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The Interplay of Monetary Policy Rate, Foreign Direct Investment and Unemployment within the Ghanaian Economy.

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ABSTRACT

A further understanding into the interplay of the reference rate, inflow of capital from non-residents of the country and unemployment within the Ghanaian economy was sought by this study. To achieve this, secondary data from 2003 to 2023 were utilized. Three specific objectives were addressed by the research work. To begin with, the effect of the base rate and prior capital inflows from foreigners on future investments in Ghana was assessed. The results indicated that while a direct influence on future investments was made by the reference rate and past investments from non-residents, a more deterministic significance was by previous investments. Second, the effect of prior capital inflows by foreigners and previous levels of unemployment on the current levels of the base rate was probed. The reference rate that was set by the central bank of Ghana was found to be more dependent on lagged foreign direct investments than on past unemployment levels. This showed that the central bank was more willing to mitigate the risk associated with inflation than to stabilize the labor market. Lastly, the influence of the reference rate and unemployment from previous years on future unemployment was determined. An analysis of the impact of prior levels of unemployment and the rate set by the central bank on the unemployment rate revealed that a notable effect on the level of unemployment in Ghana was had by the monetary policy rate.

Keywords: Unemployment, Monetary Policy Rate, Foreign Direct Investment

INTRODUCTION

Background of the Study

From old, achieving economic stability was a crucial goal for governments and policymakers. Economies were categorized into three groups: developed, transitioning and developing. In the long run, macroeconomic stability was sought by every economy, with economic growth as the ultimate goal.

A number of policies were formulated to help stabilize and grow Ghana's economy. For Ghana to develop, keen attention was to be placed on investment, interest rates and unemployment. The reference rate is considered crucial for the efficient distribution of resources, which was aimed at fostering investment and stimulating economic growth. The meanings and names of interest rates differed based on their context, with some names including mortgage rates and policy rates. This research concerned itself with the reference rate, which was determined by the Bank of Ghana as a way to manage the economy. It was believed that a higher monetary policy rate discouraged borrowing and spending, while a lower rate encouraged economic activity. In 1988, a comprehensive Financial Sector Adjustments Program (FINSAP) was launched in Ghana. This financial reform was intended to restructure regulations for banking operations and liberalize interest rates. Over the past years, Ghana's economic landscape had witnessed enormous interest rate savings in various sectors.

Investment was considered a key component of economic growth because it contributed to national income. The differential of stock within a set period was described as an investment and was classified into private and public.

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Private investment involved the inflow of capital from firms, financial organizations, or other non-government investors. The reference rate was said to be an important component of investment in an economy. The most important task for any economy seeking economic growth was to disburse its capital resources across varying investment outlays. For this work, capital inflow was limited to foreign direct investment (FDI).

FDI referred to long-term investments that were made by individuals who did not reside in a country. It could take various forms, including the establishment of new businesses or the merger or acquisition of existing ones. FDI was considered a notable catalyst for economic growth, job creation and technological innovation.

Unemployment, a persistent macroeconomic issue, impacted individuals, societies and nations as a whole. It signified the underutilization of resources. A reduction in unemployment and a knowledge of its determinants was considered important for developing effective strategies.

The link between foreign direct investment, the reference rate and unemployment was complex and multifaceted. A lower monetary policy was thought to be able to stimulate investment by reducing borrowing costs. A rise in FDI could lead to job creation and economic growth, which in turn could lead to a fall in unemployment. However, the actual impact of these factors could vary depending on other elements such as economic conditions, the type of capital inflows and the effectiveness of monetary policy transmission mechanisms.

Statement of the Problem

Ghana's economic setting is characterized by an interdependence between the reference rate set, the employment rate and the movement of capital into the country by foreigners. The reference rate that was set by the central bank was a key determinant for controlling inflation and stimulating economic activity. Its effectiveness could be influenced by and in turn could influence, other macroeconomic factors such as unemployment rates and foreign direct investments. All things being equal, foreign direct investment was a long-term capital inflow that was often necessary for economic growth through job creation and technological transfer. Despite this, foreign direct investment decisions were not made by investors in a vacuum; rather, they depended on a country's economic stability, which was signaled by the reference rate. Concurrently, the level of unemployment, which was a reflection of the health of the labor market, could be used to shape the decisions of policymakers regarding the setting of interest/reference rates. The intricate relationship between these macroeconomic variables presented an issue for policymakers and researchers, necessitating a thorough investigation to understand their causal links and feedback mechanisms.

This thesis sought to address some research gaps that were identified by critically analyzing the interactions between the monetary policy rate, foreign capital inflow, unemployment and the previous values of capital inflows by foreigners and unemployment to observe how they influenced one another. By exploring such relationships, a contribution to existing knowledge on the matter would be made by this research, thereby providing insights for policymakers who were aiming for sustained economic growth and stability.

Objectives of the Study

The primary intent of this work was to scrutinize the interplay between capital inflows from foreigners, the base rate and unemployment. The primary objectives of the study are:

1. To assess the influence of monetary policy rate and previous foreign direct investment on future investments in Ghana.

2. To investigate the effect of lagged unemployment and lagged foreign direct investment on monetary policy rate in the current year within the country.

3. To ascertain how monetary policy rate and previous years' unemployment influences unemployment in the current year

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Research Problems

The research questions for the study are:

1. What is the impact of past foreign direct investments and monetary policy rates on prospective foreign direct investment in Ghana?

2. What is the impact of lagged foreign direct investment and lagged unemployment on Ghana's current monetary policy rate?

