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RELATIONSHIP AMONG FOREIGN DIRECT INVESTMENT, TRADE OPENNESS, GROSS CAPITAL FORMATION, REAL EFFECTIVE EXCHANGE RATE AND ECONOMIC GROWTH IN UGANDA

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Abstract: This article examines the relationship between foreign direct investment (FDI), Trade openness (TO), Real effective exchange rate (REER) , Gross capital formation (GCF) and economic growth in Uganda for the 1986 to 2023 period using the Autoregressive Distributed Lag (ARDL) approach and the Toda-Yamamoto (1995) method. The Toda-Yamamoto results show that there is unidirectional causality from Foreign Direct Investment (FDI) to Economic growth, Real effective exchange rate (REER) and unidirectional causality from REER to FDI. There is no evidence of significant causality from Trade openness, REER, and GCF to economic growth. In the short run the previous values of TO, REER affected economic growth positively while FDI affected economic growth positively but previous values of FDI significantly affected economic growth negatively. In the log run FDI, GCF positively affected economic growth. From sustainability perspective, the lack of a significant causal effect from REER, TO and GCF to economic growth suggests that Uganda's economic policy, which is based on private sector-led and TO led growth, has not significantly changed the economy to bring about significant growth-enhancing effects. This study recommends that policymakers in Uganda should identify measures that enhance trade openness (exports and imports) competitiveness alongside investment promotion that could assure diversification of the country's exports to international markets that could improve REER.

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1. INTRODUCTION

A foreign direct investment is a purchase of an asset in another country, such that it gives direct control to the purchaser over the asset. For the developing countries, investment promotion is at the core of national economic objectives, which are aimed at achieving sustainable development goals. As economies move towards a globally integrated economy, vast sums of funds associated with FDI promoting policies, mobility of financial and physical capital, and rapid diffusion of technology, are transferred across borders as argued by Shittu et al. (2020) and Mishra and Jena (2019). The acquisition of businesses by foreign entities culminates into foreign direct investment (FDI), which has become an important driver of trade activities and economic growth.

According to Sakyi and Egyir (2017) FDI flows can sometimes interact with exports and the ultimate effect resulting from the interaction of FDI and exports can be in the form of enhancements in economic growth as postulated by the Bhagwati hypothesis. Apart from improving living standards, FDI can enhance export competitiveness in host economies as local firms could acquire better production and management practices from their foreign counterparts.

Since the early 1980s, the world has witnessed a massive increase in the flow of foreign direct investment (FDI). According The International Monetary Fund (IMF) global FDI flows grew from US$50 billion in the early 1980s to USD 1.364 trillion in 2023. FDI is a composite package that includes physical capital, production techniques, managerial skills, products and services, marketing expertise, advertising and business organizational processes according to Thirlwall (1999) and Zhang (2001). It is argued that FDI has important growth effects on host economies. In theory, FDI can boost the host country's economy through capital accumulation, the introduction of new goods, and foreign technology according to the Exogenous Growth-theory view. It can also enhance the stock of knowledge in the host country by the transfer of skills, according to the endogenous growth theory as argued by Elboiashi (2011). Herzer *et al.* (2008) highlighted that FDI plays an important function in the host country's economic growth by increasing the amount of investable capital, and technological spill-over's.

If FDI increases, it also increases export activities, promotes the transfer of goods and services, or increases access to technology, increasing GDP. Besides, TFP also positively impacts economic growth because TFP reflects the efficiency of capital and human resources used in production. Several factors influence Foreign Direct Investment (FDI) in Uganda, include market size, infrastructure quality, political and economic stability, and the presence of free trade zones. Fiscal incentives, business climate, labor costs, and openness to trade also play a role.

A large domestic and regional market is a primary driver for FDI, as it provides a larger pool of potential customers. Uganda's strategic location in East Africa, coupled with its relatively stable political climate, makes it an attractive hub for investors entering the region. Infrastructure, particularly transportation infrastructure, is crucial for attracting FDI. Access to reliable and efficient infrastructure, such as roads, railways, and ports, facilitates the movement of goods and services, which is essential for businesses.

A stable political and economic environment creates a predictable and secure environment for investors to operate. Political stability reduces the risk of expropriation or nationalization of assets, while macroeconomic stability, including low inflation and sound fiscal management, enhances investor confidence. Free trade zones can offer attractive incentives, such as tax breaks and streamlined regulations, which can encourage FDI. These zones can also help to attract investors looking to export goods and services to international markets.

Strong institutions, including a transparent legal system and effective government, create a business-friendly environment. Access to skilled labor, particularly in technology-intensive sectors, can be a key factor in attracting FDI. Stable and consistent policies, as well as policies that promote FDI, can significantly impact investment decisions. The wholesale trade, communication, and financial sectors have historically been major recipients of FDI in Uganda.

Technological advancements and the introduction of new management techniques can also attract FDI. Despite the potential for FDI, challenges such as inadequate infrastructure, particularly transportation bottlenecks, can hinder investment. Inconsistent application of regulations and potential regulatory delays can create uncertainty and deter investors. A shortage of skilled labor in specific sectors can also pose a challenge. By addressing these

challenges and strengthening the factors that drive FDI, Uganda can further enhance its attractiveness as an investment destination and harness the positive impact of FDI on its economic growth.

Since 1986, Foreign Direct Investment (FDI) has played a crucial role in Uganda's economic growth, particularly after the National Resistance Movement (NRM) government implemented policy reforms. Studies show a positive relationship between FDI inflows and economic growth, with FDI contributing to GDP growth directly and indirectly through domestic investment and export-led growth. However, FDI inflows have also had a fluctuating pattern since 2007 the highest peak of 6.7 percent it has ever reached.

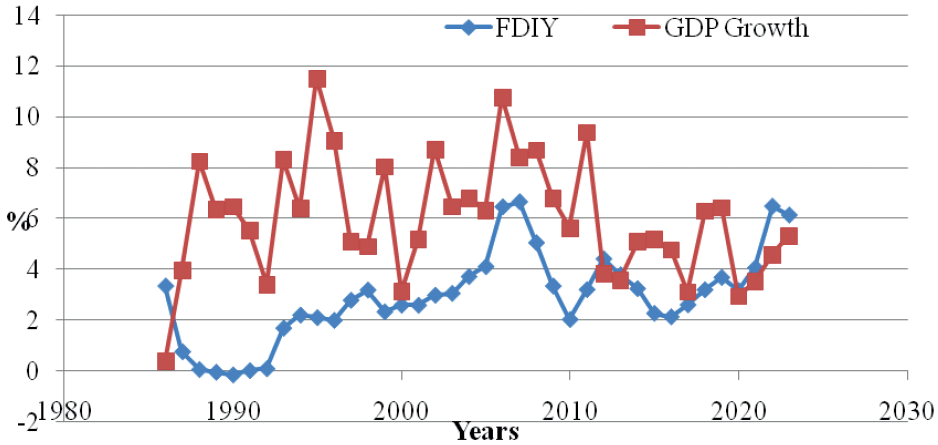

Figure 1.1: Foreign Direct Investment (FDIY) and Growth rates 1986 - 2023

FDI has been identified as a key driver of economic growth in Uganda by National Development Plan III. According to Nyiramahoro et. al. (2025) FDI can stimulate economic growth through direct transmissions to GDP, and indirectly by boosting domestic investment and export-led growth. Macroeconomic stability and proper policies are also important in attracting FDI. Gross domestic product growth and gross capital formation have a positive and significant impact on FDI. Trade openness also positively influences FDI, particularly in the short run. Higher GDP levels can indicate a more robust economy with greater stability and higher investment potential. Similarly, GCF, which represents the amount of new investment in an economy, can signal that an economy is actively growing and developing, further incentivizing FDI

However, private investment can have a negative impact on FDI as argued by Encinas-Ferrer and Villegas-Zermeño (2015).

Uganda has implemented a number of policy reforms on FDI Inflows, that include stabilization and structural adjustment policies that have led to a surge in FDI inflows since 1992 as indicated in figure 1.1. Uganda has implemented economic liberalization programs as indicated in the NDP I, II, and III, Vision 2040 and Presidential Initiatives, which have improved investor confidence. While FDI is beneficial, over-reliance on FDI and a large foreign asset base can put negative pressure on resources and institutions, potentially leading to negative externalities like unemployment and income inequality. Uganda has attracted significant foreign investment in various sectors, including the construction and real estate sector, manufacturing, tourism, and telecommunications. The Uganda government can enhance the policy and institutional environment to attract more FDI and translate the potential into inclusive economic growth.

1.2. Problem Statement

Despite the increasing importance of Foreign Direct Investment (FDI) as a driver of economic growth in developing economies, the precise impact of FDI on economic growth remains a subject of debate. While some argue that FDI inflows stimulate economic growth by enhancing productivity, technology transfer, and capital accumulation, others contend that the benefits of FDI may be unevenly distributed, leading to potential adverse effects like crowding out domestic investment or making worse income inequality. In addition, the effectiveness of FDI in promoting economic growth may vary depending on factors like the trade openness, gross capital formation, real interest rate, the absorptive capacity of the host economy, and the sectoral composition of FDI inflows. Therefore, there is a need for empirical research to provide insights into the relationship between FDI, GCF, REER, trade openness and economic growth in Uganda, taking into account the heterogeneity of FDI effects across different contexts and time periods.

1.3. Objective

The overall objective of the study is to find out how variables like FDI, GCF, Trade openness and Real Effective Exchange rate affect economic growth of Uganda, while the specific objectives are:

1. To investigate the short-run and long-run relationship between FDI, GCF, Trade openness and Real Effective Exchange rate and economic growth in Uganda
2. To find out the causality and direction of causality between FDI, GCF, Trade openness and Real Effective Exchange rate and economic growth in Uganda

1.4. Organization of the study

The study is organized as follows. *Section 1* briefly gives the introduction of the study including statement of the problem and objectives; *Section-2 briefly* gives theoretical framework and reviews the existing literature on this study. *Section-3* describes the data and methodology of the study. *Section-4* reports and discusses the empirical results. *Section-5* shows the conclusion and recommendations of this study. Finally section 6 provides the references of the study.

2. THE THEORETICAL MODELS AND LITERATURE REVIEW

The theoretical framework suggests a strong relationship between FDI, REER, trade openness, GCF, and economic growth. FDI and trade openness can drive economic growth by increasing productivity, fostering technological advancements, and promoting specialization. REER fluctuations can affect the competitiveness of exports and the profitability of investment decisions, while GCF is a crucial driver of economic growth through increased production capacity and technological improvements.

2.1. Foreign Direct Investment, Gross Capital Formation, Trade Openness, Rear Effective Exchange Rate and Economic Growth

Exogenous Growth Model suggests that economic growth is driven by external factors like technological progress and capital accumulation, with FDI playing a key role in capital accumulation. Endogenous Growth Model emphasizes the importance of knowledge and skills in driving economic growth, with FDI playing a significant role in transferring skills and knowledge to the host country. There is also the diverse Theory of FDI (Dunning) which integrates industrial organization theory, internalization theory, and location theory to explain why firms choose to invest in foreign countries.

