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Casual Relationship Between Economic Growth and Foreign Direct Investment, Trade Openness, Gross Capital Formation and Real Effective Exchange Rate 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 transformed 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.

Keywords: Foreign direct investment; Trade openness; Economic growth; Toda-Yamamoto; Gross capital formation; Uganda

Introduction

Economic growth in Uganda is positively driven in the long run by Gross Capital Formation (GCF) and foreign direct investment (FDI), while trade openness has mixed, often short-term, positive effects according to Nyiramahoro. FDI and capital formation, along with stable real effective exchange rates (REER), are crucial for sustaining Uganda's economic development. Foreign Direct Investment (FDI) generally impacts Uganda's economic growth positively. However, some studies indicate it may have an adverse short-run effect before contributing to long-term growth. Gross Capital Formation (GCF) acts as a critical driver of economic growth in Uganda, both the short and long run, indicating that physical investment is vital for expanding the productive capacity of the economy. Trade Openness primarily promotes growth in the short run. While some studies show a significant positive long-run impact, others suggest it may negatively affect GDP per capita in certain contexts. Real Effective Exchange Rate (REER) stability in the exchange rate is essential for growth, with depreciation or excessive volatility often hindering economic performance. A more competitive (stable) RER generally favors growth. 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, physical capital, and rapid diffusion of technology, are transferred across borders as argued by Shittu and

Mishra and Jena [1,2]. 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. Foreign Direct Investment (FDI), trade openness, gross capital formation, and the real effective exchange rate are interconnected and significantly affect economic growth. FDI and trade openness affect economic growth significantly while the real effective exchange rate and gross capital formation are necessary in facilitating economic growth.

The relationship among these variables is complex like higher FDI inflows can lead to an appreciation of the real exchange rate, potentially making exports less competitive. In addition, increased trade openness can attract FDI, but it can also expose domestic industries to greater competition, requiring them to adapt and innovate. Gross capital formation is often influenced by both FDI and trade openness, as investments is needed to support export-oriented production and upgrade infrastructure to facilitate trade. The theoretical relationship among these variables is generally supports a positive economic growth, but empirical studies provide mixed results. Some studies find a strong positive relationship between FDI, trade openness, and economic growth, while others find weaker or even insignificant relationships. This variation can be attributed to differences in country-specific factors, such as the quality of institutions, the level of human capital, and the nature of trade policies as argued by Wiredu, Nketiah and Adjei [3]. FDI is often considered a catalyst for economic growth, bringing in capital, technology, and management expertise. It can improve productivity, create jobs, and enhance export capacity. However, the impact of FDI can vary depending on factors like the quality of institutions, infrastructure, and human capital in the host country. Trade openness, meaning the extent to which a country participates in international trade, is also generally linked to economic growth. It allows countries to specialize in producing goods and services where they have a comparative advantage, leading to increased efficiency and productivity. Open trade also encourages competition, which can drive innovation and lower prices. Gross capital formation, which includes investments in physical capital like machinery, equipment, and infrastructure, is essential for long-term economic growth. Increased investment can lead to higher productivity, greater capacity, and improved living standards. The real effective exchange rate (REER) reflects the competitiveness of a country's exports in the global market. A stable and competitive REER can attract FDI and boost exports, leading to economic growth. However, a volatile or overvalued REER can hinder growth by making exports less competitive and imports cheaper, potentially harming domestic industries.

According to Sakyi and Egyir 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 [4]. 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 and Zhang [5]. 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 [6]. Herzer 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 [7]. 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. In Uganda, Foreign Direct Investment (FDI), Trade Openness, Gross Capital Formation, and the Real Effective Exchange Rate (REER) are all significant factors influencing economic growth. Studies suggest that FDI and trade openness, particularly exports, have a positive impact on Uganda's GDP. FDI is a crucial driver of economic growth in Uganda, contributing to capital accumulation, technology transfer, and increased productivity. Gross Capital Formation is also empirically confirmed to have a positive and significant effect on economic growth. The REER's impact on economic growth is said to be complex and sometimes inconclusive but generally seen as having a positive influence.