3. What impact does past years' unemployment and monetary policy rate have on Ghana's unemployment rate?

Significance of the Study

Though various works have been examined on the effect of the base rate on unemployment and the role of foreign capital inflows in the overall growth of economies, there is a need for further research to specifically bring to light their combined effect on unemployment. This research work seeks to empirically analyze the connection between these macroeconomic variables and bring to light valuable insight for economists, policymakers and other learning institutions on the path to developing policies for employment outcomes. In understanding this relationship, policymakers can make more informed decisions on attracting foreign direct investment, implement appropriate monetary policies and design targeted interventions to address unemployment challenges in Ghana. Knowledge acquired in this research will add on to the broader exiting literature on monetary policy, foreign direct investment and unemployment, providing a deeper understanding of their interplay in less developed economies such as Ghana.

Scope and Limitations of the Study

This work pays attention to the various forms of connections that thrive between monetary policy rate, foreign capital inflows and unemployment. It seeks to use secondary data obtained from various trusted sources spanning from 2003-2023.

This study acknowledges its inherent limitations, primarily in the form of the linear association between variables used for estimation and the omission of other relevant variables such as policies implemented by the government. Furthermore, the findings were constrained by the accuracy of the Ghanaian labor data, as official unemployment figures often fail to capture the large informal sector and hidden underemployment.

Organization of the Study

Every chapter was presented using a five-part study. The first chapter detailed the past works on the research topic, problem description, aims, research questions, significance, scope and overall organization. A review of the research on the link between the base rate, investments and unemployment in Ghana was the main topic of the second chapter. In the third chapter, the methodology and data sample used were discussed. The empirical results of the investigations were given and addressed in the fourth chapter. Finally, a synopsis of the findings, a recommendation and a conclusion were included in the fifth and final chapter.

LITERATURE REVIEW

INTRODUCTION

This chapter presented a clear, concise and useful analysis of all previous literature reviews that were empirically connected with the goals of the study. This was achieved by analyzing earlier research on the connection between foreign capital inflows (or investment in general) and monetary policy rates (or interest rates generally) and unemployment in Ghana. Additionally, the theoretical foundations of the association between these variables

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were examined. The phrases "base rate", “reference rate” and "interest rate" were used interchangeably because the one could influence the latter due to the connection between unemployment and the base rate.

This chapter was divided into four subsections. The first portion, a contextual review, addressed the study's foundations while also taking into account its background and present issues. The second segment reviewed theories related to this work’s objectives. Empirical works from other academics that were in line the study's objectives was discussed in the third section. The final segment marked the end of Chapter 2.

Contextual Review

This contextual review explored the synergy between unemployment, capital inflows from foreigners and the base rate. The tone was set in the past tense, as is typical for academic writing and a strict passive voice was maintained throughout. The focus was on providing a detailed, paraphrased and properly cited review of the relevant concepts and Ghana's economic history.

It was understood that achieving economic stability was a crucial goal for policymakers and governments. Globally, economies were categorized into developed, transitioning and developing, with each seeking to achieve economic emancipation through macroeconomic stability (World Economic Situation Prospect). In Ghana, several policies were formulated to stabilize and grow the economy. To achieve development, it was recognized that keen attention was to be placed on investment, interest rates and unemployment. The reference rate, dictated by the central bank (the Bank of Ghana), was considered a vital tool for managing the economy. It was said that the central bank could impact borrowing costs, investment decisions and the overall economy by varying the reference rate. A higher rate was believed to discourage borrowing and spending, while a lower rate was seen as a way to encourage economic activity.

Investment was considered a key component of economic growth due to its contribution to national income. The differential of stock within a set period was described as an investment and was classified into private and public categories. Private investment involved the inflow of capital from firms, financial organizations, or other investors who were not part of the government. In the context of this study, capital inflow was limited to foreign direct investment (FDI), which referred to long-term investments that were made by individuals who did not reside in the country. It was noted that FDI could take various forms, such as establishing new businesses or acquiring existing ones. FDI was considered a catalyst for economic growth, job creation and technological innovation.

Unemployment, a persistent and significant macroeconomic issue, was understood to impact individuals, societies and the nation as a whole. It signified the underutilization of resources and was a dominant concern for policymakers (Carlin et al.). According to Keynes (1936), unemployment was a result of deficiencies in aggregate output during certain periods of the business cycle, where an insufficient number of jobs were created for everyone who was capable and willing to work. It was believed that these deficiencies could be averted with investment, which was dependent on the interest rate.

Theoretical Review

Theoretical frameworks surrounding the interplay of unemployment rate, foreign direct investment (FDI) and monetary policy rate were examined, with a primary focus on how these variables influenced one another within a macroeconomic context. It was established that various schools of thought had approached these relationships from different perspectives, leading to diverse conclusions. The theoretical underpinnings of these interactions were explored to provide a deep understanding of the topic.

The first major theoretical perspective that was reviewed centered on the link between the base rate and unemployment. According to the Keynesian theory, unemployment was primarily attributed to insufficient aggregate demand in an economy. It was argued that when there was a decline in aggregate demand, there was an associated weakening in manufacturing, which necessitated a reduction in the number of workers. In this framework, monetary policies, such as adjustments to the interest rate, were used by central banks to influence aggregate demand and, by extension, employment levels (Keynes, 1936). An inverse connection between the

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base rate and unemployment was posited, as a higher rate could dampen economic activity and lead to job losses, while a lower rate could stimulate growth and job creation. However, it was also noted that the effectiveness of monetary policy could be limited by factors such as investor confidence and liquidity traps.