The nexus between Foreign Direct Investment (FDI), Real Effective Exchange Rate (REER), Trade Openness, Gross Capital Formation (GCF),

and Economic Growth is a multifaceted relationship rooted in various economic theories. FDI and trade openness can boost economic growth by increasing productivity and fostering technological advancements, while REER fluctuations and GCF can impact the effectiveness of these factors.

FDI is theorized to enhance economic growth through capital accumulation. FDI can provide a crucial source of capital for host countries, leading to increased investment and productivity. FDI can bring in new technologies and managerial practices, improving the efficiency of industries and leading to higher productivity. In addition, FDI can facilitate the transfer of skills and knowledge, leading to a more skilled workforce and potentially higher wages, it can also lead to increased productivity through the introduction of new production techniques and the optimization of existing resources.

The exogenous-growth theory, usually referred to as the neo-classical growth model or the Solow-Swan growth model, was pioneered by Solow (1956 and 1957). The theory assumes that economic growth is generated through the accumulation of exogenous factors of production that include stock of capital and labor. Empirical studies on economic growth using the exogenous model employ the production function. It has been shown that through this framework, capital accumulation contributes directly to economic growth in proportion to capital's share of the national output. The growth of the economy depends on the augmentation of the labor force and technological progress. According to this theory, FDI increases the capital stock in the host country and this in turn, affect economic growth.

De Jager (2004) explains that if FDI introduces new technology, which leads to increased labor and capital productivity, this would then lead further to more consistent returns on investment, and labor would grow exogenously. Elboiashi (2011) demonstrated that there is a positive relationship between capital accumulation and output and Herzer, et al. (2008) established that FDI stimulates economic growth by augmenting domestic investment. Through the exogenous or neo-classical growth model, it has been shown that FDI can impact economic growth directly through capital accumulation and the inclusion of new inputs and foreign technologies in the production function of the host country.

Neoclassical economists like Robert Solow and Trevor Swan argue that FDI can positively influence economic growth by facilitating the transfer of

technology, knowledge, and managerial expertise to developing countries. According to this theory, FDI enhances productivity and stimulates economic growth by augmenting the stock of physical and human capital in host countries as demonstrated by Alfaro et al. (2019). Neoclassical growth theory is pertinent to the research as it provides a framework for understanding the mechanisms through which FDI can contribute to economic development in developing economies.

REER, which measures the relative price of a country's currency against a basket of other currencies, can influence economic growth. A weaker REER (depreciation) can make a country's exports more competitive and attract foreign investment, while a stronger REER (appreciation) can make exports less competitive. While a stronger REER can make imports cheaper, potentially lowering production costs for domestic firms and increasing consumer purchasing power. REER fluctuations can affect the profitability of FDI and other investment decisions, potentially impacting overall economic growth. Trade openness, measured by the level of trade liberalization and the proportion of exports in GDP, is theorized to promote economic growth. Trade can increase competition, leading to greater efficiency and lower prices for consumers. Trade allows businesses to access larger markets and increase sales, leading to economic growth. Trade allows countries to specialize in the production of goods and services where they have a comparative advantage, leading to higher productivity and efficiency.

Gross Capital Formation (GCF) and Economic Growth), which represents the total investment in fixed assets and inventories, is a key driver of economic growth. Investment in fixed assets like buildings and machinery expands the capacity of businesses to produce goods and services. New technology and equipment can improve the productivity of existing labor and capital. Investment can create new jobs and increase employment levels.

These factors are interconnected. FDI can drive GCF, especially in sectors with high returns and potential for export growth. Trade openness can facilitate FDI inflows and make REER fluctuations less significant. Unlike neoclassical growth models, which assume technological progress to be exogenous, the endogenous growth theory hypothesizes that economic growth is driven by two main factors: the stock of human capital and technological changes according to Romer (1994). Nair-Reichert and Weinhold (2001) argue that

the new endogenous growth models take into account long-run growth as a function of technological progress and they offer a framework in which FDI can perpetually increase the rate of economic growth in the host country through technology transfer, diffusion and spill-over effects. Although both the exogenous and endogenous growth theories argue that capital accumulation or formation is an important determinant of economic growth, they differ in their treatment of technological progress.

The exogenous growth model treats technological progress as exogenous to the model and the latter argues that technological progress is improved endogenously by the increase in knowledge and innovation according to Borensztein et al., (1998). lboiashi (2011) and Al Nasser, 2010). FDI by multinational corporations (MNCs) is assumed to bring research and development (R&D), in addition to human capital accumulation, which creates positive or negative externalities (growth spill-overs), which would affect the host country's firms and the economy. These growth factors, or FDI spill-over's, are assumed to arise from tangible capital, human capital, or Research and Development expenditures.

The two growth theories by the FDI-economic growth nexus illustrated above reveal that FDI can contribute to economic growth through both direct impact and indirect impact. In theory, FDI can boost the host country's economy through capital accumulation, the introduction of new goods and foreign technology according to the exogenous-growth theory view, and also by enhancing the stock of knowledge in the host country by way of the transfer of skills according to the endogenous growth theory. The OECD (2002) emphasizes that FDI represents a potential source for sustainable growth and development, given its assumed ability to: Generate technology spill-over's; (ii) assist in the formation of human capital and development (iii) help the host to integrate into global economic trade integration; and (iv) assist in the creation of a more competitive business environment and enhance enterprise development.

2.2. Dependency Theory

Originated by scholars such as Prebisch Raul and Andre Gunder Frank, Dependency Theory posits that developing economies are inherently disadvantaged within the global economic system due to their reliance on

more developed nations for investment and technology. However, their work on trade, dependency theory, and import-substitution industrialization had a profound impact on the understanding and management of FDI in developing countries. It influenced policies related to attracting and regulating FDI, as well as the overall approach to economic development in the post-war period. According to this theory, FDI can exacerbate economic inequalities by reinforcing the dependency of developing countries on foreign capital and expertise, thereby hindering their long-term economic growth as pointed out by Amin et. al. (2022). Dependency theory is relevant to the study as it offers a critical perspective on the potential negative impacts of FDI on economic development in developing economies. They argued that Foreign Direct Investment (FDI) can exacerbate economic inequality and "development of underdevelopment" in developing nations rather than fostering growth. He posited that these countries are inherently disadvantaged within the global system, relying on advanced nations for investment and technology, which can lead to further dependence and control.

2.3. Institutional Theory

This theory developed by scholars like Douglass (1991) and Mongong at. el. (2021), it emphasizes the role of formal and informal institutions in shaping economic outcomes. Institutions such as property rights, rule of law, and regulatory frameworks influence the impact of FDI on economic growth by providing a conducive environment for investment and entrepreneurship as argued by Haini et al., (2024). Institutional theory is significant for the study as it highlights the importance of institutional quality in mediating the relationship between FDI and economic growth in developing economies.

2.4. Literature Review

Numerous researches have attempted to establish the link between FDI and macroeconomic performances including GDP, however, the results are rather mixed. Many papers have mentioned that FDI influence growth in various ways, others have portrayed the negative influence of FDI to economic growth and others showed insignificant results. Balasubramanyam, Salisu and Sapsford (1996) argued that FDI can speed up growth of the receiving countries through improving foreign trade and ensuring stability of macroeconomic variables.

Further, they concluded that FDI inflows can effectively boost economic growth than local investments in developing economies which implement export promotion policies. For nations with high institutional competence, FDI has a significant beneficial influence on their growth.

Nyiramahoro et. al. (2025) study on Uganda's macroeconomic dynamics, the objective of studying relationships among GDP growth, Gross Capital Formation (GCF), population growth, and net inflows of Foreign Direct Investment (FDI) by applying the endogenous growth theory. The study follows a quantitative approach by adopting a descriptive and econometric design to investigate the relationship among the aforementioned variables. The methodological tools were Descriptive statistics, stationarity tests, multicollinearity testing, cointegration testing, and ARDL model estimation. They found out that relative stability in GDP growth to the highly volatile GCF growth and smooth population growth trends to negative net inflows indicated by FDI. This confirms the long-run cointegration between the variables, whereby GCF proves to be firmly and positively related to GDP through an ARDL model. In contrast, variables FDI and population growth become influential after due lags. The results show that Uganda needs domestic and foreign investment to maintain economic growth; however, it has to deal with disinvestment challenges and an increasing population for long-term stability. They found out that capital formation and foreign investment are integral to the Ugandan economy and can, if managed appropriately, ensure continued growth by overcoming these challenges in demography and investment.

Makhetha and Rantaoleng (2017) examined the long-run relationship among FDI, trade openness and growth in Lesotho for the period 1980-2011. The results show a long-run relationship between output, FDI and trade openness. The VAR Granger causality shows a unidirectional causal relationship running from trade openness, FDI to output and from output, FDI to trade openness. FDI was found to be insignificant in explaining growth of output in both the long and short run. Trade openness was found to be significant with a negative impact on output growth in the long run but was found to be insignificant in the short run.

Encinas-Ferrer and Villegas-Zermeño (2015) said that it has been assumed that foreign direct investment (FDI) is an important factor of economic growth (EG). The reason for this is that as investment is the dynamic element of gross

domestic product (GDP), therefore, FDI is the independent variable and GDP growth the dependent. Recent studies in Argentina and Mexico have shown by the contrary that the consistent increase of GDP is the attractor of FDI. In our investigation we include other countries: China, Brazil, South Korea and Peru beside Mexico and the results are consistent with the prior studies and were proved empirically by testing causality in the Granger sense, adjusted by Toda and Yamamoto's method using the software e-views. We found that FDI, as a percentage of total gross fixed capital formation (GFCF), is so small that it has only a marginal influence in economic growth. In this paper we show only the econometric results for China.

Makiela and Ouattara (2018) studied the impact of foreign direct investment (FDI) on growth remains a thorny question for researchers and policy makers. At the theoretical level it has been argued that FDI is growth enhancing. However, existing empirical studies have left researchers and policy makers perplexed as these studies do not appear to find a strong relationship between the two variables. Their paper departs from the existing literature by exploring the transmission channels from FDI to growth. The results, based on a sample of developed and developing countries over the period 1970–2007, conclusively reveal that FDI affects growth via inputs accumulation but not the total factor productivity growth channel. In other words, our results suggest that factors other than FDI may have contributed to the increase in productivity witnessed in developing countries in recent decades.

Shittu et. al. (2020) studied the impacts of foreign direct investment (FDI), globalisation and political governance on economic growth in West Africa. The empirical analysis also included the interaction effect of political governance and FDI on the growth of the sub-region, over the period of 1996–2016. The study employs the autoregressive distributed lag technique on data obtained from the World Bank and the KOF institute. The study findings suggest a positive relationship between globalization and political governance on economic growth. Even though there have been inconclusive results on the FDI–growth nexus, the authors found that FDI stimulates the growth of the sub-region, while political governance enhances the positive impact of FDI on economic growth. The other factors of growth included are labor, capital and government size, whose effects on growth are, respectively, negative, negative and positive.

