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The Effect of Foreign Direct Investment (FDI) on Economic Growth in the Ghanaian Economy: Insights from Time Series

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Abstract

Foreign Direct Investment (FDI) is recognized as a significant macroeconomic indicator that exerts a substantial influence on the economic framework of each nation. FDI also possesses the capacity to shape the economic growth trajectory of countries, particularly those in the developing category. Ghana stands out as a burgeoning nation within Sub-Saharan Africa, exhibiting promising economic advancement. In recent years, Ghana's economy has sustained a robust momentum and impressive growth; however, recent data indicate a discernible decline. FDI is a crucial determinant in the propulsion of economic growth. This study aims to investigate the characteristics and trends, magnitude, and direction of FDI inflows into Ghana, while also determining whether these inflows have positively impacted economic growth. The research utilizes an extensive dataset spanning 38 years, comprising annual time series data on FDI, GDP per capita, inflation, macroeconomic stability, and exchange rates from 1980 to 2018, to assess the economic growth of Ghana. The secondary data were obtained from the World Development Index (WDI) and UNCTAD. The methodological framework employed in this study includes the unit root test utilizing the Augmented Dickey-Fuller (ADF) approach, alongside the Ordinary Least Squares (OLS) multiple regression analysis. The findings revealed that the exchange rate emerged as the sole significant variable among the various covariates analyzed in the study. Moreover, the evidence highlights the critical importance of the exchange rate as a vital component of FDI. A sectoral analysis further disclosed that FDI, due to its essential nature in Ghana, is predominantly concentrated in the mining sector, often to the detriment of the fundamental drivers of Ghana's economic growth. The study also identifies various challenges, such as inflation and unfavorable governmental policies, that may impede the efficacy of FDI. Recommendations include the implementation of conducive monetary and fiscal policies aimed at attracting increased FDI, thereby invigorating economic growth and alleviating poverty levels within the Ghanaian economy.

Keywords

FDI, Economic Growth, Time Series, Unit Root Test, OLS, Ghana

1. Introduction and Background of the Study

Foreign Direct Investment (FDI), as delineated by the International Monetary Fund's Balance of Payments, is characterized as a distinct category of international investment that signifies the intent of the direct investor to attain a sustained interest in the enterprise receiving the direct investment. FDI constitutes an investment initiated by an entity within one nation into a commercial venture situated in another nation, aimed at fostering a sustained interest (wherein sustained interest is established upon the investor holding no less than 10% of the voting equity in the enterprise) (Asiedu 2002; Bartlett, Kotrlik, and Higgins 2001). The Organization for Economic Co-operation and Development (OECD) (2012) posits that FDI represents a cross-border investment executed by a resident entity within one economy, with the intention of acquiring a lasting interest in an enterprise that resides in a different nation or economy. Economic growth, conversely, is defined as the enhancement in an economy's capacity to generate goods and services, assessed between distinct temporal intervals. In other terms, it signifies the augmentation in the aggregate volume of goods and services produced by an economy over time (Van den Berg 2016). Since the early

1980s, developing nations have liberalized their economies to pursue investment-friendly policies aimed at attracting foreign investment for the enhancement and expansion of their economic frameworks. Throughout this epoch, FDI was perceived as the preeminent catalyst of economic growth. Nonetheless, the contemporary scenario presents a divergent narrative. The discourse surrounding the impact of FDI on economic growth, particularly in numerous developing economies, including Ghana, remains contentious (Antwi, Mills, Mills, and Zhao 2013; Antwi and Zhao 2013). A considerable number of economists and policymakers maintain that FDI exerts a beneficial influence on economic growth concerning productivity for both nations involved (Nuworkpor 2016). Nevertheless, empirical research has indicated that nations attracting substantial FDI amounts have been able to adeptly navigate the complexities of swift economic reforms by privatizing state assets to foreign investors. This resulted in enhancements in efficiency, technology dissemination, and improved access to global markets. FDI may serve as either a boon or a bane. Numerous studies have substantiated a positive influence, while other researchers assert that FDI has adversely affected nations through the disruption of pre-existing production networks and minimal value addition to manufacturing, alongside a persistent reliance on foreign economic actors (Evans, Larbi, and Johnson 2017).

FDI holds significant relevance to the stock market; over the past decade, the Government of Ghana, via the Ministry of Trade and Industry, has initiated a multi-sectoral project aimed at establishing a conducive environment to attract increased FDI to enhance trade within the economy (Boateng 2010). In an effort to augment FDI inflows, numerous economies have relaxed restrictions on FDI, bolstered their macroeconomic stability, and have also privatized state-owned enterprises while providing subsidies to foreign organizations and individuals seeking to invest in these nations (Boateng 2010).