A second key theoretical perspective explored was the link between FDI and unemployment. It was argued that FDI could influence employment through both direct and indirect channels. The direct channel involved the creation of new jobs by foreign firms that established operations in a host country. The indirect channel, on the other hand, was related to spillovers, where new technologies, management practices and expertise were introduced by foreign firms. These spillovers could enhance the efficiency and competitiveness of domestic firms, which, in turn, could lead to job growth across the economy (Bacalci et al., 2013). However, some studies also highlighted the potential for negative impacts, where the entry of foreign firms could displace less competitive domestic firms, causing a short-term rise in unemployment. This was often seen as a temporary adjustment period before the long-term benefits of FDI were realized (Crangwell, 2006).

The final theoretical relationship that was considered was the connection between the reference rate and inflows of capital from foreigners. According to the cost of capital theory, a higher monetary policy rate increased the cost of borrowing for firms, including foreign investors. This, in turn, was said to reduce the profitability of a firm's projects, thereby discouraging or limiting the inflow of FDI. Conversely, a lower monetary policy rate reduced borrowing costs, which made investment projects more attractive and promoted economic growth (Aizenman, 1992). It was also argued that the base rate could influence the cost of acquiring a foreign currency; a higher rate could lead to an upward valuation of the local currency, which could make bringing in goods from abroad more expensive and selling goods to outsiders cheaper, thereby influencing the attractiveness of a country for FDI. A steady and predictable policy environment was also posited to be essential for enhancing investor confidence and encouraging sustained capital inflows (Saari et al., 2012).

In conclusion, the theoretical landscape of the interplay among the unemployment rate, foreign direct investment and the base rate was multifaceted. The connections were not always straightforward and were often influenced by a variety of other factors. The Keynesian framework provided an understanding of the monetary policy's influence on employment, while theories on FDI highlighted its potential to impact job creation directly and indirectly. These theoretical perspectives collectively suggested that the monetary policy rate and FDI were crucial drivers of employment, but their impacts were complex and could be influenced by a number of other factors.

Empirical Review

A variety of conclusions have been drawn from empirical findings on the link between FDI, unemployment and the monetary policy rate. For example, research on 21 emerging countries from 1971 to 1980 revealed a positive interaction between real interest rates and the expansion of financial assets. This raised doubts about the accepted theory of an inverse correlation. Interest rates and investment were found to be positively correlated in another study conducted in an uncertain environment. His investigation, which used the GMM estimation method, showed that a larger positive correlation was the outcome of higher interest rate volatility. This suggested that assuming a simple inverse link between interest rates and investment was not always feasible.

Some empirical evidence specifically explored the link between FDI and employment. Mucu's 2013 study on seven developing countries showed a positive correlation between FDI and employment, indicating that job creation was contributed to by FDI inflows. This positive effect was also found by Crangwell (2006) in an examination of 20 Caribbean countries, which brought out a positive long-term nexus between FDI and job creation. However, his findings also indicated a short-term negative relationship, suggesting that an initial rise in unemployment was caused by labor adjustments or the displacement of domestic firms in the immediate aftermath of FDI inflows. A study by Woldetennsaye et al. (2022) on the MENA region presented a different view, revealing a negative long-term growth relationship between FDI and unemployment, although a significant relationship was observed in the short term. These mixed results highlighted the complexity of the issue and the influence of country-specific factors.

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The direct correlation between unemployment and monetary policy rates was also discussed. A study that used a VAR model to assess the interplay between interest rates and investment found that the amount of demand in the macro economy had a greater influence on investment than interest rates did. This showed that the influence of the base rate on investment decisions might have been minimal. Another study in West Germany showed that differing policies caused interest rates to have distinct effects on investment over two time periods, which further confused the expected outcomes.

Microeconomics research has produced a number of findings. Even though it was challenging to prove a longterm macroeconomic relationship, an analysis of data from 2002 to 2010 showed that investors could not cope with the short-term implications of interest rate fluctuations. This suggests that rate changes had a direct impact on investor conduct. Collectively, these research demonstrated that the association between the reference rate, foreign direct investment and unemployment were intricate and often influenced by a wide range of other factors.

CONCLUSION

This section of the research paper aimed to provide an analytical and insightful review of the contextual,

theoretical and empirical works that were related to our research topic. This was done to help us better elaborate on what our study sought to clarify. Given that investment is a component of aggregate demand and that aggregate demand equals output (GDP growth) in equilibrium, investment was considered a necessary economic variable to facilitate economic growth in most of the theories reviewed.

Theories and empirical papers reviewed tend to show an adverse connection between the base rate and investment. Past and present empirical findings have established that investments are encouraged by a low interest rate and vice versa. However, a practical association between interest rates and economic growth in the countries of research, including Ghana, has not been established by these empirical studies with data over a period of time. So far, only the theoretical relationship between the two economic variables has been identified. For this reason, our research paper sought to update the existing literature on Ghana and account for the impact of the reference rate on our unemployment.

Theories and empirical papers that were reviewed tend to show an adverse association between the base rate and capital inflows, as well as between investment and unemployment. To conclude, it's worth noting that a direct association between the interest rate and unemployment is found in the various literature that was explored.

RESEARCH METHODOLGY

INTRODUCTION

This chapter focuses on the description of the econometric models and the method of estimation that is employed to best address the goals of our study. Also, the chapter incorporates the data types and sources as well as variable descriptions and their expectations. In summary this chapter provides the analytical framework needed to achieve what this research intended.