The governments of the West African countries promote policies that attract FDI into the sub-region, so that economic performances may be enhanced. In addition, the governments of the West African sub-region should work to reap the benefits of globalization, by promoting the competitiveness of their local economies in order to keep pace with the global markets. The political-governance infrastructures should be overhauled; the culture of accountability and transparency should be promoted, while all efforts should be made to improve stability in the political environment in order to increase investors' confidence in the West African economy. The study is the first to single out the impacts of political governance, as categorized by the World Bank, through both direct and interactive measures.

Husain (2024) studied the Impact of Foreign Direct Investment (FDI) on Economic Growth in Congo. This study adopted secondary data collection and found out that Foreign Direct Investment (FDI) has been widely studied FDI inflows can stimulate economic growth by providing access to capital, technology, and managerial expertise, which may enhance productivity and efficiency in the host country's industries. Additionally, FDI often fosters job creation and facilitates knowledge transfer, contributing to human capital development and skill enhancement within the workforce and promote competition and innovation, driving overall economic dynamism. He found out that relationship between FDI and economic growth is contingent upon various factors such as the quality of institutions, regulatory environment, infrastructure, and host country policies. Weak institutional frameworks or inadequate infrastructure may hinder the full realization of FDI benefits. There are concerns about the potential for FDI to exacerbate income inequality and exploit natural resources, especially in developing countries. Thus, while FDI generally presents opportunities for economic growth, its impact is multifaceted and context-dependent, requiring careful consideration of host country conditions and policy frameworks.

Sharifi and Mirfatah (2012) studied the flows of foreign investment and sais that FDI are the fundamental elements in the economical evolution of countries within the globalization process of economy. They mentioned that previous research on exchange rate shows its significance as a key role in trades and flows of FDI. Although exchange rate and FDI are empirically investigated but the relationship between the volatility of exchange rate and

flows of international investments is generally not identified. Therefore, considering the importance of the subject discussed, it is needed to consider the determinants of FDI specially the volatility of exchange rate and provide better situations for attracting FDI in Iran. The main goal of this study is evaluating the determinants of inward FDI particularly volatility of exchange rate in Iran by using the Johansen and Juselius's cointegration system approach model covering the period 1980Q2-2006Q3.

The findings of this study reveal that gross domestic product, openness and exchange rate to have positive relationship with foreign direct investment but, world crude oil prices and volatility of exchange rate have negative relationship with foreign direct investment. The empirical results obtained in this paper recommend the economy Politicians in Iran to implement exchange rate policies that promote stability of exchange rate, which could help reduce exchange rate volatility in order to attract more FDI.

Alfaro et. al. (2019) estimated the effects of foreign multinational corporations (MNCs) on workers. They combined micro data on all worker-firm and firm-firm relationships in Costa Rica with an instrumental variable strategy that exploits shocks to the size of MNCs in the country. First, using a within-worker event-study design, they find a direct MNC wage premium of nine percent. Next, they study the indirect effects of MNCs on workers in domestic firms. As MNCs bring jobs that pay a premium, they can improve the outside options of workers by altering both the level and composition of labor demand. MNCs can also enhance the performance of domestic employers through firm-level input-output linkages.

Shocks to firm performance may then pass through to wages. We show that the growth rate of annual earnings of a worker experiencing a one standard deviation increase in either her labor market or firm-level exposure to MNCs is one percentage point higher than that of an identical worker with no change in either MNC exposure. Finally, we develop a model to rationalize the reduced-form evidence and estimate structural parameters that govern wage setting in domestic firms. We model MNCs as paying a wage premium and buying inputs from domestic firms. To hire new workers, domestic firms need to incur recruitment and training costs. Model-based estimates reveal that workers in domestic firms are sensitive to improvements in outside options. Moreover, the marginal recruitment and training cost of the average domestic firm is

estimated at 90% of the annual earnings of a worker earning the competitive market wage. This high cost allows incumbent workers to extract part of the increase in firm rents coming from intensified linkages with MNCs.

Sadik and Bolbol (2001) argued that FDI inflows had affected positively the GDP growth and local investment in six Arab countries from 1978 to 1998. Moreover, Bengoa (2003) found a positive association among FDI and GDP in 18 economies of South America. Sokang (2018) found out that foreign direct investment had a favorable effect on growth in Cambodia's economy by examining data from 2006 to 2016. Furthermore, Akiri, Vehe and Ijuo (2016) used VECM and determined positive impact of inward FDI to Nigeria's GDP growth during from 1981 to 2014.

Lajevardi and Chowdhury (2024) investigated the relationship between the real effective exchange rate (REER) and its volatility with the net inflow of foreign direct investment (FDI) to Canada, placing a novel emphasis on sector-level analysis. The study utilizes time series data from 2007 to 2022 and employs the autoregressive distributed lag (ARDL) approach to assess short-run and long-run relationships between the said variables. The findings reveal significant impacts of changes in REER, its volatility, and GDP on net FDI in the short run, with lasting effects of REER and its volatility, lagged GDP, and trade openness on FDI in the long run. At the sectoral level, FDI inflows in energy and mining, manufacturing, finance, and insurance exhibit significant sensitivity to changes in REER. Simultaneously, the volatility of REER has a significant impact on FDI inflows in manufacturing industries and the finance and insurance sector in the short run. In the long run, REER exerts a significant influence on the net FDI inflows in energy and mining, as well as manufacturing industries. The asymmetry in findings suggests a need for sector-specific attention to retaining and attracting FDI to Canada.

Mishra and Jena (2019) examined the determinants of foreign direct investment (FDI) flows from some leading developed countries (the USA, Japan, Germany, the Netherlands, the UK and France) into major four Asian economies (China, Korea, India and Singapore). Using one basic and four augmented versions of gravity model technique, the authors tried to examine the determinants of bilateral FDI flows in four major Asian economies. The study used World Development Indicators, CEPII, KOF and Heritage Foundation data for period 2001–2012. Findings The results revealed that

besides the market size for host and source country, other criteria such as distance, common language and common border also influence foreign investors. Other macroeconomic factors such as inflation rate and real interest rate are among the key factors that attract more FDI. In addition to economic factors, institutional and infrastructural factors such as telecommunication, degree of openness, index of globalization and index of economic freedom also stimulate the international investors from the developed world to the major Asian countries. It is altogether possible that only a set of home country specific characteristics or host country specific characteristics does not matter when determining FDI. Most empirical studies using indices such as the index of globalisation and economic freedom are subject to certain methodological limitations such as model selection, parameter heterogeneity, outliers and moral hazard. More distance between the host and source country would result in less FDI flows due to more managerial and raw material supply chain cost.

Su and Liu (2016) using a panel of Chinese cities over the period 1991–2010, they examined the determinants of economic growth, focusing on the role of foreign direct investment (FDI) and human capital. Consistent with the predictions of a human capital-augmented Solow model, they found that the growth rate (along the path to the steady-state income level) of per capita GDP is negatively correlated with population growth rate and positively correlated with investment rate in physical capital and human capital. They established that FDI has a positive effect on the per capita GDP growth rate and this effect is intensified by the human capital endowment of the city. They latter suggests that one way that human capital contributes to growth is to serve as a facilitator for technology transfers stemming from FDI. They also established that some suggestive evidence that the FDI-human capital complementary effect is stronger for technology-intensive FDI than for labor-intensive FDI.

Trang et. al. (2019), their paper examines and provides additional and relevant quantitative evidence on the impact of foreign direct investment (FDI) on economic growth, both in the short run and the long run in developing countries of the lower-middle-income group in 2000–2014. Various econometric methods are employed such as the panel-based unit root test, Johansen cointegration test, Vector Error Correction Model (VECM), and Fully Modified OLS (FMOLS) to ensure the robustness of the findings.

The results of this study show that FDI helps stimulate economic growth in the long run, although it has a negative impact in the short run for the countries in this study. Other macroeconomic factors also play an important role in explaining economic growth in these countries. Money supply has a positive effect on growth in the short run while total credit for private sector has a negative effect. In addition, long-run economic growth is driven by money supply, human capital, total domestic investment, and domestic credit for the private sector. Based on these results, recommendations for the governments of these countries have been developed.

Blomström and Kokko (2018) embarked on a cross-country empirical analysis with the overarching objective of unraveling the intricate relationship between FDI and economic growth across various developing economies. The study sought to delineate the diverse channels through which FDI exerts its influence on economic growth while discerning the heterogeneity of its effects across different nations. Methodologically, the researchers undertook a rigorous regression analysis leveraging data spanning several decades from numerous countries to construct a comprehensive understanding of this complex relationship. The findings of the study revealed a nuanced picture, indicating that the impact of FDI on economic growth is contingent upon a myriad of factors, including institutional quality and human capital. The study underscored the imperative of enhancing institutional capacity and investing in education and training to maximize the developmental dividends of FDI. Moreover, the study provided valuable insights for policymakers, emphasizing the need for tailored strategies to harness the potential benefits of FDI while mitigating associated risks effectively.

Sakyi and Egyir (2017) said the Bhagwati hypothesis predicts a growth enhancing effects of trade (exports) and foreign direct investment (FDI) interaction. They tested the validity of the Bhagwati hypothesis by investigating the extent to which the interaction of trade (exports) and FDI has had an impact on economic growth for a sample of 45 African countries over the period 1990–2014. To do so, they estimate an augmented endogenous growth model with the aid of a dynamic system generalized method of moment (GMM) estimation technique, which adequately cope with potential endogeneity issues. The findings reveal support for the Bhagwati hypothesis and provide vital information for policy formulation aimed at promoting more credible

export-promotion strategies and channeling of FDI into export-oriented sectors in long-term development strategies in African countries.

De Castro et. al (2013) analyzed the foreign direct investment determinants in Brazil and Mexico during the period 1990 to 2010, in order to identify common and divergent characteristics that affect FDI's attraction. For this purpose, it was constructed an analytical model estimated using the Vector Error Correction Model (VEC). From the results, it was noted that in Brazil the main multinationals' strategy is the market seeking - linked to the size of the domestic market-, and, in Mexico, the dominant strategy seems to be efficiency seeking, related to the importance of trade liberalization and the historical flows to attract FDI.

Kyereboah-Coleman and Kwame (2008) study aimed at using a broader data set and longer time frame coupled with a relatively rigorous and robust methodology to examine the effect of real exchange rate volatility on foreign direct investment (FDI) in a small and developing country such as Ghana. Design/methodology/approach - Time series data covering the period 1970-2002 were used. ARCH and GARCH models were employed for the determination of real exchange rate volatility, and co-integration and ECM were used to determine both the short- and the long-term relationships. Findings - The study showed that the volatility of the real exchange rate has a negative influence on FDI inflow and that the liberalization process has not led to a greater inflow of FDI in Ghana. It is also revealed that while both the stock of FDI and political factors are likely to attract FDI, most foreign investors do not consider the size of the market in making a decision to invest or otherwise in Ghana.