Uganda is promoting specialized industrial parks and economic zones around strategic locations in order to help attract capital-intensive FDI, especially those oriented towards exports. FDI flows can be affected by global events like pandemics, as seen with the decline during the COVID-19 pandemic. Trade openness, measured by the ratio of exports and imports to GDP, trade liberalization, often linked to economic globalization, is a key determinant of capital formation in Uganda. Gross capital formation, which includes investments in fixed assets like machinery and buildings, has a demonstrated positive and significant impact on Uganda's economic growth. Uganda's experience with trade liberalization and subsequent rise in FDI following the Economic Recovery Programme (ERP) highlights the importance of trade openness for capital formation. The REER can affect economic growth through its influence on exports and imports. A combination of policies that promote FDI, trade openness and capital formation is essential for sustainable economic growth. The government focuses on promoting exports and managing the REER effectively to maximize the benefits of these factors (Figure 1). FDI has been identified as a key driver of economic growth in Uganda by National Development Plan III. According to Nyiramahoro 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-Zermeno [8].

The Ugandan government has implemented various policies to boost economic growth by influencing Foreign Direct Investment (FDI), trade openness, Gross Capital Formation, and the Real Effective Exchange Rate (REER). These include offering tax incentives, strengthening property rights, improving infrastructure, and promoting regional integration. 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. 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.

Problem statement

Despite the increasing importance of Foreign Direct Investment, Trade Openness, Gross Capital Formation, and Real Effective Exchange Rate play an important role as drivers of economic growth in developing economies and the precise impact of them on economic growth remains a subject of debate. While some argue that they stimulate economic growth by enhancing productivity,

technology transfer, and capital accumulation, others contend that their benefit may be unevenly distributed, leading to potential adverse effects like crowding out domestic investment or making worse income inequality. In addition, their effectiveness 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 their sectoral composition. 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.

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

Theoretical Framework 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.

Foreign direct investment, gross capital formation, trade openness, real 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 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 [9]. Elboiashi demonstrated that there is a positive relationship between capital accumulation and output and Herzer, 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 [10]. 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 [11]. Nair-Reichert and Weinhold 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 [12]. 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 [13]. lboiashi and Al Nasser. 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.

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 [14]. 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.

Institutional theory

This theory developed by scholars like Douglass and Mongong, it emphasizes the role of formal and informal institutions in shaping economic outcomes [15,16]. 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 [17]. 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.

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 argued that FDI can speed up growth of the receiving countries through improving foreign trade and ensuring stability of macroeconomic variables [18]. 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 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 [19]. 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 examined the long-run relationship among FDI, trade openness and growth in Lesotho for the period 1980-2011 [20]. 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-Zermeno 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 studied the impact of foreign direct investment (FDI) on growth remains a thorny question for researchers and policy makers [21]. 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 studied the impacts of foreign direct investment (FDI), globalization 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 studied the Impact of Foreign Direct Investment (FDI) on Economic Growth in Congo [22]. 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 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 [23]. 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 estimated the effects of foreign multinational corporations (MNCs) on workers [24]. 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 argued that FDI inflows had affected positively the GDP growth and local investment in six Arab countries from 1978 to 1998. Moreover, Bengoa found a positive association among FDI and GDP in 18 economies of South America. Sokang 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 used VECM and determined positive impact of inward FDI to Nigeria’s GDP growth during from 1981 to 2014. Lajevardi and Chowdhury 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 [25]. 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 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 globalization 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 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 [26]. 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, 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 [27]. 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. Blomstrom and Kokko 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 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 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 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 [28]. 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 examined the relationship between foreign direct investment (FDI) and economic growth in Nigeria [29]. 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 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 embarked on an empirical investigation focusing on Sub-Saharan African economies to discern the impact of FDI on economic growth in the region [30]. 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 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 [31]. 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 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 [32]. 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 embarked on an empirical exploration focusing on the Turkish economy, aiming to analyze the impact of FDI on economic growth dynamics and employment patterns [33]. 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. Kwaku studied quantitative to ascertain the effect of foreign direct investment, real exchange rate, remittances, and import on economic growth in Ghana [34]. 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.