According to the investment policy articulated by the United Nations Conference on Trade and Development (UNCTAD), foreign direct investment (FDI) inflows into Sub-Saharan Africa (SSA) since 1994 have averaged in excess of USD 4.3 billion, marking the zenith of inflows between the years 1986 and 1991 (UNCTAD 1998). In the year 1997, Nigeria emerged as the preeminent recipient of FDI in Africa, largely attributable to its oil reserves, recording inflows approximating USD 1.5 billion (Townsend 2003). The World Investment Report of 2012 revealed substantial inflows of FDI into Ghana during the preceding years, a phenomenon primarily driven by the discovery of oil resources. FDI is posited to exert a beneficial influence on economic growth through the facilitation of enhanced technological advancement and superior managerial practices (Evans, Larbi and Johnson 2017; Nuworkpor 2016; Townsend 2003). Numerous scholars argue that the advantages of FDI surpass its associated costs, thereby suggesting that FDI does not independently catalyze economic growth, particularly when considered alongside the favorable macroeconomic conditions prevailing in host nations (Djurovic 2012; Hermes 2003; Mello 1999; Melnyk, Kubatko and Pysarenko 2014; Mohammed and Nasiru 2021). The Ghana Investment Promotion Centre (GIPC) was instituted in 1994 with the objective of promoting and facilitating investment within Ghana, thereby fostering an appealing incentive structure and a transparent environment for potential investors. A series of policies have been implemented in Ghana aimed at attracting increased foreign direct investment to elevate the levels of capital and technology (Boateng 2010; GIPC 2013). The GIPC approximated Ghana's FDI inflows at 1.3 billion dollars, constituting roughly 8.09% of Ghana's Gross Domestic Product (GDP) in 2013 (GIPC 2013). Ghana experienced significant inflows of foreign capital, with inflows amounting to USD 3.3 billion from 2011 to 2013 (GIPC 2013). Since gaining independence, Ghana has heavily relied on FDI, a reliance that has adversely impacted various sectors of the economy, resulting in stagnated growth and development. A plethora of studies assert that the relationship between FDI and economic growth remains inconclusive and variable, underscoring the necessity for further research in this domain (Alfaro, Chanda, Kalemli-Ozcan and Sayek 2010; Aitken and Harrison 1999). Notwithstanding this, FDI has predominantly concentrated in Ghana's mining sector over the years (Ackah, Turkson and Adjasi 2014; Antwi et al. 2013), thereby contributing to the neglect and underdevelopment of alternative sectors such as agriculture. Numerous mining operations have usurped extensive tracts of arable land and compromised water bodies, consequently jeopardizing food security within Ghana (Ackah et al. 2014).

Ghana is a nation that has invested considerable resources (both human and financial) towards augmenting FDI within its borders in preceding years. Currently, investment appears to be gradually gaining momentum, attributable to the recent influx of foreign nationals migrating to Ghana to establish businesses. The aim of this study is to empirically investigate the impact of FDI on the Ghanaian economy. The research seeks to elucidate the contributions of foreign investors already operating in Ghana by evaluating the extent to which their investments have facilitated economic growth. It is of paramount importance for both the government and policymakers to ascertain the precise effects of FDI on the national economy.

Having articulated this point, the present study elucidates how policymakers and decision-makers can utilize the empirical evidence provided to establish frameworks and regulations that foster an enabling environment for foreign investment in Ghana.

2. Literature Review

2.1. Empirical Review

Despite the extensive body of literature produced by numerous scholars in prior years aimed at elucidating the correlation between Foreign Direct Investment (FDI) and economic growth, this section is dedicated to a critical examination of both the beneficial and detrimental facets of the influence of FDI on economic growth across diverse nations and regions.

2.1.1. Studies of Positive Impact of FDI on Economic Growth

Despite the extensive body of literature produced by numerous scholars in prior years aimed at elucidating the correlation between Foreign Direct Investment (FDI) and economic growth, this section is dedicated to a critical examination of both the beneficial and detrimental facets of the influence of FDI on economic growth across diverse nations and regions.

2.1.1. Investigations into the Beneficial Effects of FDI on Economic Growth

Melnyk et al. (2014) undertook an empirical investigation encompassing 26 developing nations, including Russia, Ukraine, and Bulgaria, to assess the ramifications of FDI on economic growth. Utilizing the panel ordinary least squares fixed effects methodology from 1998 to 2010, they established a positive correlation between FDI and economic growth. Furthermore, Djurovic's (2012) research explored the nexus between FDI and economic growth within developing economies, employing ordinary least squares and deductive reasoning techniques for analysis over the period from 2000 to 2010. Her findings corroborated a positive linkage between FDI and economic growth, additionally noting that FDI exerts a favorable influence on economic growth when accompanied by increased government expenditure. The study conducted by Mohammed & Nasiru (2021) posited the implications for economic growth in Nigeria from 1981 to 2018, implementing the Augmented Dickey-Fuller technique and the Autoregressive Distributed Lag approach to examine both long- and short-run relationships. The unit root analysis indicated that four variables within the model were stationary at first difference, while one variable was stationary at level. The results from their primary model indicated that FDI has a positive effect on economic growth in both the long and short run. Alfaro et al. (2010) engaged in a comprehensive study aimed at discerning the effects of FDI on economic growth, with a methodological emphasis on the significance of the local financial market. Their analysis favored a small and open economy framework. The findings suggested that economies characterized by higher growth rates are generally more financially developed when juxtaposed with their less developed counterparts. To further substantiate their conclusions, they asserted that increases in share capital yield more substantial growth in financially advanced countries compared to those that are financially underdeveloped. Domestic conditions, encompassing market structures, human capital, and absorptive capacity, exert a more pronounced influence of FDI on economic growth. Additional scholars, including Hermes and Lensik (2003), conducted a study to investigate the interplay between FDI, financial development, and economic growth. Analyzing data from 67 Least Developed Countries (LDCs), predominantly from Latin America, spanning the years 1970 to 1995, they similarly observed a positive

correlation. They further noted that 37 out of the 67 countries exhibited more developed financial markets and consequently experienced a favorable effect of FDI on economic growth, whereas those economies with weaker financial markets did not manifest such positive outcomes. Mello's (1999) findings also corroborate a positive relationship between FDI and economic growth.