Model Specification

In line with our study's specific objectives, we specified three separate models using the Auto- regressive Distributed Lag for their estimation. These are as follows:

$$I_t = \beta_0 + \beta_1 m_t + \beta_2 I_{(t-1)} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots (3.1)$$

$$M_t = p_1 I_{(t-1)} + p_2 U(_t-1) + n_t \ldots\ldots\ldots\ldots\ldots\ldots (3.2)$$

$$U_t = \times_1 m_t + \times_2 U(_t-1) + q_t \ldots\ldots\ldots\ldots\ldots\ldots (3.3)$$ where,

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I_t represents Foreign Direct Investment (in billions of dollars) at the current time period

$I_{(t-1)}$ represents Foreign Direct Investment (in billions of dollars) at time period t – 1 (previous year) m_t represents Monetary Policy Rate at the current time period

U_t represents Unemployment Rate at the current time period

$U_{(t-1)}$ represents Unemployment Rate at the current time period at time period t – 1 (previous year)

ε_t and v_t are the stochastic error terms at the current time period

The error term follows the normal distribution and has a mean of zero and a constant variance.

Data Source(s)

The type of data employed for this study was secondary data. The data was taken from the Macroeconomic Trends and Bank of Ghana. The data, a time series data covered the period of 21 years from 2003.

In line with our objectives, the Kwiatkowski-Philips-Schmidt-Shin (KPSS) test and the Auto-regressive Distributed Lag (ARDL) model were used for this investigation. The Kwiatkowski-Philips-Schmidt-Shin test was used to test the null hypothesis, which states that a unit root is not present in a time series sample. The alternative hypothesis, usually "not stationary" or "not trend-stationary" changes according on the test version. The test relies on the idea that if a unit root process characterizes the series, the lagged level of the series will not yield any more information than what is found in the lagged changes that is pertinent to predicting the change. In this case, the null hypothesis is not refuted. In contrast, a process without a unit root is stable and demonstrates reversion to the mean; hence, the null of a unit root will be rejected and the lagged level will offer relevant information in forecasting the change of the series.

The study carried out the diagnostic test for heteroscedasticity with the aid of Breusch Pagan (BP) test using the test statistic $nR^2 \sim \chi^2$ with k degrees of freedom, where n is the sample size, R^2 is the coefficient of determinant, $\chi^2 k$ is chi squared and k is the number of independent variables. The model was further tested for auto correlation with the help of Breusch-Godfrey LM test which uses the test statistic $(n - p)\ R^2 \sim X^2 p$.

Variable Definition

Foreign Direct Investment (*I*)

Foreign Direct Investment (FDI) is a term that refers to the inflow of capital by an individual or organization in one country into an organization in another country. It is expected that this will create future benefits or that these funds will be used to increase the production of goods and services to enhance economic growth. FDI may include the purchase of plant and machinery, changes in business inventories and residential investments in the form of the purchase of new houses and apartments. All these would be done through either greenfield investments, joint ventures, or mergers and acquisitions. Numerous benefits are brought by this type of investment, such as capital, technology and expertise to the local (host) country. Competition in local markets is increased, which causes government revenue to rise (taxes) as well as infrastructure to be developed from social responsibility. Though this may be so, the inflow of capital could lead to job displacement when the firms relocate back to their respective countries, overreliance on foreign companies leading to economic vulnerabilities due to changes in investment inflows and the potential exploitation of cheap labor and environmental regulation in certain sectors of the economy (e.g. galamsey in mining sector).

Unemployment Rate (*U*)

Unemployment is a term referring to individuals who are employable and are actively seeking for a job but are unable to find a job. The government, central banks and investors use unemployment statistics to gauge the health of the economy as it is a significant economic and social issue affecting household. Unemployment in

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itself could be as a result of economic recession, technological advancements, outsourcing of job to countries with lower labor cost causing job losses in local country, lack of education and skills, regulations and policies. This situation ideally can be minimized through sound government interventions such as fiscal and monetary policy can promote economic growth and create jobs, investing in educational and training programs for employable people to acquire skills.

Monetary Policy Rate (m)

The monetary policy rate is a crucial tool that a country's central bank uses to manage its economy. This is the interest rate at which the Bank of Ghana, the country's bank, lends money to commercial banks. For other rates, including the cost of borrowing for consumers and businesses, this rate acts as a standard. To influence the quantity of money in circulation throughout the economy, the central bank adjusts the monetary policy rate. The rate can be lowered to make borrowing more affordable, which would promote investment and spending and accelerate economic growth, or it can be raised to make borrowing expensive, which would deter investment and spending and slow down economic growth.

It should be noted that changes in the base rate may not immediately have a full impact on the economy since central banks often have to make trade-offs between the central government and important economic issues. This is due to the fact that economic considerations like unemployment, inflation and economic growth determine the appropriate level.