Kumari and Kumar identified key determinants of foreign direct investment (FDI) inflows in developing countries by using unbalanced panel data set pertaining to the years 1990-2012 [35]. 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 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 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 [36]. 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 an 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 Foreign exchange rates can both facilitate and potentially hinder Foreign Direct Investment (FDI) and economic growth [37]. 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.

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. 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 procedure of Granger Causality test in standard VAR approach.

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. The analysis involves the determination of cointegration among the variables. The study uses the Johansen and Juselius 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. 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.

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 1). This study investigates the relationship between economic growth and FDI, Real effective exchange rate, trade openness and Gross capital formation. The data was got from the Ministry of Finance and Economic Planning, Bureau of Statistics and World Database Indicators (WDI) for every variable that make up this study. Table 1 provides a comprehensive explanation of each of the variables, including their measurements and data sources. This data was not specifically collected 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 and don't have to invest time in data collection.

Econometric methodology

The Toda-Yamamoto Granger causality test is used to explore the causality among variables. It can handle variables regardless of whether they are stationary at level (I(0)), first difference (I(1)), or a combination of both and integration of order 2, I(2). 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.

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 and Zapata and Rambaldi 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. 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 dmax, ensuring that Granger causality test statistics adhere to the standard asymptotic distribution as stated by Wolde-Rufael. 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. 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 7) 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.