Sokang (2018) employed correlation matrix and multiple regression analysis methodologies to scrutinize data spanning from 2006 to 2016 with the objective of elucidating the effects of Foreign Direct Investment (FDI) on the economic growth of Cambodia, yielding results that indicated a favorable effect. Ugochukwu et al. (2013) utilized a growth model in conjunction with an ordinary least squares framework to investigate a comparable scenario, albeit with a concentration on the Nigerian economy. Their investigation revealed a positive yet statistically insignificant effect of FDI on the growth trajectory of the Nigerian economy. Menamo (2014) executed an inquiry in Ethiopia by employing an ordinary least squares technique along with a time series dataset from 1974 to 2001, which likewise established a positive and statistically significant association between FDI and the economic growth of Ethiopia. Hong (2014) conducted an analysis to ascertain how FDI facilitates economic growth, utilizing a generalized method of moments on panel data drawn from 24 prefecture cities in China over the period from 1994 to 2010, and discovered a positive influence of FDI on economic growth. Asiedu's (2002) investigation examines whether the determinants influencing FDI in developing nations exert differential effects on countries within Sub-Saharan Africa (SSA). The outcomes of her research indicate that superior infrastructure positively influences FDI inflows to non-SSA countries, while exhibiting no discernible impact on SSA nations. Tintin (2012) also undertook a study to assess the impact of FDI on economic growth, focusing on a sample of 125 countries, comprising 38 developed and 29 less developed nations. Utilizing panel ordinary least squares from 1980 to 2010, his findings reveal a positive correlation between FDI and economic growth across the selected countries.

2.1.2. Studies of Negative or no Impact of FDI on Economic Growth

Conversely, several empirical investigations regarding FDI and its effects on economic growth have revealed a negative relationship. Sunday & Ango (2014) evaluated the ramifications of FDI on economic growth within Nigeria through the analysis of quarterly time series data from 2009 to 2016. They employed an autoregressive distributed lag model alongside a vector error correction model for their analysis. Their findings indicated that FDI exerts a detrimental impact on economic growth. Rahman (2015) similarly conducted a study examining the relationship between FDI and its effects on various macroeconomic variables within the Bangladeshi economy. His research applied multiple regression analysis to time series data from the period of 1999 to 2013, revealing a negative correlation between FDI and economic growth. Brenner's (2014) research utilized GMM panel regression to analyze data pertaining to 112 nations, encompassing both developed and developing countries while excluding oil-exporting nations for the timeframe from 1974 to 2010. Although he identified a positive impact for developed nations, a negative effect was determined for less developed countries. The investigation conducted by Alfaro et al. (2010) concerning the impact of FDI on economic growth focused on a variety of developing nations. They utilized data covering the years from 1981 to 1999 from 47 developing countries, and their results indicated a negative effect on economic growth within the primary sector. However, in the context of the manufacturing and service sectors, a positive influence on growth was observed. Bermejo Carbonell & Werner (2018) contend that Spain is a nation that experiences a substantial inflow of FDI.

Using the GETS methodology, the researchers determined that there exists no substantiated evidence to suggest that foreign direct investment contributes positively to economic growth in Spain. Konings (2001) employed panel data derived from firms to examine the repercussions of foreign direct investment on the operational performance of entities across three emerging economies, specifically Poland, Romania, and Bulgaria. Utilizing data spanning from 1993 to 1997 and employing the Generalized Method of Moments (GMM), the study yielded no evidence of beneficial spillover effects. Nevertheless, it was noted that a negative spillover effect was present on domestic firms in Bulgaria and Romania, while Poland exhibited

no spillover effects. Carkovic and Levine (2002) conducted a study utilizing panel data from 72 distinct nations, including Ghana, in conjunction with GMM; their findings indicated that FDI inflows exert a contingent effect on economic growth, which stands in stark contrast to prevailing theoretical frameworks. Their analysis was grounded on cross-country data from 1960 to 1995. Demirsel, Ogut, and Macuk (2014) investigated the association between FDI and economic growth in Turkey by analyzing data from 2002 to 2014, employing unit root tests, Johansen co-integration tests, and variance decomposition methodologies. Their results indicated an absence of a long-term relationship between these two variables. Aitken and Harrison (1999) executed firm-level analyses within specific countries and concluded that foreign direct investment does not facilitate economic growth. The findings of Saqib, Masnoon, and Rafique (2013) stand in opposition to the modernization theory, which posits that FDI functions as a catalyst for economic growth, asserting that economic expansion necessitates capital investment. Their dependency theory posits that if a nation is reliant on foreign investment, it may experience adverse effects on its economic growth. Awe (2013) conducted research focusing on this topic within the context of the Nigerian economy, with his results similarly indicating a detrimental effect of FDI on Nigeria's economic growth.