El-Rasheed and Abdullahi (2022) examined the relationship between foreign direct investment (FDI) and economic growth in Nigeria. The study investigated the relationship between economic growth (GDP), foreign direct investment (FDI), gross fixed capital formation (K), total labour force (L) and, exchange rate (RER). The study employs annual time series data covering 1990 up to 2020. Utilizing the auto-regressive distributed lag (ARDL) model, the existence of long-run relationship between the independent and dependent variables was found. Additionally, we conducted the granger causality test to determine the direction of causality. The ARDL bounds testing result shows that labor has a long-term negative impact on economic growth, with foreign

direct investment, exchange rates, and capital having a positive influence. The empirical findings from a pair-wise Granger-causality model showed the existence of a bidirectional relationship between FDI and economic growth. Based on our findings, we further suggest that the government should pursue a strategy to attract FDI by enhancing Nigeria's business climate, environment, and infrastructure. To increase investor trust, the government should continue to execute sensible policies through the central bank with a goal of achieving stable exchange rates. Additionally, through enhanced educational policy, the government should aim to improve human capital and skilled workforce in the nation.

Alfaro et. al. (2017) delved into the realm of Latin American economies with the aim of unraveling the intricate nexus between FDI, productivity, and economic growth. The study embarked on an empirical journey to elucidate how FDI inflows shape productivity levels and, by extension, contribute to sustained economic growth in the region. Methodologically, the researchers undertook a meticulous analysis, leveraging firm-level data and employing sophisticated econometric techniques to disentangle the complex dynamics at play. The findings of the study unveiled compelling evidence of the positive impact of FDI on productivity growth, thereby bolstering economic expansion. By elucidating the mechanisms through which FDI fosters technological spillovers and enhances productivity, the study offered valuable insights for policymakers. Recommendations included fostering an enabling environment for innovation and knowledge transfer to fully harness the transformative potential of FDI for sustainable economic development in Latin America.

Asiedu (2019) embarked on an empirical investigation focusing on Sub-Saharan African economies to discern the impact of FDI on economic growth in the region. The study sought to assess whether FDI inflows stimulate economic growth or impede domestic investment and growth dynamics. Methodologically, the research adopted a dynamic panel data analysis approach, enabling a nuanced exploration of the long-term relationship between FDI and economic growth. The findings of the study yielded mixed results, underscoring the heterogeneous nature of FDI's impact across different countries. While some nations reaped significant benefits from FDI inflows, others experienced limited or adverse effects on economic growth. In light of these findings, the study advocated for tailored policy interventions aimed at

bolstering absorptive capacity and enhancing infrastructure to maximize the developmental dividends of FDI across Sub-Saharan Africa.

Batten and Vinh Vo (2009) using panel data for 79 countries, for the period of 1980-2003, suggest, that the "analysis supports the view that FDI has a stronger positive impact on economic growth in countries with a higher level of education attainment, openness to international trade and stock market development, and a lower rate of population growth and lower level of risk. Also studies in the East Asian economies, aiming to unravel the intricate interplay between FDI, financial development, and economic growth. The study sought to analyze how financial sector development moderates the impact of FDI on economic growth dynamics. Methodologically, the researchers employed panel data analysis and interaction models to discern the nuanced relationships among FDI, financial development indicators, and GDP growth rates. The findings of the study underscored the pivotal role of a well-developed financial sector in amplifying the positive effects of FDI on economic growth. Against this backdrop, the study advocated for strategic interventions aimed at enhancing financial infrastructure and regulatory frameworks to attract more FDI and catalyze sustainable economic growth across East Asian economies.

Sharma and Mavalankar (2017) embarked on a comprehensive empirical inquiry focusing on the Indian economy, seeking to assess the multifaceted impact of FDI inflows on economic growth and industrial development. The study aimed to unravel the sectoral distribution of FDI and its implications for economic growth dynamics and structural transformation in India. Methodologically, the researchers adopted a holistic approach, combining qualitative and quantitative analysis, including case studies and econometric techniques. The findings of the study unveiled compelling evidence of the positive contribution of FDI inflows to economic growth, particularly in sectors such as manufacturing and services. In light of these findings, the study underscored the imperative of promoting policies conducive to attracting FDI inflows into priority sectors and regions, thereby fostering inclusive growth and industrial diversification in India.

Durusu-Ciftci and Goktas (2016) embarked on an empirical exploration focusing on the Turkish economy, aiming to analyze the impact of FDI on economic growth dynamics and employment patterns. The study sought to assess whether FDI inflows have led to job creation and sustainable economic

development in Turkey. Methodologically, the research leveraged time-series data and cointegration techniques to unravel the long-term relationship between FDI, GDP growth, and employment levels. The findings of the study underscored the positive influence of FDI inflows on economic growth and their significant contribution to employment generation in Turkey. Against this backdrop, the study advocated for strategic policy reforms aimed at enhancing the investment climate and promoting technology transfer to maximize the employment effects of FDI, thereby fostering sustainable economic development in Turkey.

Kumari and Kumar (2017) identified key determinants of foreign direct investment (FDI) inflows in developing countries by using unbalanced panel data set pertaining to the years 1990-2012. This study considers 20 developing countries from the whole of South, East and South-East Asia. Using seven explanatory variables (market size, trade openness, infrastructure, inflation, interest rate, research and development and human capital), they tried to find the best fit model from the two models considered (fixed effect model and random effect model) with the help of Hausman test they found out fixed effect estimation indicated that market size, trade openness, interest rate and human capital yield significant coefficients in relation to FDI inflow for the panel of developing countries under study. The findings reveal that market size is the most significant determinant of FDI inflow.

Their work also had some limitations like lack of data on key determinants such as labor cost, exchange rate, corruption, natural resources, effectiveness of rule of law and political risk may be considered one such limitation. The study has significant implications for policy makers, mangers and investors. Policy makers would be able to understand the importance of the major determinants of FDI mentioned in the paper, and take steps to formulate policies that encourage FDI. Such measures could include developing market size, making regulations more international trade friendly and investing in the nation's human capital.

Adam (2022) examined the nexus between foreign direct investment (FDI), financial development, and sustainable economic growth in Sudan during the period of the structural adjustment program and the full Islamization of the banking and financial system that took place in the 1980s. The research provides a comprehensive analysis using the most recent time series secondary

data from 1990 to 2020 and the study employed co-integration, Granger causality, and VAR error correction technique to estimate the models, to clarify the claimed relationship between FDI and its effect on the financial sector and subsequently attending a sustainable economic development in Sudan. The results of the ARDL bounds showed the existence of a long-term relationship between the FDI and other independent variables but the short-term showed otherwise. The Granger causality test implies that the past values of FDI don't significantly contribute to the prediction of sustainable economic growth. Also, results show that there's evidence of observed causality running from the country's trade openness and the financial sector's development. The implication of these results shows there is a complementary relationship between sustainable economic growth and both financial development and trade openness in the short run. Also the study shows that the effect of financial development on economic growth is further enhanced by the inflows of FDI.

Sharma et. al. (2024) attempted to evaluate the attractiveness of FDI in India in other words, the potential of India to attract foreign direct investment. Secondly, the study investigates the role of FDI potential in the real FDI inflow in the country. The paper constructs a comprehensive index for the attractiveness of foreign direct investment for India, which reflects the preparedness or potential of the country to provide a enabling environment for foreign investments. The study adopts principal component analysis (PCA) to formulate an index that reflects socioeconomic, political, and environmental aspects of FDI. Appropriate indicators are used to reflect all the dimensions, such as social, political, environmental, economic, infrastructure, and human capital. By regressing the FDI potential index on the interest rate, final consumption, public–private partnership, and potential for FDI on actual FDI inflow, the role of FDI potential is highlighted. It is revealed that FDI potential and FDI inflows are significantly positively correlated as well as significantly positively determine the FDI inflows as revealed by the regression results. Therefore, infrastructure, socioeconomic factors, and human capital also ensure political stability and governance are favorable in promoting more FDI inflow. In addition, the policies favoring public–private partnership and supporting all dimensions of FDI potential index must be promoted.

According to Alba et. al. (2009) Foreign exchange rates can both facilitate and potentially hinder Foreign Direct Investment (FDI) and economic

growth. A currency depreciation (making the host country's currency cheaper) can attract FDI by lowering the cost of domestic assets for foreign investors. Conversely, exchange rate fluctuations and uncertainty can make investment decisions more complex and potentially deter FDI. When a host country's currency depreciates, the cost of its assets becomes cheaper for foreign investors, making them more attractive. This can increase the flow of FDI into the country. Depreciation can also increase the relative wealth of potential foreign investors, making them more willing to make large investments. A weaker currency can make a country's exports cheaper and imports more expensive, boosting export-oriented industries and potentially leading to increased economic growth.

A depreciation of the host currency can increase the attractiveness of acquiring a foreign company. Fluctuations in exchange rates can make it difficult for foreign investors to accurately predict their returns and can lead to increased risk. Unpredictable exchange rates can also make it more difficult for companies to assess their risk and can lead to reluctance to invest. While depreciation can boost exports, it can also make imports more expensive, potentially leading to higher prices for consumers and businesses, which may impact economic growth negatively. If a country's currency depreciates significantly, it can lead to higher import costs and inflationary pressures, which can impact economic stability and investment. Therefore, foreign exchange rates play a crucial role in influencing FDI and economic growth. While depreciation can offer significant benefits in attracting investment and boosting exports, the potential risks of exchange rate volatility and inflationary pressures must also be considered. By increasing the relative wealth of foreign firms, a change in the exchange rate can make it relatively easier for those firms to use internal financing, thereby lowering the relative cost of investing.

Weinhold and Reichert (2001) found out remarkable increase in FDI flows to developing countries over the last decade and focused attention on whether this source of financing enhances overall economic growth. They used a mixed fixed and random (MFR) panel data estimation method to allow for cross country heterogeneity in the causal relationship between FDI and growth and contrast our findings with those from traditional approaches. We find that the relationship between investment, both foreign and domestic, and economic growth in developing countries is highly heterogeneous and that estimation

methods which assume homogeneity across countries can yield misleading results. Our results suggest there is some evidence that the efficacy of FDI in raising future growth rates, although heterogeneous across countries, is higher in more open economies. Copyright 2001 by Blackwell Publishing Ltd

3. METHODOLOGY AND DATA

The study uses Augmented Dickey-Fuller (ADF) test and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests to determine the causal relationship between FDI, trade openness, Gross capital formation, real effectiveness exchange rate and economic growth in Uganda. To examine the stationarity properties of all the time series variables, the ADF test is used with the null hypothesis of non-stationarity against the alternative of stationarity in the time series under investigation. In contrast, the KPSS test examines the null hypothesis of stationarity against the alternative of non-stationarity in the time series. In order to investigate the short-run and long-run relationship between economic growth and FDI, the study applies the Autoregressive Distributed Lag (ARDL) approach.

Specifically, the Long Run Form and Bound test check the long-run relationship and the Error Correction Form checks the short-run relationship among the variables. Then the LM test for serial correlation and Heteroscedasticity Tests examine the residual diagnostic, and CUSUM test and CUSUM of square test check the stability of the model. The Ramsey Reset Test, also known as the Ramsey Regression Equation Specification Error Test, is a diagnostic tool used to test if the functional form of a regression model is appropriately specified. Finally, to find out the causality and direction of causality among the variables, the study uses the Toda and Yamamoto (1995) procedure of Granger Causality test in standard VAR approach.