Expectations of Coefficients

From the models, the expectations of the coefficients are as follows:

Foreign Direct Investment (I)

The relationship between foreign direct investment and unemployment is normally expected to be inverse in nature. On one hand, we assume that when monetary policy rate increases, borrowing costs also rise which tends to make a nation less attractive to investors who reside abroad thus $\beta_1 < 0$. On the other, a decrease in monetary policy rate tends to attract investments into the country by foreigners since the purchasing value of money becomes higher, making expansion by firms more feasible, all things being equal, thus $\beta_1 > 0$. We expect previous levels of capital inflow to have a direct effect on future investments by foreigners. This is because an increase in past levels of investments is a strong indicator of a stable and profitable investment setting, thus $\beta_2 > 0$. When investments fall in the lagged years, it indicates that investors no longer are willing to place their interests' in the country, thus $\beta_2 < 0$

Monetary Policy Rate (m)

An indirect relationship is expected between the reference rate and capital inflows. When foreign direct investment has increased in previous years, the amount of money in circulation is increased, which in turn causes the amount of money chasing fewer goods to increase (inflation). As a result, the rate would be increased by the Central Bank of Ghana to dissuade households and firms from holding cash, which would cause $p_1 < 0$. Conversely, a fall in previous levels of investment by foreigners could be met with a reduction in the rate set by the central bank to stimulate spending, causing $p_1 > 0$. The interaction between the base rate and past levels of unemployment is also negative. To fight inflation, the rate is raised by the central bank to slow down the economy, which causes firms to either stop hiring or lay off workers to keep operating. This results in $p_2 < 0$. Conversely, an increase in aggregate expenditure by firms and households is led to by a reduction in the base rate, which makes a more favorable outlook for expansion by firms, thus $p_2 > 0$.

Unemployment Rate (U)

It is expected that previous levels of unemployment would have a positive influence on the current level of unemployment in the country. This is because previous levels of unemployment serve as an add-on to future levels. The constant effects in unemployment in the form of graduating students yearly, movement of individuals

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to and from jobs and the laying off of workers would naturally increase unemployment rate in the subsequent years, thus $x_2 > 0$. On the other hand, policies that tend to favor employment or expansion by firms would cause unemployment to reduce in subsequent years' causing $x_2 < 0$.

Auto-Regressive Distributed Lag Test

A model that uses the independent variable's lagged value as a regressor is known as an auto-regressive distributed lag. In this method, the long-term association between series with varying integration orders is determined. ADL stands for auto-regressive distributed lag model, which is the foundation of diverse single-equation regressions. Co-integration has become more prominent in applied time series econometrics due to the discovery that it is comparable to an error-correction method for non-stationary variables. Its advantages include the flexibility with which a mixed order of integration is handled and the simplicity of estimating it using the standard least squares method. Nonetheless, the results might be significantly impacted by the choice of delayed orders.

Unit Root Test

Time series data stationarity is tested using this method. A time series data collection is said to be stationary if statistical features such as mean, variance and covariance do not alter or remain constant throughout time. Time series data is considered non-stationary when the variance, covariance and mean of the variables change with time. There are serious consequences and analysis based on nonstationary time series data may yield inaccurate findings. Because nonstationary variables can generate significant connections even when none exist, using them in economic models for regression renders forecasting unreliable. Before beginning any econometric study, the time series data must be checked for stationarity. To determine whether stationarity or data reliability exists, the Kwiatkowski-Philips-Schmidt-Shin (KPSS) unit root test is used to each variable. For each of the variables (monetary policy rate, unemployment and foreign direct investment), the alternative hypothesis which states that the time series data has a unit root and the null hypothesis that states it does not, were tested using the KPSS test.

Rules for taking decision

- if t > KPSS critical value, then reject the null hypothesis.
- if t < KPSS critical value, then do not reject the null hypothesis.

Co-integration Test

After the variables' stationarity was established, a test for co-integration was performed. This was done to see if there was a long-term relationship between the exogenous and endogenous factors. When cointegration was present, there was a shared trend and long-term equilibrium between the endogenous and exogenous variables. The Auto Regression Distributed Lag (ARDL) Model was used in this study to analyze co-integration between the variables. If the variables were cointegrated, a solid long-term link was revealed, allowing the model's coefficients to be meaningfully understood, especially over an extended period of time. Furthermore, the statistical significance of the computed model was ensured.

Error Correction Model (ECM)

The relationship between unemployment and the other variables was analyzed using Model 3. This model was also used to understand the short-run dynamics and the long-run equilibrium relationship between the variables.

$$U_t = \times_1 m_t + \times_2 U(_{t-}1) + q_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.3)$$

An error correction model (ECM), a form of multiple time series model, is most commonly used to analyze data where the underlying variables show co-integration, or a long-term stochastic tendency. A theoretical approach to assessing the short- and long-term effects of one-time series on another is provided by these models. The term "error-correction" describes how the error, or divergence from long-term equilibrium, in the previous era affects

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the short-term dynamics of that time. Co-integration needs to be established before estimating an ECM. A long-term link between two-time series is indicated by co-integration.

In the absence of a committed relationship, an ECM is considered improper. To test for co-integration, we must perform a linear regression of our target variable on our independent variable and ensure that the residuals are stationary. If there is co-integration, we can proceed. If not, it is important to consider if a long-term partnership has a strong theoretical foundation. If there is no explanation, the ECM is not a good fit for our problem. If there are breakpoints, they must be tested. Our sample might contain a period of time before which our long-term relationship might be different or nonexistent, but after that it might behave as we would expect.

Heteroscedasticity Test (HT)

The non-constancy that exists in the error variance of the values of the dependent variable is what is described, which is conditional on the changing values of the regression. Put differently, the situation where the conditional variance of the dependent variable in a regression either increases or decreases with changing regressor values is described as heteroscedasticity. Heteroscedasticity can compromise the efficiency of the estimates in any estimation involving time series data. This may be due to variables exhibiting periods of high and low volatility leading to changes in the various of the error term, significant policy changes that may alter relationships as well as inaccurate data collection.