2.1.3. Empirical Review on Ghana

Despite the multitude of studies conducted in diverse countries, Bermejo Carbonell & Werner (2018) argue for the necessity of single-country investigations, citing the heterogeneous nature of the relationship between FDI and economic growth. Accordingly, it is essential to refine the literature to concentrate exclusively on the Ghanaian economy. Asafu-Adajaye (2005) conducted a study aimed at clarifying the relationship between economic growth and FDI in Ghana. Employing the ordinary least squares technique and analyzing annual time series data from 1973 to 2003, he posits that FDI has a positive effect on Ghana's economic growth. Conversely, Owusu Antwi et al. (2016) contend that although FDI contributes to economic growth and development, its impact is significantly diminished if the investment is not directed towards alleviating the poverty rate within the host nation. The study by Antwi, Mills, and Mills et al. (2013) concentrated on the correlation between FDI and Ghanaian economic growth from 1980 to 2010, applying the Johansen Multivariate co-integration test which revealed a negative long-term relationship between GDP and FDI. They further identified a unidirectional causality existing between GDP and FDI. Iddrisu, Adam, and Halidu (2015) investigated the implications of FDI on the performance of the industrial sector in Ghana.

They utilized time series data spanning from the year 1980 to 2013 and employed Johansen's co-integration test for the analytical examination of their dataset. Their results indicated that Foreign Direct Investment (FDI) exerts a positive and statistically significant long-term impact on the performance of the industrial sector in Ghana. Moreover, Tee (2017) analyzed time series data from 1980 to 2012 with the objective of elucidating the relationship between FDI and economic growth in Ghana, ultimately discovering a positive and significant correlation of FDI on economic growth. He further employed linear regression analysis to interpret the data. His findings suggested that for FDI to significantly enhance economic growth, it is essential for the host country to possess a robust initial GDP and substantial human capital to facilitate such contributions. Frimpong and Oteng-Abayie (2006) adopted a bi-variant framework in their investigation and obtained divergent outcomes across various sample periods. The findings indicated an absence of causality between FDI and growth for both the total sample period and the pre-Structural Adjustment Program (SAP) period. Conversely, a unidirectional causative relationship was identified from FDI to GDP growth during the post-SAP period. Upon extensive literature review, empirical evidence regarding the relationship between FDI and economic growth has been characterized by either positive, negative, or negligible associations. Consequently, there appears to be no definitive directional relationship between FDI and economic growth.

2.2. Theoretical Review

Economic theories serve as foundational assumptions utilized to forecast the outcomes of a dependent variable and to elucidate the relationships that exist with other covariates or explanatory variables. In this

context, FDI and economic growth emerge as the principal variables of interest within this research. FDI has the potential to serve as a long-term determinant of growth, thereby providing a more comprehensive explanation of economic growth dynamics. A substantial amount of theoretical inspiration is derived from various growth theories that will underpin this theoretical review (Nuworkpor 2016). Among these growth models are the Solow Growth Model, which originates from the works of Solow (1956) and Swan (1956), alongside the theory of neoclassical growth, endogenous growth, and the Harrod-Domar growth model. Theoretical frameworks are often better comprehended through a classical lens. The Solow Growth Model, as proposed by Robert Solow and Trevor Swan (1956), postulates a neoclassical production function that indicates the total output and growth of an economy is contingent upon several factors: Labor (L), Capital (K) and depreciation.

The collective contributions of these inputs generate output (Y), which is mathematically represented in the function below:

All these inputs put together produces output (Y) and is represented mathematically in the function below:

$y_t = sf\ (k) - \ n + \ \delta + d)k)$ (1)

As previously mentioned, the Solow Growth Model constitutes an economic framework for long-term growth situated within neoclassical economic paradigms. A fundamental assumption of this model is that capital experiences diminishing returns. This model predicts that nations with lower GDP per capita are more inclined to experience accelerated growth rates and returns. Additionally, the model elucidates the steady-state level of capital and the influence of investment on output and economic growth. It is crucial to acknowledge that this study overlooks the long-term impacts of FDI inflows; hence, it is presumed that growth remains constant in the long run.

y= Output which is the measure of growth, s= Level of savings in the economy, n= Population

δ= Depreciation of capital, d= Depreciation of technology

The Solow growth mode is mathematically represented as;

$y_t = sf\ (k) - \ n + \ \delta + d)k)$ (2)

This framework suggests that shifts in technological paradigms have a profound effect on economic progress, and that innovations in technology often stem from unforeseen occurrences (Gujarati 2004; Todaro 2000). It is observable that an escalation in population growth adversely impacts investment levels; notwithstanding the increase in labor per capita, this phenomenon ultimately results in a contraction of economic growth. Similarly, the Harrod-Domar Model elucidates the dynamics of economic growth. This theoretical framework was established by Roy F. Harrod and Evsey Domar, integrating elements from both classical and Keynesian growth paradigms (Gujarati 2004; Todaro 2000). The model posits that there exists no inherent justification for an economy to achieve a naturally balanced growth trajectory. Pertinent to this inquiry, the model, akin to the Solow growth model, asserts that growth is contingent upon Labor (L) and Capital (K), with the caveat that augmented investments culminate in capital accumulation, which subsequently fosters economic growth (Gujarati, 2004). In numerous Least Developed Countries (LDCs) and regions in the global south, human capital is abundantly available; however, this assertion does not extend to physical capital, which tends to hinder economic advancement. Moreover, the insufficiency of disposable income for savings in LDCs significantly impedes the accumulation of physical capital stock through investment.