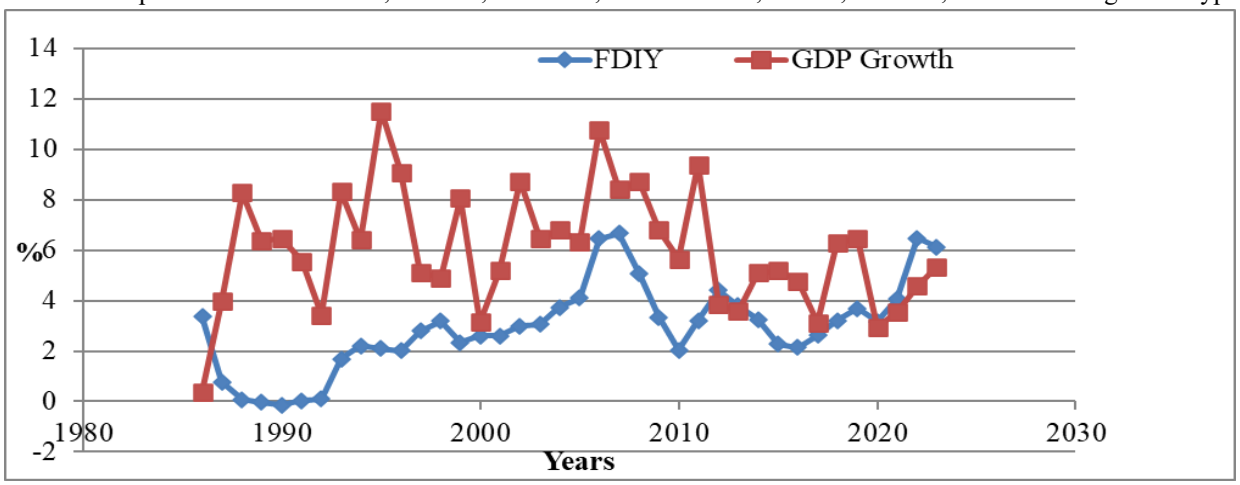

Figure 1: *Foreign Direct Investment (FDIY) and Growth rates 1986 – 2023.*

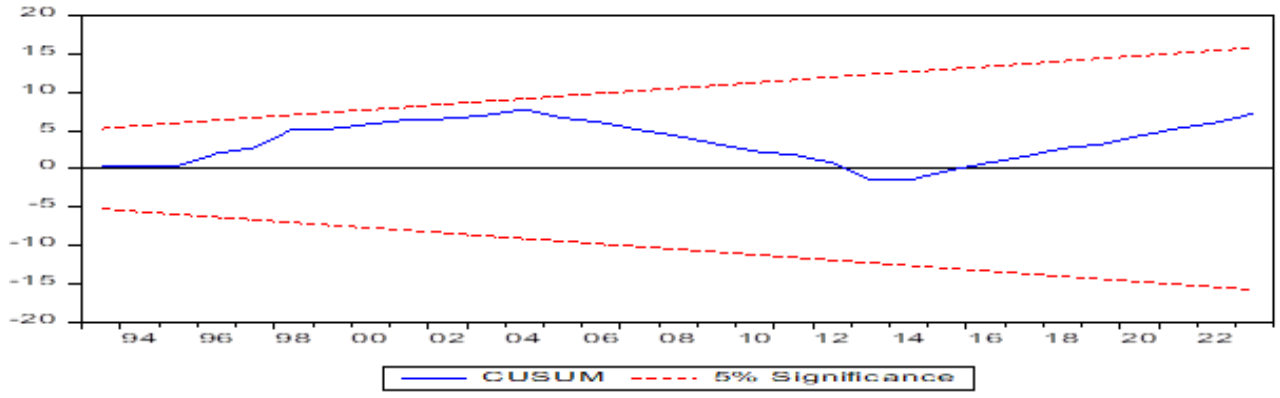

Figure 2: *CUSUM test.*

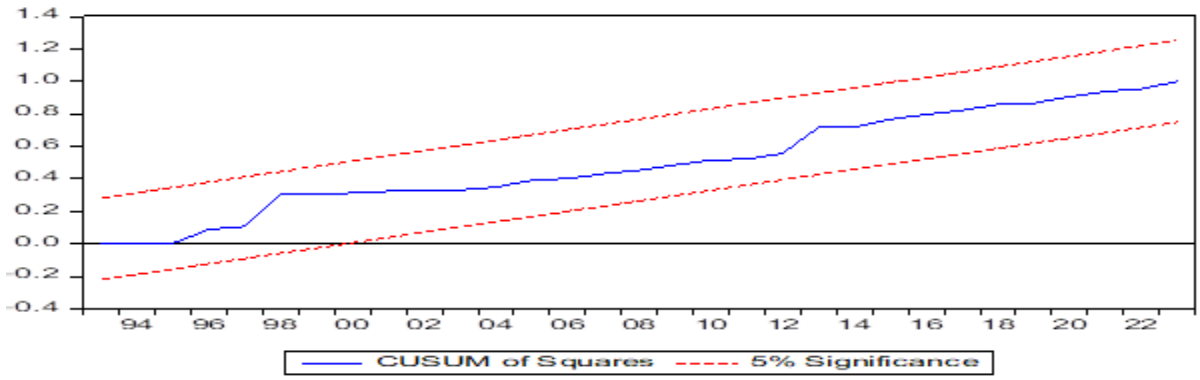

Figure 3: *CUSUMSQ test.*

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

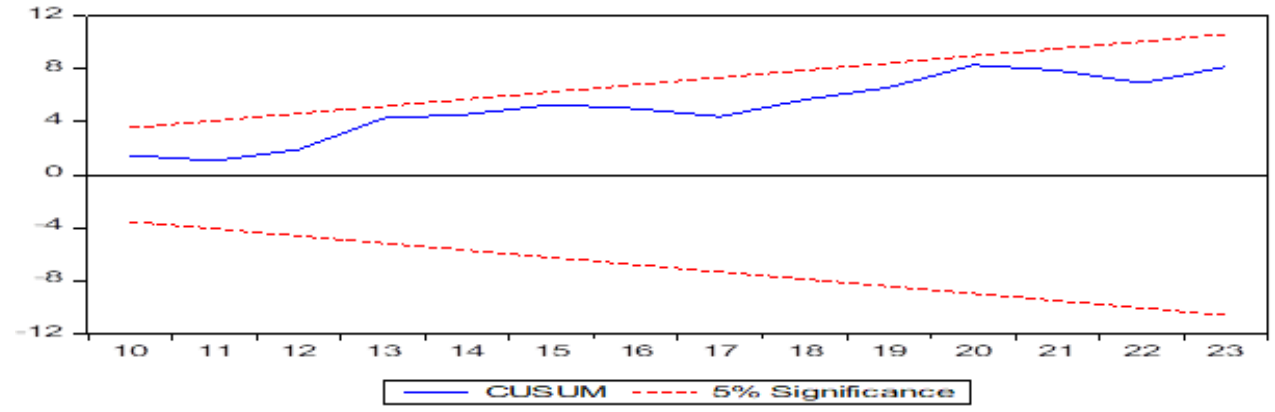

Figure 4: *CUSUM Test.*

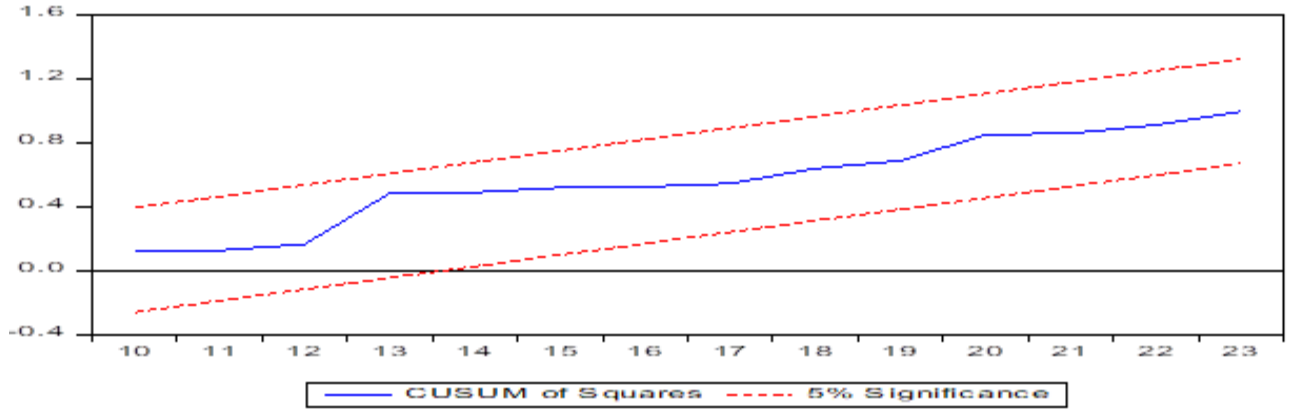

Figure 5: *CUSUM of Square Test.*

Table 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			

Table 2: *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 3: *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										

Table 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						

Table 5: *Results of the Johansen cointegration test.*

Null Hypothesized	λ-Max Statistics	Critical Value	Trace Statistic	Critical Value
r=0	127.52**	95.75	55.45	40.08
r≤1	72.07	69.81	29.89*	33.88
r≤2	42.17	47.85	26.52	27.58
Note: ** represents the rejection of the null hypothesis at 5% level of significance. Source: Own computations				

Table 6: *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
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			

Table 7: *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.			

Table 8: *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			

Table 9: *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			

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 2,3).

Discussion of the Empirical Findings

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

The Descriptive statistics in (Table 2) summarize and organize data sets using numerical measures that include mean, median, mode, variance among others and in some cases visual tools (graphs, charts, tables to describe key characteristics like center, spread, and shape. They provide a concise, objective summary of a sample, forming the foundation of data. (Table 3) 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 dmax is 2.

Cointegration test

Having that data is free from autocorrelation, free from heteroscedisty, must be normally distributed, all variables must be I(0), I(1) or mixture of level and first difference and here the KPSS Test confirms the integration of I(2) for LTOY, it is clear to use Toda-Yamamoto causality test. The final lag is 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 null hypothesis of no cointegration is tested against the alternative hypothesis of cointegration, since the null hypothesis of no cointegration is rejected. 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) indicates that the appropriate lag is 2 since the AIC, SC and HQ all have an italic on 2.