3.1. Cointegration

Cointegration is a concept in time series analysis that describes a long-term relationship between two or more non-stationary time series. It means that even though the series individually exhibit trends (meaning they're not stationary), there's a linear combination of them that is stationary, indicating a stable, long-run equilibrium relationship.

Cointegration typically involves time series that have trends and are therefore not stationary. A linear combination of the non-stationary series is

stationary, meaning it doesn't drift up or down over time. The stationary linear combination suggests that the series are somehow tied together in the long run and will tend to move together in a way that maintains their relationship. While the series are cointegrated, there can be short-term deviations from this equilibrium, but they are expected to eventually correct themselves. If two stock prices, both be trending upwards over time, but the difference between their prices might not be trending, meaning the prices stay within a certain range relative to each other. This relative stability is a sign of cointegration.

Kwaku et. al. (2022) studied quantitative to ascertain the effect of foreign direct investment, real exchange rate, remittances, and import on economic growth in Ghana. Secondary data on gross domestic product, foreign direct investment, real exchange rate, remittances, import, and gross capital formation from 1980 to 2018 were analyzed. The study employed Autoregressive Distributed Lag for the econometrics analysis. The study found that foreign direct investment, real exchange rate, remittances, imports, and gross capital formation cointegrates with economic growth. The main findings are that foreign direct investment, real exchange rate, import, and remittances matter from growth perspective. Remittances have a positive and significant effect on economic growth in Ghana both for the short run and the long run. The study also revealed that foreign direct investment, real exchange rate, and imports have a negative and significant effect on the growth process of Ghana's economy for both the short run and the long run. The study recommends that the Ministry of Finance, Ghana, financial analysts and other policy makers should undertake steps to reduce imports and attract more remittances inflows to attain long-run economic growth. In addition, the economy must concentrate on viable exchange rate policies such as undervaluation of currency to stimulate sustainable economic growth.

The analysis involves the determination of cointegration among the variables. The study uses the Johansen and Juselius (1990) cointegration approach, whose main advantage lies in its ability to test for cointegrating vectors while at the same time allowing for inclusion or exclusion of the deterministic components in the cointegrating equation and the VAR according to Johansen and Juselius (1990). The error-correction specification in the Johansen and Juselius method, which is used to test for cointegration and estimate cointegrating relationships, involves a Vector Error Correction Model

(VECM). This model incorporates both the differences of the variables and the previous period's error term from the cointegrating relationship, ensuring that short-term deviations from the long-run equilibrium are accounted for.

3.2. Data sources

Annual time series data from World Bank Development Indicators, Background to budget and statistical abstracts are used in the study, which spanned 1986 to 2023. Economic variables such as gross domestic product, foreign direct investment, growth fixed capital formation, trade openness and real effective exchange rate are considered in this study, with economic growth being the dependent variable,

Table 3.1: Variable definition

Variables	Description	Measuring Units	Sources
GDPY	Gross domestic product	Real GDP Per Capita	MoFPED, UBOS and World Bank database
TOY/GDP	Trade openness	measured as sum of export and imports per GDP	MoFPED, UBOS and World Bank database
FDI/GDP	Foreign Direct Investment	A ratio that represents the amount of Foreign Direct Investment (FDI) as a percentage of a country's Gross Domestic Product (GDP)	MoFPED, UBOS and World Bank database
GCFY/GDP	Gross Capital Formation	Measures the total investment in an economy, encompassing additions to fixed assets, changes in inventories, and the acquisition of valuables	MoFPED, UBOS and World Bank database
REER	Real Effective Exchange Rate	The nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs	MoFPED, UBOS and World Bank database

Source: Authors compilation

This study investigated the link between economic growth , FDI, trade openness, trade openness. The data was got from the Ministry of Finance and Economic Planning, Bureau of Statistics and World Database Indicators (WDI) are the sources of data for every variable that make up this study. Table 3.1 provides a comprehensive explanation of each of the variables, including

their measurements and data sources. This data was not specifically collected specifically for the current research project, but rather for other purposes. Using secondary data can save time and resources compared to collecting primary data. So using existing secondary data is often a more affordable option and time-saving. Secondary data is readily available, so researchers don't have to invest time in data collection.

3.3. Econometric methodology

The ARDL cointegration approach and the Toda-Yamamoto Granger causality test are used. The ARDL modeling is used because it is flexible and suitable for small sample sizes, which is often a limitation in economic studies. It can handle variables regardless of whether they are stationary at level (I(0)), first difference (I(1)), or a combination of both. ARDL allows for the estimation of both short-term and long-term dynamics in a single reduced form equation, providing a comprehensive understanding of the relationship among FDI, trade openness, real effective exchange rate, gross capital formation and economic growth over time.

Secondly, Toda-Yamamoto (TY) Granger causality test is used to explore the direction of causality between the variables. The TY procedure is advantageous because it does not require pre-testing for unit roots and cointegration, which can be prone to errors and inconsistencies. Instead, it augments the VAR (Vector Autoregression) model by the maximum order of integration (dmax) of the series, ensuring that the asymptotic distribution of the test statistic remains valid. By combining these two methods, the study leverages the strengths of each approach to provide a thorough analysis. The ARDL model helps establish whether a long-term equilibrium relationship exists, while the TY Granger causality test determines the causal direction without the complications of unit root and cointegration testing.

3.4. ARDL bounds cointegration test

To examine the long-term link between the variables that were explored, this study applied the autoregressive distributed lag (ARDL) "Bound Test" approach that was initially given by Pesaran and Shin (1999) and Pesaran et al. (2001). To study the short- and long-term impacts of FDI, gross capital formation, real effective exchange rate and Trade openness on economic development,

variables that cover extensive periods are required. The ARDL bounds test is utilized to assess the presence or absence of cointegration, after which long-term and short-term dynamics are generated.

The ARDL method's single equation approach simplifies application and interpretation, but it does not guarantee that each series will have the same lag orders. It provides the most precise and reliable linear and independent estimation of the deep connection and long-run traits, eliminates endogeneity and autocorrelation issues in the series, and allows for the simultaneous assessment of the short-run and long-run correlations. ARDL models also help distinguish long-term linkages from short-term dynamics, which is interesting for examining economic issues. The following is an example of the generic form of the ARDL (p,q) model that may be written:

$$\Delta LGDPY_t = \beta_0 + \sum_1^n \Delta\beta_{1i} LGDPY_{t-i} + \sum_{i=0}^n \Delta\beta_{2i} LTOY_{t-i} + \sum_{i=0}^n \Delta\beta_{3i} LFDIY_{t-i} + \sum_{i=0}^n \Delta\beta_{4i} LREER_{t-i} + \sum_{i=0}^n \Delta\beta_{5i} LGCFY_{t-i} + \eta_1 LGDPY_{t-1} + \eta_2 LTOY_{t-1} + \eta_3 LFDIY_{t-1} + \eta_4 LGCFY_{t-1} + \eta_5 LREER_{t-1} + \mu_t \quad (1)$$

LGDPY will serve as the dependent variable in this study, while LFDIY, LTOY, LGCFY, and LREER are variables of the study and the error term, has to be homoscedastic and follows a regular pattern $\varepsilon \approx iid(0,\sigma)$. The model that is depicted by Eq (2) is an illustration of a particular sort of error correction model (ECM). This behavior is regarded as a predisposed ECM, according to Pesaran et al. (2001). The null and alternative hypotheses to consider: $\mathbf{H_0}$**:** No cointegration exists, $\mathbf{H_1}$**:** Cointegration exists. To establish whether or not the variables have a long-term connection, an F-test is utilized and no specific F-test critical values are accessible for any pairing of I(0) and I(1) variables. In addition, there is no such value that can be obtained. Pesaran et al. (2001) conducted research to determine critical value boundaries for the asymptotic F-statistic distribution.

Both the lower and higher critical values determined are used to assess the F-statistic. In both cases, we assume that all of the variables are I(0) to establish the lower limit, and we assume that all of the variables are (1) to determine the upper bound. We regard the variables as I(0), meaning that cointegration cannot occur under any circumstances if the F-statistic is less than the theoretical limit. If the F-statistic is higher than the upper bound, then we can conclude that there is cointegration in the system. Lastly, if the F-statistic falls anywhere

in the middle of the boundaries, the test is inconclusive, and an alternative approach to analyzing cointegration will be required. If the t-statistic is greater than the I(1) bound, Eq (1) supports a long-term relationship between the variables. If the t-statistic is less than the I(0) bound, then the data is invariant, indicating stationarity. To estimate the short-run parameters, the regular error correction mechanism (ECM) is applied, as demonstrated by the equation below:

$$\Delta GDPY_t = \beta_0 + \sum_1^n \Delta\beta_{1i} GDPY_{t-i} + \sum_{i=0}^n \Delta\beta_{2i} LTOY_{t-i} + \sum_{i=0}^n \Delta\beta_{3i} LFDIY_{t-i} + \sum_{i=0}^n \Delta\beta_{4i} LREER_{t-i} + \sum_{i=0}^n \Delta\beta_{5i} LGCFY_{t-i} + \tau ECT_{t-1} + \mu_t \quad (2)$$

Error correction model results reveal how quickly a system will adjust to a short-term shock and reestablish its long-term equilibrium. The ECM considers both the short-run and long-run coefficients while preserving the long-run information. In the ECM approach, the negative and statistically significant value of the ECT coefficient represents long-run causation, whereas the significant value of the coefficients of other explanatory factors represents short-run causality. Long-run causality is represented by the ECM approach. We use the ECM approach to carry out this investigation according to Rahman and Mamun (2016) and Shahbaz et al., (2013).

3.5. Toda-Yamamoto Granger causality tests

Conventional causality tests, like the Vector Error Correction Model Granger causality or the Engle and Granger causality tests have faced criticism due to their limitations and finite sample properties. Research by Toda and Yamamoto (1995) and Zapata and Rambaldi (1997) revealed that these approaches are particularly sensitive to nuisance parameter values in small samples, rendering their results somewhat unreliable. Furthermore, within these methods, there is a risk of incorrectly identifying the order of integration of the series according to Mavrotas and Kelly (2001). The Toda and Yamamoto (TY) procedure mitigates these risks by augmenting a vector autoregression (VAR) model in levels with the series' highest order of integration, ensuring that the Wald statistics possess the necessary power properties.

This means there is no imperative need to establish the series' order of integration before conducting the causality test. The long-run causality test

adjusts the lag order of the VAR based on the highest order of integration, denoted as d_{max}, ensuring that Granger causality test statistics adhere to the standard asymptotic distribution as stated by Wolde-Rufael (2010). To enhance the Wald statistic, the augmented VAR model is estimated using a modified Wald (MWALD) test for the causality examination as by Zapata and Rambaldi (1997). After then use the significance of the first lag(s) to evaluate the causal relationship. Employing this procedure, the following VAR model is estimated using MWALD to discern causal relationships between FDI and economic growth.