Specification for the Harrod-Domar model:

$\Delta y/y = s/k = g = s/k$ (3)

Where g = growth of national output, s = savings ratio, k = capital

Two salient conclusions can be drawn from the aforementioned model specification. Firstly, the model asserts that elevated savings correlate with increased investment levels, which, in turn, inherently generates economic growth. Secondly, when capital diminishes, the economy is capable of producing more with fewer inputs, thereby facilitating economic growth (Gujarati 2004). Consequently, for developing nations like Ghana to realize economic growth, it is imperative for governmental entities to foster savings and advocate for technological progress to mitigate the capital-output ratio $\frac{k}{y}$.

Therefore, this model assert that economic growth is a function of FDI. This is represented as Economic growth = f (FDI). To achieve such growth, the government could promote the transfer of technology from one nation to another, as this also constitutes a form of FDI, potentially leading to technological diffusion. Technological diffusion refers to the process by which a nation assimilates foreign technology from a more technologically advanced country to enhance its own economic growth. The theoretical frameworks surrounding technological diffusion concentrate on the mechanisms and rates at which new technologies proliferate across nations. In this context, a sluggish response to the adoption of new technologies by a country may impede its growth trajectory (Geroski, 2000). The optimal approach for technology diffusion occurs through vertical integration, wherein a country establishes a partnership with a sister company in the host nation, aiming to enhance efficiency and productivity by providing technical training aligned with international market standards and introducing innovative technologies to augment worker efficacy, among other benefits. Nonetheless, the transfer of technology between firms or through horizontal integration within the same industry remains exceedingly uncommon (Lean 2018).

3. Methodology

3.1. Research Design

The research philosophy deemed most suitable for this investigation is positivism. Positivism is grounded in the conviction that knowledge is derived from empirical observation and the application of scientific methodologies. Consequently, the ontological perspective of positivism posits that an objective reality exists, which can be observed, scrutinized, and comprehended through systematic observation and analytical processes. The epistemological foundation of positivism posits that knowledge is most effectively obtained through the application of quantitative data and statistical analysis, which serve to elucidate concealed patterns and facts. Accordingly, this investigation employs quantitative and secondary data to examine the determinants of Foreign Direct Investment (FDI) in Ghana. Quantitative research is characterized as a systematic inquiry into phenomena that entails the collection of quantifiable data and the application of statistical, mathematical, or computational methodologies (Aryeetey and Baah-Boateng 2007; Obuobi 2024). Moreover, it constitutes an empirical examination with the primary aim of establishing and utilizing mathematical models and hypotheses that pertain to the elucidation of the truth regarding an event. Unlike primary data, secondary data is gathered by an external entity for an alternative purpose. This type of data is utilized to enhance the sample size of research studies, thereby improving their overall efficiency. A sample is defined as the appropriately selected subset of individuals, animals, or entities from which data is extracted (Bartlett, Kotrlik and Higgins 2001). This study has compiled secondary data (time series) sourced from the World Development Index (WDI) spanning the years 1980 to 2018. Additionally, data was also obtained from UNCTAD covering the period from 2010 to 2018. The rationale for utilizing time series data was to elucidate the relationship between FDI and economic growth. Furthermore, the study aspires to investigate specific sectors within the economy that significantly contribute to FDI in Ghana, such as the mining, banking, and telecommunications sectors, among others. A substantial proportion of the data utilized was derived from the WDI database, and the inflows of FDI into the various sectors were collected from their respective annual reports accessible on their websites for the purposes of sector analysis. The data was analyzed using the 2016 version of the Stata statistical analytical tool, as well as Microsoft Excel version 2016. The latter was employed for frequency analysis, descriptive statistics, and inferential statistics, including tables and charts for visual representation.

3.2. Model Specification

As previously delineated in the literature review, this study adopts the Harrod-Domar growth model, which exhibits similarities to the Solow growth model. This model asserts that the growth rate of an economy is contingent upon the savings and capital-output ratio. Consequently, the Harrod-Domar model is specified as follows;

$$\Delta Y/Y = s/k \equiv g = f(S/K) \qquad (4)$$

Here:

g = Growth rate of national output, s= Savings ratio

k = capital output ratio

From this equation savings has a positive (direct) relationship with growth. With a focus on the Ghanaian economy, it is clear that FDI is a form of investment. In view of this, the hence model can be specified as:

$$g = f(FDI) \qquad (5)$$

Instead of FDI alone being the only variable, some covariates have been introduced into the model to generate a baseline model as shown below. These explanatory variables are inflation, government spending, and savings.

$$g = f(FDI, INF, GE, S) \qquad (6)$$

Where FDI= Foreign direct investment, INF= Inflation, GE= Government expenditure, S= Savings

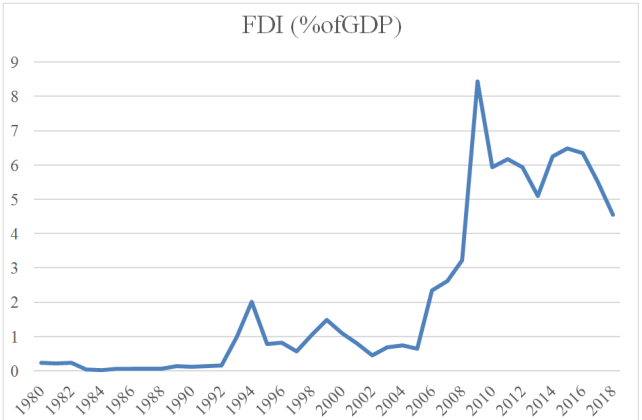
This model is depicted in an econometric form as shown in the equation below:

$$lng = \beta_0 + \beta_1 lnFDI + \beta_2 lnINF + \beta_3 lnGE + \beta_4 lnS + \mu) \qquad (7)$$

Where μ is the disturbance term, β represents the parameter estimate while ln represents the natural logarithm. According to Gujarati (2004), there exist several justifications for the incorporation of logarithmic transformations in a model. Firstly, such transformations facilitate the measurement of all variables using a uniform unit. Secondly, time series data, like that employed in this study, typically exhibit no linear trend until subjected to logarithmic transformation. Thirdly, this approach aims to mitigate the issues of heteroscedasticity and autocorrelation present in the residuals. Lastly, most time series data possess intrinsic growth rates that may either be constant or variable. Furthermore, irrespective of the degree of differencing applied, the data will remain non-stationary unless it is transformed.