Auto-correlation (AC)

A correlation between the error terms across different time periods is what is being referred to. It is assumed by the Classical Linear Regression Model (CLRM) that a disturbance term relating to one observation is not influenced by the disturbance term of another observation. Thus, E(εtqt) = E(ntqt) = E(n$t\varepsilon t$) = 0. Auto-correlation can either be negative or positive and is mostly prevalent in time series data. If auto correlation exists, though the estimated parameters by OLS are still unbiased, they are no longer efficient because their co-variance are enlarged. Hence, the t-statistic, confidence interval and hypothesis testing statements are no longer reliable; therefore, it is important to check whether or not the data used in this study suffers from auto correlation or not. If autocorrelation exists within an autoregressive distributed lag model, it leads to inefficient estimates, invalidate hypothesis and confidence intervals and bring out biased forecasts. The below models had their residuals tested for auto-correlation.

$$I_t = \beta_{0+}\beta_1 m_t + \beta_2 I_{(t-1)} + \varepsilon_t. \ldots\ldots\ldots\ldots\ldots \quad (3.1)$$

$$M_t = \mathrm{p}_1\, I_{(t-1)} + \mathrm{p}_2 U(_t\text{–}1) + \mathrm{n}_t \ldots\ldots\ldots\ldots\ldots\ldots \quad (3.2)$$

$$U_t = \times_1 m_t + \times_2 U(_t\text{–}1) + \mathrm{q}_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.3)$$

Variance Inflation Factor

For detecting multicollinearity in a multiple regression model, the variance inflation factor (VIF) is used as a diagnostic measure. Multicollinearity itself is defined as the correlation that exists between two or more independent variables in a model. The degree to which the variance of an independent variable's estimated regression coefficient is increased by its relationship with other individual variables is measured by the VIF. No correlation between the independent variables is denoted by a VIF of 1, but some level of multicollinearity is depicted by values larger than 1. It is generally suggested by a VIF of 1 to 5 that mild multicollinearity is present and may not require intervention, whereas a value above 5 indicates significant multicollinearity that needs attention.

When the variance inflation factor of a variable is large it is difficult for the model to distinguish the individual effects of each correlated variable on the dependent variable. As a result, the standard errors of the dependent coefficients are inflated, leading to a broader confidence interval and a lower t-statistic.This may lead to the coefficients being statistically insignificant, even in cases when the variables are suitable predictors of the

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dependent variable. In some cases, a high multicollinearity value can even cause the sign of a regression coefficient to diverge from predictions which makes the output of the model unstable and difficult to interpret.

$$I_t = \beta_0 + \beta_1 m_t + \beta_2 I_{(t-1)} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots \quad (3.1)$$

$$M_t = p_1\, I_{(t-1)} + p_2 U(t-1) + n_t \ldots\ldots\ldots\ldots\ldots\ldots \quad (3.2)$$

$$U_t = \times_1 m_t + \times_2 U(t-1) + q_t \ldots\ldots\ldots\ldots\ldots\ldots \quad (3.3)$$

CONCLUSION

Chapter three first of all made a recap of the paper's theoretical or conceptual framework. It specified the econometric models to be used. The chapter also mentioned Augmented Dickey-

Fuller Test as the estimation techniques adopted by the study. This chapter also identified the data type used in the study as well as the data sources which included the Macroeconomic Trends and Bank of Ghana. It then went on to give a description and expectations of variables used in the two specified econometric models.

Data Analysis and Interpretation of Results

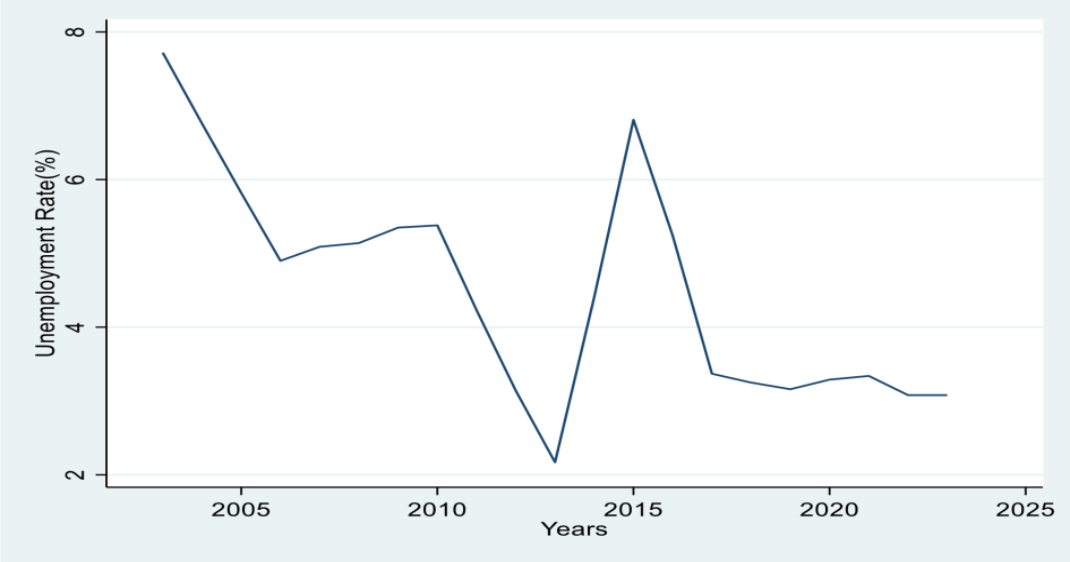
Introduction

Data analysis and the interpretation of findings are the focus of this chapter. It is subdivided into trend analysis and multiple regression analysis. The objectives of this study were met by these subdivisions and the analysis that was performed.

Trend Analysis

The trends in all the variables considered in this study are presented in this section. These variables are the investment growth rate, unemployment and the interest rate.

