability</th>
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<tbody>
<tr>
<td>t-statistic</td>
<td>1.7858</td>
<td>62</td>
<td>0.0790</td>
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</table>

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>Value</th>
<th>df</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>3.1890</td>
<td>(1, 62)</td>
<td>0.0790</td>
</tr>
</tbody>
</table>

*Note: Authors’ calculations*
Figure I: Normal Distribution of Data

Series: Residuals
Sample 1994Q1 2015Q4
Observations 88

Mean -7.39e-15
Median -0.000141
Maximum 0.084245
Minimum -0.079663
Std. Dev. 0.035865
Skewness 0.091043
Kurtosis 2.645741
Jarque-Bera 0.581733
Probability 0.747616

Source: Authors estimates