4. Results of Data Analysis and Discussions

4.1. Pattern of Ghana's FDI Inflows from 1980-2018



Source: Authors construct from WDI (1980-2018)

Figure 1. *Graphical analysis of FDI in Ghana.*

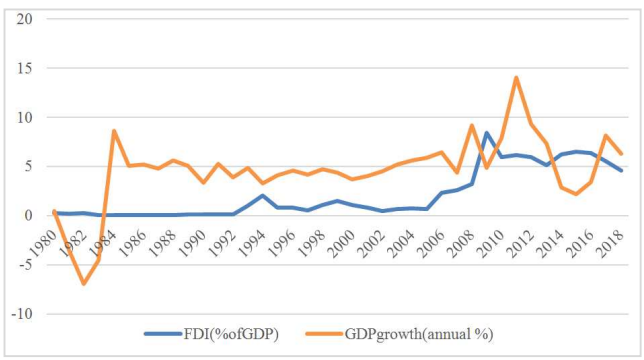
Figure 1 presented above illustrates the variability in the patterns of Foreign Direct Investment (FDI) inflow within the country from 1980 to 2018. The trajectory exhibited an asymptotic nature from 1980 to 1992, subsequently adopting a positive incline until it reached its zenith in 2009, after which it transitioned into a negative slope. The initial asymptotic trajectory can be ascribed to the gradual ripple effect of the Structural Adjustment Programme (SAP) until the year 1992, a pivotal moment marking Ghana's emergence as a democratic state. In this context, one may posit a potential correlation between the establishment of democracy and the inflow of FDI. This observation suggests that the benefits of the SAP were not instantaneously manifested in FDI, thereby causing investors to harbor diminished confidence in the country until the consolidation of Ghana's democratic governance.

4.2. Descriptive Analysis of FDI as a Percentage of Ghana's GDP

Both Table 4.1 and the accompanying graph delineate FDI inflows into Ghana as a proportion of Gross Domestic Product from 1980 to 2018. The investment climate in Ghana during the 1980s was characterized by relatively low levels of FDI owing to significant economic adversities (such as droughts occurring from 1981 to 1983) experienced during this timeframe, with investors typically reluctant to commit capital to unstable nations (Ghana Investment Promotion Centre [GIPC], 2013). In response to these challenges, the government initiated the Economic Recovery Program (ERP) in 1983, under the auspices of the World Bank and the International Monetary Fund (IMF). The ERP was instituted with the objective of alleviating Ghana's debt burden and enhancing the nation's trading position within the global economic arena. This initiative unfolded in two distinct phases, the initial phase transpiring from 1983 to 1986 (GIPC, 2013). The primary aim of the initial phase was stabilization, while the subsequent phase, spanning from 1987 to 1989, focused on structural adjustment. Following the successful execution of this program, there was a notable enhancement in international confidence regarding Ghana as a viable investment destination; from 1980 to 1993, Ghana's FDI fluctuated between 0.23 and 0.99, failing to surpass the threshold of 1.00 until the establishment of the GIPC in 1994, which catalyzed an increase in FDI to 2.02 (GIPC 2013).

During the interval from 1990 to 1992, Foreign Direct Investment was relatively subdued due to political instability and the presence of a military government. However, FDI experienced an upswing from 0.15% in 1992 to 0.99% in 1993, coinciding with the promulgation of the 1992 constitution. The Ghana Investment Promotion Center was inaugurated in 1994, aiming to bolster the inflow of FDI into Ghana. Following the year 1994, FDI exhibited a decline, with Ghana achieving an unprecedented FDI level of 8.43 in 2009, which remains the highest recorded in its historical context. Since that time, the country has not replicated such elevated levels of FDI. A reduction of approximately 3% in FDI was observed in 2010 relative to 2009. An increase was noted in 2011, reaching 6.18, followed by a downturn in 2012 and 2013. In 2016, the nation reported FDI inflows amounting to 6049, marking the second highest figure ever recorded by Ghana (GIPC, 2013).