The presence of cointegration across variables implies a minimum of three causal links, yet it doesn't reveal the direction in which these interactions are oriented. In a similar vein, the Toda-Yamamoto causality test is used in this investigation to determine whether there is a direct causal link between the series in question. This information helps formulate LFDIY, LTOY, LGCFY, LREER and economic growth that will lead to sustainable development. The results of the short- and long-run causality tests are presented in Table 4.5 along with their respective directions. All the F-statistic coefficients are positive and statistically significant. When looking at the causality over the long run, it shows that there is a feedback effect between the variables. The results demonstrate a long-term, unidirectional causal link between the LFDIY, LTOY, LGCFY, LREER GDP growth hypothesis.

3.6. Structural breaks

Both the CUSUM (Cumulative Sum) and CUSUMSQ (Cumulative Sum of Squares) tests can indicate structural breaks, but they detect different types of changes. The CUSUM test is primarily used to identify changes in the intercept or mean of the regression model, while CUSUMSQ is more sensitive to changes in the slope coefficient or variance of the error term. The CUSUM Test checks for a cumulative deviation of residuals from the expected value, which can indicate a shift in the intercept or mean of the time series.

A violation of the CUSUM test's critical bounds suggests a structural break in the intercept or mean. While the CUSUMSQ test is designed to detect changes in the variance of the error term or in the slope coefficients of the regression model. If the CUSUMSQ graph deviates from the critical

bounds, it suggests a structural break that affects the variance or the slope. When the CUSUM and CUSUMSQ tests were conducted, the data did not indicate any structural breaks.

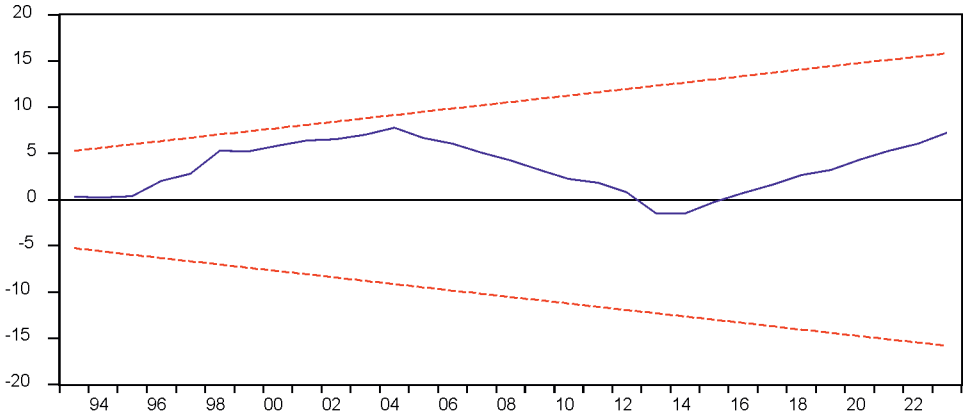

Figure 3.1: CUSUM test

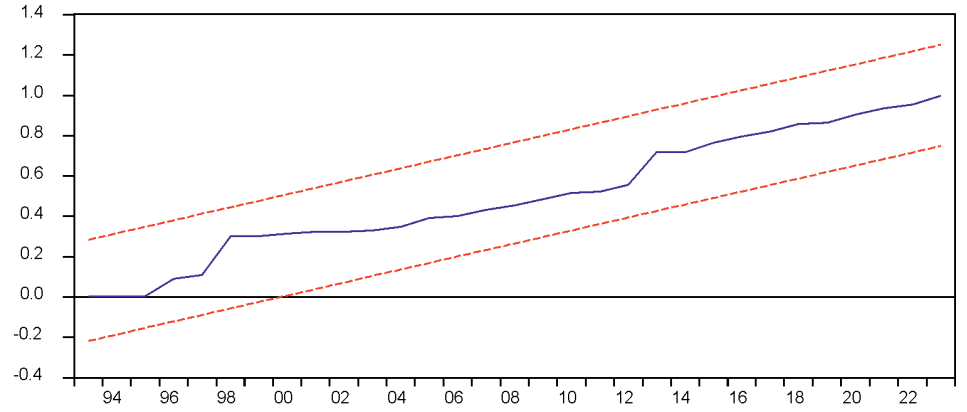

Figure 3.2: CUSUMSQ test

The results of the tests indicate no significant structural break point in the data.

4. DISCUSSION OF THE EMPIRICAL FINDINGS

Drawing experience from the works of Sharifi-Renani and Mirfatah (2012), de Castro et al. (2013), and Kyereboah-Coleman and Agyire-Tettey (2008), our model is formulated as follows: $LGDPY_t = \beta_0 + \beta_1 LREER_t + \beta_2 LFDIY_t + \beta_3 LGCFY_t + \beta_4 LTOY_t + \beta_t$ (3)

Table 4.1: Descriptive statistics of variables

	LGDPY	*LGFCY*	*LREER*	*LTOY*	*LFDIY*
Mean	7.03	2.98	4.83	3.58	0.80
Median	7.36	3.06	4.68	3.58	1.14
Maximum	8.04	3.45	6.24	4.03	1.90
Minimum	5.02	2.13	4.52	3.23	-3.50
Std. Dev.	0.91	0.29	0.43	0.17	1.19
Skewness	-1.08	-1.19	2.40	0.20	-2.48
Kurtosis	2.80	4.21	7.81	3.17	8.55
Sum	253.21	107.33	174.06	128.72	28.92
Sum Sq. Dev.	29.22	2.94	6.37	1.04	49.32
Observations	36	36	36	36	36

Source: Authors computations

Table 4.2 reports the results of the unit root tests the ADF test, the study concludes that variables, LFDIY, LTOY, LGCFY, LREER and LGDPY are of mixed level of integration. Some at I(0) and others at I(1), then we apply the bound test to test for cointegration among variables. The KPSS results confirm that LTOY is integrated at I(2), therefore our d_{max} is 2.

Table 4.2: Results of the unit root tests

	ADF Test				*KPSS Test*					
Var	*Level*		*First Difference*		*Log Level*		*First Difference*		*Second Difference*	
	NO TREND	*TREND*	*NO TREND*	*TREND*	*NO TREND*	*TREND*	*NO TREND*	*TREND*	*NO TREND*	*TREND*
LGDPY	-11.81***	-1.57	-4.43**	-4.34**	0.64	0.13*	0.07**	0.06**		
LTOY	-2.14	-2.19	-7.06	-7.14	0.52	0.18	0.50	0.40	0.24*	0.21
LFDIY	-2.49	-3.68*	-9.95***	-9.02***	0.53	0.15	0.03**	0.05*		
LGCFY	-3.39**	-2.14	-6.51***	-6.30***	0.66	0.20	0.62	0.07**		
LREER	-2.68*	-1.61	-3.76***	-4.55**	0.61	0.18	0.32*	0.05**		

Note: *, ** and *** indicate significance level at 10%, 5% and 1% respectively.
Source: Own computations

4.1. Cointegration Test

Having established the assumptions for ARDL approach that include; data must be free from autocorrelation, Data must be free from heteroscedisty , data must be normally distributed, all variables must be I(0) or I(1) or mixture of level and first difference, a cointegration test based on the ARDL procedure was employed using annual data over the period 1986-2023. The number of lags on the first-differenced variables was selected using Akaike Information

Criterion (AIC). The final lag was then selected when the estimated equation satisfied all the diagnostic checks and the CUSUMSQ test of stability. Testing for cointegration is a necessary step to establish if a model empirically exhibits meaningful long run relationships. If it fails to establish the cointegration among underlying variables, it becomes imperative to continue to work with variables in differences instead.

The unit root test results reported in Table 4.2 reveal that all variables are integrated of order zero and one, supporting the use of the ARDL approach to co-integration in this study. The bounds testing procedure is carried out by conducting the F test for the joint significance of coefficients of the lagged variables as indicated in Table 4.3. The null hypothesis of no cointegration is tested against the alternative hypothesis of cointegration. Since the null hypothesis of no cointegration is rejected since the calculated F-statistic is greater than the upper-bound values. The short-run ARDL model, within the error correction framework, allows for the analysis of dynamic relationships between time series data, disentangling long-run relationships from short-run dynamics and testing for cointegration

Table 4.3: Results of ARDL Cointegration Test-bound test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	27.31	10%	3.03	4.06
k	4	5%	3.47	4.57
		2.5%	3.89	5.07
		1%	4.4	5.72
Actual Sample Size	30		Finite Sample: n=30	
		10%	3.43	4.62
		5%	4.154	5.54
		1%	5.86	7.58

Source: Author's computations

The results of the bound test indicate that the calculated F statistics 27.31 is greater than the lower and upper bound critical value for any significance level. It means there is a short run and long run equilibrium among the considered variables, in the examined period. The null hypothesis of no cointegration is rejected. The short run and long run were estimated, according to the Akaike Information Criterion.

Three steps are followed in the estimation process of foreign direct investment and growth. In the first step, stationarity of the variables is conducted. In the second step, a test of the presence of both short-run and long-run relationships between the variables is carried out, and the third step conducts the diagnostics to ensure that the coefficients are stable and not driven by biases. In this study, we follow the autoregressive distributed lag (ARDL) bounds testing technique to cointegration pioneered by Pesaran et al. (2001).

When choosing the correct lag order, the VAR is crucial for accurate inference. Several information criteria are used to select the optimal lag order, including Akaike Information Criterion (AIC), Hannan-Quinn Criterion (HQIC), and Schwarz Information Criterion (SIC). These criteria balance model fit with model complexity, penalizing models with more parameters. Table 4.4 indicates that the appropriate lag is 2 since the AIC, SC and HQ all have an italics on 2.

Table 4.4: VAR Lag Order Selection Criteria

Endogenous variables: LGDPY LTOY LREER LGFCY LFDIY						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	10.08237	NA	5.01e-07	-0.317648	-0.088627	-0.241734
1	131.3433	197.0490	1.25e-09	-6.333956	-4.959828	-5.878472
2	156.6154	3.16970*	1.39e-09*	-6.35095*	-3.831732*	-5.515911*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

The existence of cointegration is confirmed above in table 4.3 among the variables. The study then estimates the Toda-Yamamoto causality and Table 4.5 reports the results in The Toda-Yamamoto causality test is based on the modified Wald statistic known as the MWald statistic. The augmented lag length for the MWald statistic, p, is set to 4, which is computed from the sum of the VAR lag length (k) plus the maximum order of integration (d) in Table 4.5 That is to say: $p = (k + d)$; leads to $p = (2 + 2) = 4$.

The Toda-Yamamoto causality results in Table 4.5 suggest that there is unidirectional causality from LFDIY to LGDPY, indicating that foreign

direct investment inflows cause real GDP growth in Uganda for the period understudy at 1 percent significance level. This finding can be partly be attributed to Foreign Direct Investment (FDI) in Uganda significantly boosts real GDP growth by enhancing capital accumulation, technology transfer, and productivity improvements. FDI inflows stimulate investment in critical sectors like infrastructure and manufacturing, leading to overall economic expansion.