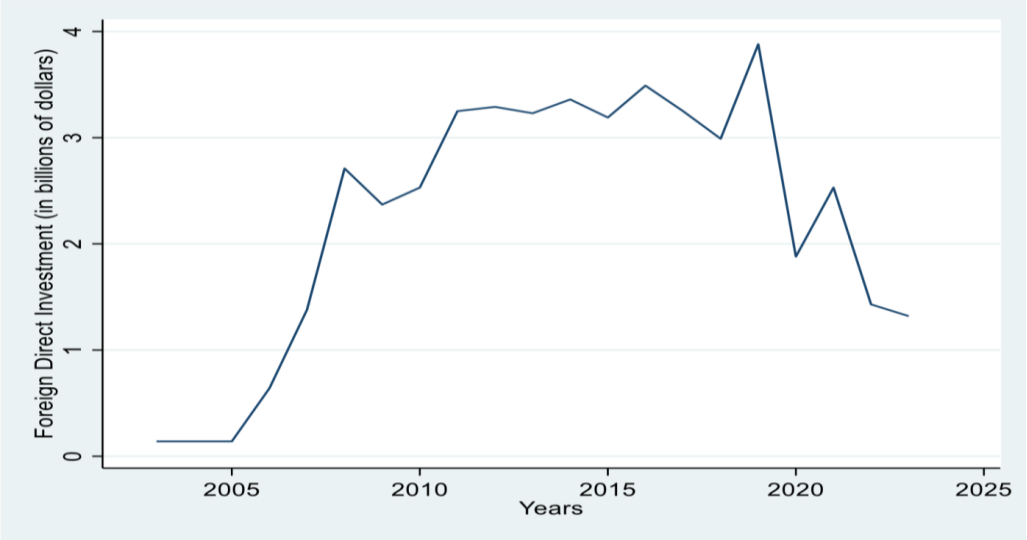
Figure 1: Trend Analysis in Unemployment Rate.



The graph above shows how unemployment has been fluctuating throughout the periods of 2003 to 2023. From Figure 1, it can be seen that unemployment decreased from the year 2003 to 2006 and started increasing. The massive rise in unemployment may be attributed to rapid increase in population from the year 2006 to 2018. The graph shows that the lowest unemployment was recorded in the year 2013 (2.17%) and the highest was recorded in the year 2003 (7.72%).

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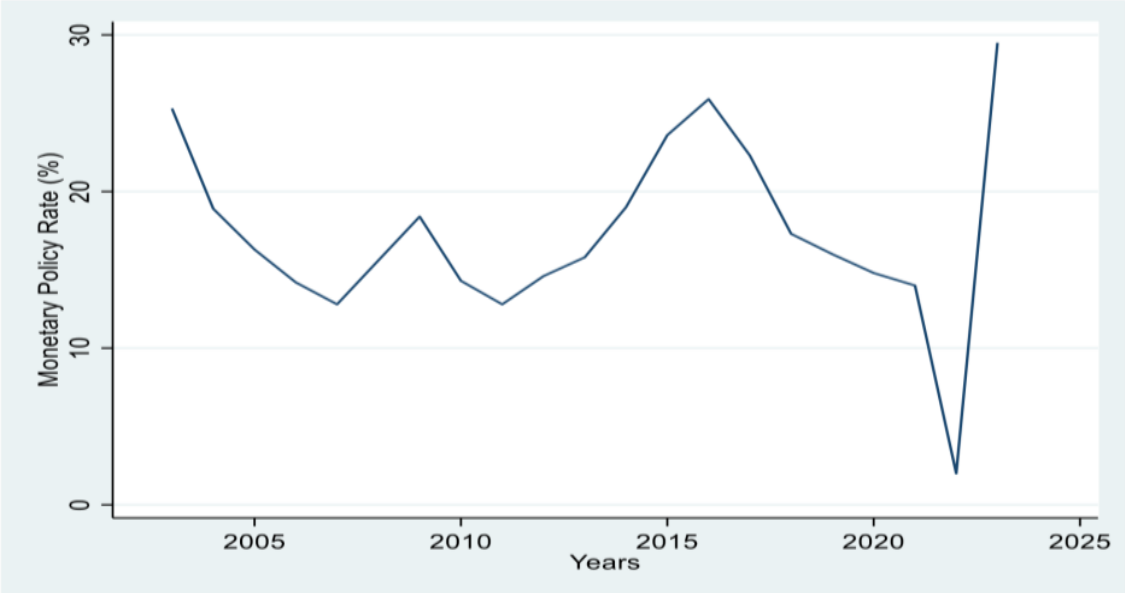
Figure 2: Trends in Foreign Direct Investment.



The graph above shows capital investments in Ghana has been on the rise over the years. Figure 2 shows foreign direct investment averaged $2.25bn over the period under consideration.

Furthermore, it was at its highest, $3.38bn in the year 2019 and at its relatively low level of $0.14bn of GDP from the years 2003 to 2005. It is worth noting generally that due to governments regulated interest rate ceilings between the periods of 1980 to 1991, Ghana's economy was characterized with low levels of private investment. The period was also characterized by significant rises in the inflation rate, with inflation rising between 1991 and 1994, 18.03%, 10.06%, 24.96%, 24.87% respectively, with inflation pegged at a staggering 59.46% in the year 1995. Since then, inflation has been fluctuating over the period, with a record low of 9.84% in 2018. The rise in inflation was associated with low levels of investment within that period (Fosu, 2001). After financial and sectorial reforms, private investment rose from 0.69 percent in 1986 to 2.01 percent in 1991. The introduction of a liberalized interest rate regime increased credit availability which helped to improve private investment (Nkrumah et al; 2018). The rate of private investment experienced a significant dip in the run up to the 1992 general elections. Investor confidence fell due to uncertainty about the outcome of the elections especially since the country had been marred by series of political unrest and government overthrows in the previous decade. Private investment rose after a peaceful election in 1992 and has continually risen over the years.