4.3. Trend of FDI Net Inflows and GDP Growth from 1980 to 2018



Source: Authors construct from WDI (1980-2018)

Figure 2. *FDI Net Inflows and GDP Growth from 1980 to 2018.*

4.4. Trend of GDP Annual Growth from 1980 to 2018

Examining figure 2, it becomes evident that GDP annual growth reached its apex in 2011 at 14.047%. Subsequent to this peak, GDP annual growth diminished in 2012 to 9.293%; however, between 1981 and 1983, Ghana experienced its lowest annual GDP growth, which was characterized by negative figures. Conversely, from 1984 to 2007, the annual growth rate stabilized, after which the trend exhibited fluctuations until the year 2018. In 1981, Ghana experienced a foreign direct investment (FDI) net inflow of 0.23%, while the gross domestic product (GDP) growth for that year was recorded at 3.503%. In 1984, despite a further decline in FDI to 0.02%, GDP growth exhibited a positive trajectory, culminating in a rate of 8.648%. An examination of Figure 2 indicates that net inflows of FDI do not necessarily correlate with economic growth; notably, during the years 1987 and 1988, when FDI remained constant at 0.5%, GDP growth increased from 4.795% to 5.628%. The year 2011 marked the apex of GDP growth for Ghana, achieving a remarkable rate of 14.047%, while foreign direct investment inflows were recorded at 6.18%.

4.5. Sectors that Attract FDI in Ghana

The mining sector garnered substantial attention under the Economic Recovery Programme initiated in 1983. This period witnessed significant policy reforms aimed at attracting investors, including the establishment of the Minerals Commission in 1984, the enactment of the Small Scale Mining Law in 1989, and the formation of the Environmental Protection Agency in 1994, all designed to enhance investor interest within the mining sector. The corporate income tax levied on mineral production by private enterprises in Ghana decreased from approximately 50 percent in 1975 to 45 percent in 1986, and further to 35 percent in 1994. Mining companies were permitted to retain a minimum of 25 percent of foreign exchange for the procurement of physical capital necessary for production and the distribution of dividends. The advantages derived from mining companies, reinforced by mineral statutes and policies, culminated in the swift expansion of Ghana's mining sector (Amponsah-Tawiah and Dartey-Baah 2011; Aryeetey and Baah-Boateng 2007). The mining sector attracts over fifty percent of total foreign direct investment, generates more than one-third of overall export revenues, and stands as the leading tax-contributing sector within the economy, thereby making a significant contribution to the gross domestic product. In 2013, the sector represented approximately 37 percent of export revenues and 19 percent of all direct tax contributions in Ghana (Ghana Chamber of Mines 2015).

4.6. Analysis of Regression and Unit Root Test Results

Having established that the mining sector represents the preeminent contribution to foreign direct investment in Ghana, the next section undertakes a detailed analysis of the data relevant to the study. This analysis examines the regression outcomes derived from time series data utilizing the STATA statistical software. Investment decisions made by firms are typically informed by historical data and various covariates. The explanatory variables identified include exchange rate, inflation, GDP, and economic stability, with FDI inflow serving as the dependent variable. Ojiya, Okoh, Mamman, et al. (2017) assert that the Augmented Dickey-Fuller (ADF) test appropriately adjusts for autocorrelation; hence, in order to commence the dynamic (long-term) regression analysis, the study initiates with a unit root test to ascertain the stationarity of the variables within each of the models presented in the table below.

Table 1. *Results of the Augmented Dickey-Fuller (ADF).*

Variables	Test Result	Prob. values
Macroeconomic Stability		
Augmented Dickey-Fuller test statistics	-6.822	0.0000 ***

	1%	-4.260	
Test critical values:	5%	-3.548	
	10%	-3.209	
Inflation			
Augmented Dickey-Fuller test statistics		-8.480	0.0000***
	1%	-4.260	
Test critical values:	5%	-3.548	
	10%	-3.209	
GDP per Capita			
Augmented Dickey-Fuller test statistics		-3.612	0.0288**
	1%	-4.260	
Test critical values:	5%	-3.548	
	10%	-3.209	
Exchange Rate			
Augmented Dickey-Fuller test statistics		-1.729	0.0462**
	1%	-2.434	
Test critical values:	5%	-1.688	
	10%	-1.306	
FDI			
Augmented Dickey-Fuller test statistics		-2.567	0.2952
	1%	-4.260	
Test critical values:	5%	-3.548	
	10%	-3.209	

Source: Authors construct from Stata Computations using WDI data (1980-2018). Note: ***, **, * significant at 1%, 5% and 10% respectively

Table 2. *Unit Root Test Results.*

Variables	**Test Result**
Macroeconomic Stability	-6.822
Inflation	-8.480
GDP per Capita	-3.612
Exchange Rate	-1.729
FDI	-2.567

Source: Authors construct from Stata Computations using WDI data (1980-2018)

Cochrane (1997) posits that unit root analysis addresses the implications for the levels of a process that are stationary in differences, as opposed to generalized random walks. In light of this, it is imperative to monitor the level of the process or its first difference $(y_t - 1)$.

Consequently, the outcomes derived from the unit root test, utilizing the Augmented Dickey-Fuller (ADF) methodology as delineated in tables 1 and 2, indicated that none of the examined variables exhibited stationarity across various levels. The variables pertaining to Macroeconomic stability and inflation reached significance at the 1 percent level, while GDP and exchange rate attained significance at the 5 percent threshold. Thus, the null hypothesis concerning non-stationarity cannot be dismissed at the levels tested, with the exception of Foreign Direct Investment (FDI). Consequently, it can be asserted that FDI represents the sole non-stationary variable among the variables under investigation. The remaining variables do not demonstrate characteristics indicative of a random walk; however, FDI achieves stationarity after the first difference.