Additionally, LFDIY supports job creation, income generation, and improvements in living standards, further fueling long-term economic growth. However LFDIY is found not to Granger cause Gross Capital Formation (LGCFY). This might be because of past levels of LFDIY do not predict future levels of LGCFY, and vice versa. Some studies like Kaikara (2024) have shown that GDP growth and gross capital formation positively affect LFDIY in Uganda, but FDI does not Granger cause economic growth. Also LFDIY is found to have unidirectional causality to LREER at 1 percent significance level indicating that foreign direct investment inflows cause Real Effective Exchange Rate (LREER) growth in Uganda. This might be because Foreign Direct Investment (LFDIY) can cause an appreciation of the Real Effective Exchange Rate (REER) due to increased capital inflows and potential shifts in the economy's production and trade patterns. Higher LFDIY inflows can increase the supply of foreign currency, potentially leading to a stronger national currency.

Table 4.5: Granger causality results based on Toda-Yamamoto procedure

Null hypothesis	*Causality dynamics*	*MWald statistic*	*Probability value*
LFDIY does not Granger-cause LGDPY	LFDIY → LGDPY	11.91**	0.00
LFDIY does not Granger LGCFY	LFDIY → LGCFY	2.90	0.23
LFDIY does not Granger-cause LREER	LFDIY → LREER	15.45**	0.00
LFDIY does not Granger-cause LTOY	LFDIY → LTOY	3.17	0.20
LTOY does not Granger-cause LGDPY	LTOY → LGDPY	2.50	0.29
LTOY does not Granger-cause LGCFY	LTOY → LGCFY	2.91	0.23
LTOY does not Granger-cause LREER	LTOY → LREER	0.20	0.91
LTOY does not Granger-cause LFDIY	LTOY → LFDIY	2.07	0.35
LGCFY does not Granger-cause LGDPY	LGCFY → LGDPY	3.26	0.20
LGCFY does not Granger-cause LTOY	LGCFY → LTOY	0.47	0.79
LGCFY does not Granger-cause LREER	LGCFY → LREER	1.37	0.50
LGCFY does not Granger-cause LFDIY	LGCFY → LFDIY	1.29	0.52

Null hypothesis	*Causality dynamics*	*MWald statistic*	*Probability value*
LREER does not Granger-cause LGDPY	LREER → LGDPY	2.18	0.34
LREER does not Granger-cause LTOY	LREER → LTOY	1.98	0.37
LREER does not Granger-cause LREER	LREER → LGCFY	1.76	0.41
LREER does not Granger-cause LFDIY	LREER → LFDIY	26.59**	0.00
LGDPY does not Granger-cause LFDIY	LGDPY → LREER	4.58	0.10
LGDPY does not Granger-cause LTOY	LGDPY→ LTOY	0.58	0.75
LGDPY does not Granger-cause LREER	LGDPY → LGCFY	1.27	0.53
LGDPY does not Granger-cause LFDIY	LGDPY → LFDIY	1.23	0.54

Note: ** denotes significance level at 1%. The augmented lag length for the MWALD statistic is given by (k + d) = (2+2) = 4; where k is the lag length obtained from unrestricted VAR, and d is the maximum order of integration.

Source: Authors computations

Also LREER is found to have unidirectional causality to LFDIY at 1 percent significance level indicating that foreign LREER cause LFDIY growth in Uganda. This is because A depreciation of the Real Effective Exchange Rate (REER) in Uganda can stimulate Foreign Direct Investment (FDI) growth by making Uganda's economy more attractive to foreign investors. This is primarily due to two effects: the wealth effect and the relative production costs. In addition the results of this study fail to confirm any unidirectional causality from Trade Openness (LTOY), LGCFY, and LREER on economic growth in Uganda.

4.2. Short run model

The short run outcome of the model is shown in table 4.6. The short-run model within an Autoregressive Distributed Lag (ARDL) framework, often represented as an Error Correction Model (ECM), captures the speed at which variables return to their long-run equilibrium after a shock, using an error correction term. The LFDIY is positively related to economic growth and significant at 1 percent. This is probably because in the short run, FDI is positively related to economic growth because it directly injects capital and resources into the host economy, leading to increased investment, job creation, and potential technology transfer. This immediate infusion of capital can stimulate immediate growth, especially in sectors like manufacturing or infrastructure that are dependent on investment.

Table 4.6: ARDL Error Correction Model

ARDL Error Correction Regression			
Dependent Variable: D(LGDPY)			
Selected Model: ARDL(1, 0, 3, 3, 3)			
Sample: 1986 2023			
Included observations: 30			
ECM Regression			
Case 4: Unrestricted Constant and Restricted Trend			
Variable	Coefficient	t-Statistic	Prob.
C	4.76***	15.58	0.00
D(LREER)	-0.05	-0.22	0.83
D(LREER(-1))	-0.31	-1.47	0.16
D(LREER(-2))	0.46**	2.50	0.03
D(LTO)	0.08	0.81	0.43
D(LTO(-1))	0.30**	3.01	0.01
D(LTO(-2))	0.16	1.48	0.16
D(LFDIY)	0.12**	2.39	0.03
D(LFDIY(-1))	-0.22***	-5.04	0.00
D(LFDIY(-2))	-0.33***	-7.96	0.00
ECT(-1)	-0.95***	-15.33	0.00
R-squared	0.96	Mean dependent var	0.10
Adj R-squared	0.94	S.D. dependent var	0.23
S.E. of regression	0.06	Akaike info criterion	-2.63
Sum squared resid	0.06	Schwarz criterion	-2.12
Log likelihood	50.46	Hannan-Quinn criter.	-2.47
F-statistic	45.51	Durbin-Watson stat	2.45
Prob(F-statistic)	0.00		

*, **, *** denotes statistical significance at 10%, 5% and 1% respectively
Source: authors' Computations

LFDIY brings in capital from foreign investors, which can be used to fund new projects, expand existing businesses, or modernize infrastructure. This increase in investment can lead to higher output and economic growth in the short term. LFDIY often leads to the creation of new jobs, both directly within the foreign-owned companies and indirectly through the development of related industries and the expansion of the overall economy. This can increase the supply of labor and boost overall productivity. Foreign companies often bring in new technologies, management practices, and skills, which can be

transferred to local businesses and workers. This can lead to increased efficiency, productivity, and innovation, all of which contribute to economic growth.

In the short run, the effect of Foreign Direct Investment (LFDIY) on economic growth was positive and significant at 5 percent level and the lagged values of once and twice was very significant and negative. While LFDIY can offer potential benefits like increased capital and technological transfer, its immediate impact on growth may be limited. Some studies suggest that FDI may have a negative effect in the short run, potentially due to the time it takes for the full benefits of investment to be realized or for local economies to fully integrate with the new investment. The positive effects of FDI may not be fully realized in the short run. There can be a time lag as local economies adjust to new technologies, management practices, and increased capital. The Potential Negative Impacts is probably be because Over-reliance on FDI might lead to negative externalities like unemployment, over-urbanization, and income inequality, which can hinder growth in the short term

LFDIY can also create positive spillovers through backward linkages, where local businesses start producing inputs for foreign companies, or through forward linkages, where local businesses benefit from the increased demand for their products from foreign companies. The presence of foreign firms can increase competition in the market, leading to improvements in efficiency and productivity among domestic firms.

However lagged once and second values of LFDIY affect economic growth negatively and statistically significant at 1 percent. Probably in the short run, lagged values of LFDIY can exhibit a negative relationship with economic growth due to factors like resource constraints, temporary disruptions from investment, and the time it takes for investments to fully integrate and generate positive economic effects. For instance, a surge in LFDIY might strain existing infrastructure or create short-term job displacement as companies restructure or relocate. Additionally, the initial stages of LFDIY projects often involve setup and adaptation, delaying the realization of full economic benefits.

In the short run there is a positive and significant relationship at 5 percent between lagged real effective exchange rate (LREER) values and economic growth probably because of the impact of the exchange rate on aggregate demand. A weaker domestic currency (lower LREER) can boost exports and

potentially stimulate domestic demand, leading to increased economic activity and growth. Also In the short run, lagged values of trade openness (LTOY) tend to be positively related to economic growth and significant at 5 percent because increased trade allows for the import of essential goods and services, including capital-intensive inputs that directly contribute to the growth process. This increased availability and lower costs can boost productivity, leading to higher output and economic growth in the short term.

In the model, the speed of adjustment indicating how quickly a model corrects itself towards a long-run equilibrium after a short-run disequilibrium, measured by the coefficient of the error correction term (ECT) is negative and less than 1 as expected. In the model, the error correction model (ECT) is -0.758. an error correction model (ECM), where the ECT captures the speed at which variables return to their long-run equilibrium after a shock. The ECT is typically a lagged term representing the difference between the current value of the dependent variable and its long-run equilibrium value. The coefficient of the ECT indicates the speed of adjustment: a larger negative coefficient suggests a faster speed of adjustment towards equilibrium.

A negative and statistically significant ECT coefficient is expected, indicating that deviations from the long-run relationship are corrected over time. A positive ECT coefficient would suggest the model is diverging from equilibrium, which is not a desirable outcome. Understanding the speed of adjustment is crucial because it helps determine how quickly a model can recover from shocks or deviations from equilibrium. In this study, the ECT coefficient is -0.95, it means that 95.0 percent of the previous period's deviation from equilibrium is corrected in the current period.

4.3. Long run model

In the long run, as shown in Table 4.7, the Gross capital formation (LGCFY) affects economic growth positively and statistically significant at 5 percent. A one unit increase in LGCFY will cause economic growth to increase by 0.5 units. In the long run, Gross Capital Formation (LGCFY) positively affects economic growth by increasing an economy's productive capacity and overall supply of goods and services. This is achieved through the accumulation of physical capital, which allows for greater efficiency, innovation, and productivity. LGCFY, which represents investment in assets like machinery,

equipment, and infrastructure, directly increases the amount of capital available for production. This leads to a higher potential output for the economy, boosting its capacity to produce goods and services. New capital goods and technological advancements embedded within them often lead to increased productivity per worker or per unit of capital. This means more output can be produced with the same amount of resources, driving down costs and making the economy more competitive.

Investments in research and development, which are often funded through LGCFY, are crucial for fostering innovation and technological advancements. These advancements can lead to new products, processes, and industries, further contributing to economic growth. Investing in capital goods, like machinery and equipment, can enhance the productivity of the labor force. Workers become more efficient and productive when they have access to better tools and technologies, leading to higher output per worker and overall economic growth. Investments in infrastructure, such as roads, railways, and ports, also contribute to economic growth by facilitating transportation, distribution, and trade. This can reduce costs, improve efficiency, and boost overall economic activity. Gross Capital Formation is a fundamental driver of long-run economic growth because it increases an economy's productive capacity, enhances productivity, fosters innovation, and improves infrastructure. These factors collectively contribute to a higher level of output, increased efficiency, and a more prosperous economy

In the long run the foreign direct investment (LFDIY) positively supports economic growth and statistically significant at 1 percent, a one unit increase in LFDIY results in 0.42 units in economic growth. In the long run, Foreign Direct Investment (LFDIY) can positively support economic growth, often with statistical significance at the 1% level, due to several key factors. LFDIY facilitates capital accumulation, technology transfer, and human capital development, all of which contribute to increased productivity and economic output. LFDIY brings in capital from foreign investors, which can be used to finance new businesses, expand existing ones, and modernize infrastructure. This investment leads to increased production capacity and output. LFDIY often comes with the transfer of new technologies, management practices, and organizational structures from foreign companies. This can lead to increased efficiency, innovation, and productivity in the host country.