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

Given the trace test and the maximum eigenvalue (λ-max) statistics derived under the Johansen cointegration test, the study confirms that there is cointegration among the variables. The trace test indicates one cointegrating vector, while the maximum eigenvalue test suggests two cointegrating vectors. The existence of cointegration is confirmed above in (Table 5) among the variables. The study then estimates the Toda-Yamamoto causality and Table 7 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 7 That is to say: $p = (k + d)$; leads to $p = (2 + 2) = 4$. The Toda-Yamamoto causality results in (Table 6) 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 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 have shown that GDP growth and gross capital formation positively affect LFDIY in Uganda, but FDI does not Granger cause economic growth [38]. 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. Also, LREER is found to have directional 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.

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 7, 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. The results as shown in (Table 8) 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).

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 9) the null is accepted and conclude that there is no misspecification in the model. 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). 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 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 Toda-Yamamoto approach has been used to investigate the relationship among variables. 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. I recommend Uganda's private sector investment policy to 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 IV. Uganda should 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 [39-45].

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 study recommends Uganda 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.

To most effectively leverage and exploit Uganda's potential to harness beneficial foreign direct investment for the purposes of national economic development and growth, the study recommends that Uganda should vigorously promote and market its investment prospects to the wider global community of prospective foreign investors through coordinated bilateral trade missions and investment promotion agencies stationed at its embassies abroad. It’s also important that macroeconomic stability be fortified by maintaining internationally competitive foreign exchange rates for the domestic currency, curbing inflationary pressures on the general price level, and instituting supportive business regulations and policies that stabilize the macroeconomic environment. Industrial parks and economic zones with supportive infrastructure should be strategically established in regions of Uganda to attract capital inflows oriented towards exports. Fiscal incentives like tax holidays be offered accompanied by public-private partnerships in priority growth. 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. Uganda should strengthen the implementation of this agreement. Real Effective Exchange Rate (REER) is found to supports Foreign Direct Investment (FDI) implying that a stronger or stable currency is attracting investment, often market-seeking or strategic asset-seeking. Therefore, the policy recommendations should focus on maximizing benefits of these inflows while mitigating the risks of reduced trade competitiveness (appreciation) and volatility. The key policy recommendations include:

1. Maintain Exchange Rate Stability and Manage Volatility, Targeted Monetary Policy and implement policies that maintain a stable, predictable exchange rate rather than just a "strong" one, as high volatility deters long-term investment, Manage Currency Appreciation where the REER appreciation is driven by excessive capital inflows (portfolio or FDI), consider cautious capital account management, such as implementing macro prudential regulations to manage capital flows and accumulate foreign reserves and use inward investment to build foreign reserves, allowing the central bank to intervene in the market to prevent excessive currency volatility.
2. Enhance Competitiveness Beyond Currency because the higher REER can make exports more expensive, focus on non-price competitiveness to retain, efficiency-seeking FDI where Infrastructure Investment involves to Invest heavily in transport, energy, and digital infrastructure to reduce operational costs for investors, to Improve Ease of Doing Business and streamline administrative procedures, reduce regulatory burdens, and enhance transparency to boost investor confidence and Skill Development and Invest in human capital to ensure a skilled workforce, enabling technology transfer and higher productivity, making the country attractive despite a higher currency value.
3. Maximize FDI Quality and strengthen local linkages that involve implement policies that encourage multinational companies to develop backward linkages with local firms (e.g., in supplier development programs), fostering technology spillovers, Promote Specific Sectors: Target FDI in industries that are less sensitive to exchange rate fluctuations, such as high-tech manufacturing or services, rather than purely commodity-based sectors and Support Technology Transfer that encourage investments that provide training and knowledge transfer to the local workforce, rather than just capital-intensive, low-skill investment.
4. Foster Institutional Quality that includes legal protections and strengthens intellectual property rights and contract enforcement to ensure that investors feel secure, which is critical when investing in a high-REER environment and investment promotion agencies (IPAs) and utilize IPAs as a "one-stop shop" to facilitate investment, providing support from attraction to after-investment care like Uganda Investment Authority.

By following these policies, a country can leverage a strong REER to attract quality, long-term FDI while ensuring that the broader economy remains competitive and diversified.

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