Table 3. *OLS Regression Results.*

Variables	**Coefficient**	**Standard Error**	**T**	**P-Value**	**95% Confidence Int.**	
Macroeconomic Stability	-0.0580165	0.035298	-1.64	0.109	-0.1297508	0.0137177
Inflation	0.0476265	0.0363449	1.31	0.199	-0.0262352	0.1214882
Real Exchange rate	0.0221988	0.0068877	3.22	0.003***	0.0082014	0.0361962
GDP per Capita	0.0529763	0.109004	0.49	0.630	-0.1685465	0.274499
Cons	0.926694	0.9503668	0.98	0.336	-1.004684	2.858072
Number of Observations	39	R-Square	0.4437		Adj.R-squared	0.3783
		F-Statistic	6.78		Prob > F	0.0004

Source: Authors construct from Stata Computations using WDI data (1980-2018). Note: ***, **, * significant at 1%, 5% and 10% respectively

Table 3 shows the results on determinants of FDI in Ghana using the multiple regression results of the OLS Technique. The results shows that (R^2) = 0.4437 which is 44.37%. This implies that the explanatory variables explained up to at least 44.37% of the constant (FDI). The F-statistic is used to test the overall significance of the model and from the results Prob > F is 0.0004 which means that the overall significance of the model is significant at 1 percent. In testing for the individual statistical significance, the t-statistic is used by employing the rule of two (2). This implies that if the t value is greater than two (2) then the variable becomes significant. In view of this, real exchange rate was found to have a positive and statistically significant effect ion FDI in the Ghanaian economy. The results implies that a 1% increase in exchange rate leads to 0.22% increase in FDI in Ghana using the OLS. Therefore, a stable exchange rate in Ghana will serve as a stimulus for massive foreign investment in Ghana. This is because according to the p-values only real exchange rates was significant therefore the result implies that when real exchange rate increase by 1%, foreign direct investment will increase by 0.0221988 percentage points. The empirical evidence suggests an absence of a significant correlation between FDI and economic growth, which aligns with the conclusions drawn by Aitken and Harrison (1999) and Demirsel, Ogut, and Macuk (2014).

5. Conclusion

Foreign Direct Investment (FDI) constitutes a pivotal element in stimulating economic growth. This study primarily aims to elucidate the nature, pattern, magnitude, and direction of FDI inflows within Ghana, while also assessing whether these inflows have contributed to enhancing economic growth. The research utilizes extensive time series annual data on FDI, GDP per capita, inflation, macroeconomic stability, and exchange rates spanning from 1980 to 2018 (a duration of 38 years) to analyze the economic growth trajectory of Ghana. The secondary data was acquired from the World Development Index (WDI) and UNCTAD. The methodological framework adopted for this study comprised the unit root test utilizing the Augmented Dickey-Fuller (ADF) approach, in conjunction with the Ordinary Least Squares (OLS) multiple regression technique. The findings revealed that the effect of the exchange rate was the singularly significant variable among the various covariates considered in this analysis. Moreover, the evidence emphasizes the critical importance of the exchange rate as an essential determinant of FDI. A comprehensive sector analysis has elucidated that foreign direct investment (FDI) and its critical significance within the context of Ghana is predominantly concentrated in the mining sector, thereby undermining the essential drivers of Ghana's economic growth (Antwi et al. 2013; Aryeetey and Baah-Boateng 2007; Ghana Chamber of Mines, 2015). Notably, the regression analyses indicated a lack of correlation between FDI and economic growth, given that economic growth was not a statistically significant variable. Nevertheless, the trend analysis depicted in the charts generated via Excel suggests the presence of a certain degree of association. It is important to highlight the existence of outliers, particularly in the intervals from 1980 to 1984 and from 2014 to 2017. During the former period, while FDI reached asymptotic levels, GDP exhibited both negative and positive slopes concurrently. In contrast, the latter period presents a divergent scenario; as FDI demonstrated a concave trajectory, GDP manifested a convex trajectory. This discrepancy warrants further investigation to elucidate these phenomena. Additionally, the study identifies obstacles such as inflationary pressures and adverse governmental policies that may impede the efficacy of FDI.

6. Recommendations

The study offers both empirical and theoretical perspectives regarding the role of FDI in facilitating economic growth. Several recommendations have been derived from the findings of the study. It is crucial for the government to formulate and implement policies that foster the attraction of increased FDI into Ghana, particularly through the Ministry of Trade and Industry. Furthermore, FDI inflows should be strategically directed towards the enhancement of the manufacturing and agricultural sectors. This is attributable to the numerous bottlenecks that obstruct the development and advancement of these two sectors, which are pivotal for driving the country's industrialization agenda. Lastly, the study advocates that the Bank of Ghana and the Ministry of Finance should enact favorable monetary and fiscal policies, respectively, to lure more FDI into the nation. Such initiatives possess the potential to stimulate economic growth and mitigate poverty levels within the Ghanaian economy.

Abbreviations

ADF	Augmented Dickey-Fuller
ERP	Economic Recovery Program
FDI	Foreign Direct Investment
GETS	Generalized Evaluate Test and Support
GCM	Ghana Chamber of Mines
GDP	Gross Domestic Product
GIPC	Ghana Investment Promotion Centre
GMM	Generalized Moment Method

LDCs	Least Developed Countries
OLS	Ordinary Least Squares
OECD	Organisation for Economic Co-operation And Development
SSA	Sub-Saharan Africa
SAP	Structural Adjustment Programme
UNCTAD	United Nation Conference on Trade and Development
WDI	World Development Index

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability

Data for the study was sourced from the WDI website. The Data is publicly available on https://databank.worldbank.org/source/world-development-indicators.

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