Table 4.7: ARDL Long run Model

ARDL Long Run Form and Bounds Test			
Dependent Variable: D(LGDPY)			
Selected Model: ARDL(1, 0, 3, 3, 3)			
Sample: 1986 2023			
Included observations: 30			
Variable	Coefficient	t-Statistic	Prob.
LGFCY	0.50**	2.36	0.03
LREER	0.18	0.63	0.54
LTOY	-0.32	-1.30	0.21
LFDIY	0.42***	5.15	0.00
@TREND	0.03***	7.94	0.00
R-squared	0.99	Mean dependent var	7.34
Adj R-squared	0.99	S.D. dependent var	0.61
S.E. of regression	0.07	Akaike info criterion	-2.30
Sum squared resid	0.06	Schwarz criterion	-1.55
Log likelihood	50.46	Hannan-Quinn criter.	-2.06
F-statistic	166.32	Durbin-Watson stat	2.45
Prob(F-statistic)	0.00		

*, **, *** denotes statistical significance at 10%, 5% and 1% respectively
Source: authors' Computations

LFDIY can create new jobs, provide training opportunities, and improve the overall skill level of the workforce. This leads to a more skilled and productive labor force, further contributing to economic growth. LFDIY can create positive externalities for the wider economy, such as improved infrastructure, access to global markets, and increased competition. These externalities can further boost economic growth. When the effect of LFDIY on economic growth is statistically significant at the 1 percent, it means that the observed relationship between FDI and growth is very unlikely to be due to random chance. It suggests a strong and reliable link between the two variables.

While these are the main reasons why LFDIY can support economic growth, it's important to note that the effectiveness of LFDIY can vary depending on a number of factors, such as the level of development of the host country, the quality of its institutions, and the specific policies implemented by the government. The positive effect of Foreign Direct Investments (LFDIY) on economic growth in both the short run and the long run could be an implication that LFDIY inflows are seen as an important source of savings

and capital accumulation for Uganda, creating positive spillovers, improving human capital, providing access to advanced

4.5. Residual and stability diagnostics tests

The Breusch-Godfrey (BG) test is a robust method for detecting serial correlation. The BG test uses residuals from the original regression as the dependent variable run against initial regressors plus lagged residuals and null hypothesis is the coefficients of the lagged residuals are zero. From the results in Table 4.8, the null hypothesis is accepted and concluded that there is no serial correlation in the model. This means there's no statistically significant relationship between successive values of a variable over time. It indicates that the current value of a variable is not influenced by its past values. A serial correlation value of zero suggests this independence. The current observation is not correlated with its previous observations, indicating no predictive power from past values.

Residue stability tests determine how well a substance or residue maintains its integrity over time when stored under specific conditions. These tests are crucial for ensuring the accurate analysis of residues, demonstrating the stability of pesticides in crops, and verifying the stability of residues in various products

Table 4.8: Breusch-Godfrey Serial Correlation

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.52	Prob. F(2,12)	0.61
Obs*R-squared	2.37	Prob. Chi-Square(2)	0.31

Source: Authors computations

The results as shown in Table 4.9 show that there is no heteroscedasticity since the null of no heteroskedasticity is accepted. No heteroskedasticity means the errors in a model have a constant variance, meaning the spread of the residuals is consistent across all values of the independent variable. In simpler terms, it means the variability of the dependent variable (the thing being predicted) is the same at all levels of the independent variable(s).

Table 4.9: Heteroskedasticity Test: Breusch-Pagan-Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.21	Prob. F(15,14)	1.00
Obs*R-squared	5.59	Prob. Chi-Square(15)	0.99
Scaled explained SS	0.60	Prob. Chi-Square(15)	1.00

Source: Authors computations

The Ramsey Reset Test, also known as the Ramsey Regression Equation Specification Error Test, is a diagnostic tool used to test if the functional form of a regression model is appropriately specified. Specifically, it checks if non-linear combinations of the independent variables help explain the dependent variable, indicating potential model misspecification. In essence, it helps determine if a linear model is the best representation of the relationship between variables or if a non-linear model would provide a better fit. From the results in Table 4.10 the null is accepted and conclude that there is no misspecification in the model.

Table 4.10: Ramsey Reset Test

Omitted Variables: Squares of fitted values			
	Value	df	Probability
t-statistic	0.87	4	0.72
F-statistic	0.46	(1, 4)	0.55

Source: Authors computations

A CUSUM (Cumulative Sum) chart is a statistical quality control tool used to monitor a process and detect small shifts in the process mean. It works by plotting the cumulative sum of deviations from a target value, helping to identify changes that might be missed by traditional control charts. CUSUM charts is a valuable tool for monitoring processes and detecting subtle changes that might not be visible with other control chart methods, enabling timely corrective actions and improving process stability as shown in figure 4.1.

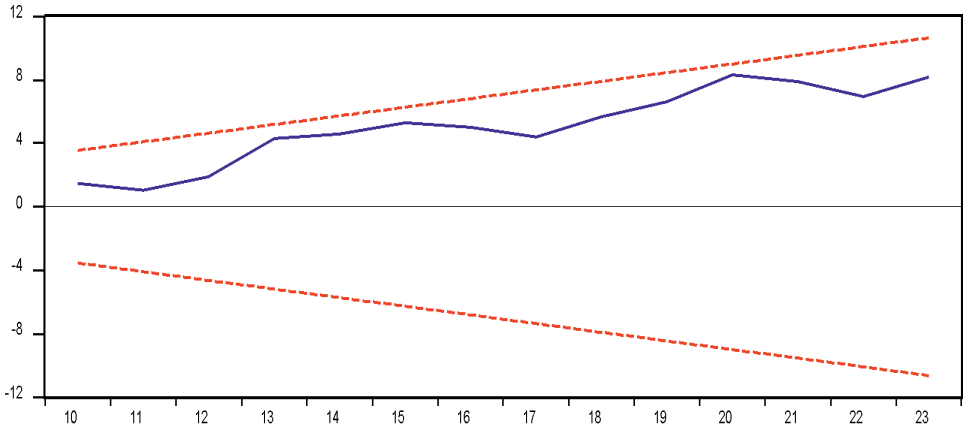

Figure 4.1: CUSUM Test

The CUSUM of Squares test is a statistical test used to assess the stability of regression models, especially in time series analysis. It's designed to detect systematic changes in the model parameters, including the variance of the error term, over time. Specifically, it looks for sudden shifts or changes in the squared values of the residuals, which can indicate instability in the model's parameters as indicated in figure 4.2.

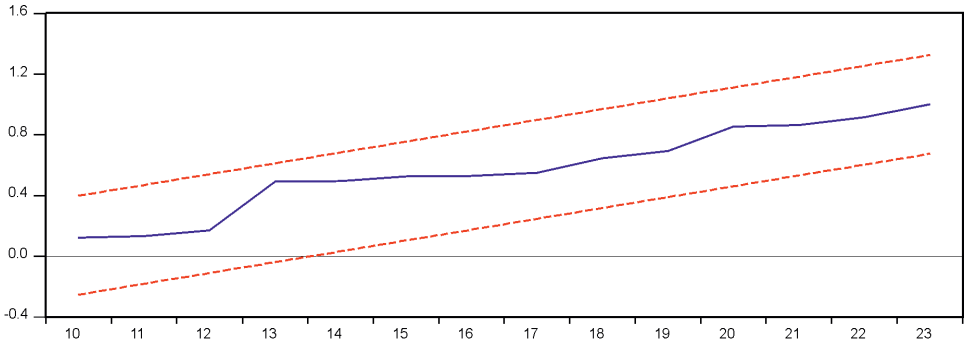

Figure 4.2: CUSUM of Square Test

5. CONCLUSION AND POLICY RECOMMENDATIONS

This paper has discussed the link of Foreign Direct Investment (LFDIY), Trade Openness (LTOY), Real Effective Exchange Rate (LREER) and economic growth of Uganda. Using the Toda-Yamamoto causality test and other relevant literature, this study provides the causal relationship between foreign direct investment (LFDIY), Trade Openness (LTOY), Real Effective Exchange Rate (LREER) and economic growth of Uganda. The Augmented Dickey-Fuller (ADF) and the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) tests unit root tests show that all of these annual time series are integrated in level, I (0) , first order, I(1).and second order, I(2). Therefore, the Autoregressive Distributed Lag (ARDL) approach has been used to investigate the long-run and short-run relationship among the variables.

The empirical findings indicate that LFDIY, LTOY and LREER are key contributor to the economic growth of the Uganda in the short run while in the long run LFDIY is a key contributor to economic growth. It was also observed that LFDIY affects economic growth through two broad channels: (i) LFDIY can encourage the adoption of new technologies in the production process through technological spillovers; and (ii) LFDIY may stimulate knowledge

transfer, both in terms of labor training and skill acquisition, and additionally by introducing alternative management practices.

From a policy perspective, the empirical findings of this study signify the desirability of taking necessary steps to ensure that improvements in Uganda's LFDIY inflows translate into increased LTOY, LREER and economic growth. Uganda's private sector investment policy focuses on increasing the competitiveness of the private sector to drive sustainable, inclusive growth. This is achieved through various initiatives and policies aimed at creating an enabling environment for private sector development and attracting foreign investment. Key aspects of Uganda's private sector investment policy: This recommendation requires Uganda to review and align its investment incentives with the private sector-led growth initiative, which is in line with the country's National Development Plan III.

To increase Foreign Direct Investment (FDI) in Uganda can focus on creating a stable and attractive business environment, improving infrastructure, promoting trade openness, and investing in education and human capital. A coordinated approach involving different government levels, along with the Uganda Investment Authority can be effective

The other policy implication arising from the study relates to the expiry of AGOA. Most of the foreign investment in Uganda followed this initiative. Therefore the suspension of Uganda's AGOA benefits could negatively impact foreign direct investment (FDI) in the country by reducing the competitiveness of Ugandan products in the US market and potentially discouraging foreign investors. While it's difficult to quantify the exact impact, the loss of duty-free access under AGOA could make Ugandan goods less attractive to US buyers, potentially leading to reduced export volumes and FDI in sectors that heavily rely on AGOA for competitiveness. the recommendation is to focus on attracting green energy investments, particularly in ethanol production, which is an AGOA-eligible product. Additionally, Uganda should leverage existing trade agreements like AfCFTA and explore new partnerships to diversify its export markets and attract FDI beyond the US.

The AfCFTA (African Continental Free Trade Area) is an agreement among African countries aimed at creating a single market for goods and services across the continent. It seeks to boost intra-African trade, foster economic integration, and improve Africa's global trading position. The AfCFTA has 54

signatories and is the largest free trade area in the world by number of member states and by population.

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