Figure 3: Trends in Monetary Policy Rate.



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From Figure 3, Ghana's monetary policy rate has experienced quite significant and regular fluctuations from 2003 to 2023. Policy rates fell from 25.3 in the year 2003 to 12.8 by the end of 2007. Interest rates also started rising from 2007 to 2009. Interest rates in the country was liberalized after the introduction of the financial sector reforms in the late 80's which marked an upward trend in the country's lending rate. Since then nominal interest rates have followed an irregular pattern with altering significant rises and falls. This is due to market conditions of demand and supply of credit as well as the Bank of Ghana's reference rate which is set to achieve macroeconomic targets set at different periods. Figure 4.3 is a plot for Nominal interest rate and it shows the overall rise and falls for the period 2003 to 2023. Regression Analysis

The results of the estimation are presented and discussed in this section. Data analysis was once again carried out using the ARDL model. The regression results were acquired using RStudio.

The Kwiatkowski-Philips-Schmidt-Shin (KPSS) test was performed to check for stationarity. Based on its null and alternative hypotheses, the results showed that the time series data is stationary.

H0: The time series data is stationary

H1: The time series data is not stationary

Table 1: Kwiatkowski-Philips-Schmidt-Shin test results

VARIABLE	DIFFERENCED LEVEL	P-VALUE
Unemployment	0	0.02578
	1	0.1
Policy Rate	0	0.1
Foreign Direct Investment	0	0.09279

From Table 1, it can be observed that since the tests conducted for monetary policy rate and foreign direct investment resulted in p-values of more than 0.05 we can conclude that the data used for subsequent analysis was stationary but unemployment became stationary at first difference.

The results of the first model are given below

Table 2: Dependent Variable, Foreign Direct Investment

Variable	**Coefficient**	**Standard Error**	**Test Statistic**	**Prob. Value**
Intercept	0.33698	0.55241	0.610	0.550
Policy Rate	0.01671	0.02791	0.599	0.557
Lagged FDI	0.75535	0.12923	5.845	0.000
Note: Lagged FDI is Lagged Foreign Direct Investment				

R-Squared= 0.677

Adjusted R-squared= 0.639

F-Statistic= 17.82

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Prob(F-Statistic) = 0.0000

AIC= 46.6268

From Table 2, Policy rate has a coefficient of 0.01671, suggesting that in Ghana, the reference rate set by the central bank positively impacts foreign direct investment in the current year. The implication is that high levels of the MPR motivates foreigners to invest in Ghana but not by a significant margin, this is not in line with our expectation. The model above also indicates that when compared with policy rate, previous investments made by foreigners contributed by far to greater levels of investments by other foreigners in the current year. This makes the finding consistent with a priori expectation.

Factors which account for this might include:

Expectations of a favorable market in the country which would attract more foreigners into the country. A country with a high level of foreign investment finds it easier to attract additional investment since it is a sign that the economy is stable in nature

A higher MPR reduces the purchasing power of firms. It causes a reduction in the supply of money all things being equal since it would be more rational to invest in debt instruments such as bonds rather than to expand output.

The adjusted R-square is approximately 0.639 depicting that approximately 63% of the total variation in foreign direct investment is explained by the total variation in the variables used, when the increasing effect of additional explanatory variables are taken into account.

Table 3: Diagnostic Results

TEST	Prob. Values
Heteroscedasticity	0.3878
Auto-correlation	0.1928
Multicollinearity	1.01(VIF)
F-statistic	17.82
F-critical	10.22

From Table 3, a general 5% significance level was used for the tests presented. The Breusch-Pagan's test for heteroscedasticity produced a p-value of 0.3878, indicating that the test is statistically significant. This implies the absence of heteroscedasticity. Additionally, no serial correlation is found to be present in the model, according to the Breusch-Godfrey test with a probability value of 0.1928. Finally, the Variance Inflation Factor (VIF) of 1.01, which was calculated for the model, revealed that no issues with multicollinearity are present in the regression model. An overall significance at the 5% level was discovered in the regression results of Table 4.3, as the F-Statistic (17.82) exceeded the F-critical value (10.22). As a result, a significant relationship is shown to exist between capital inflows by foreigners and its determinants, which are the monetary policy rate and lagged foreign direct investment.

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The results of the second model are also given below

Table 4: Dependent Variable, Monetary Policy rate

Variable	Coefficient	Standard Error	Test Statistic	P-Value
Lagged FDI	5.8670	0.7797	7.525	0.0000
Lagged U.	0.1619	1.8786	-0.086	0.932
Note: Lagged U. is Lagged Unemployment Lagged FDI is Lagged Foreign Direct Investment				

R-Squared= 0.7728

Adjusted R-squared= 0.7461

F-Statistic= 28.92

Prob(F-Statistic) = 0.0000

AIC= 141.0271

It is shown in Table 4 that lagged FDI has a significant coefficient of 5.8670, implying that in Ghana, previous levels of foreign direct investment might lead to higher inflation because of a large money supply. The policy rate may be increased by the central bank to decrease the amount of cash in circulation, as individuals and firms would rather have their money invested than kept as cash.

A lagged unemployment coefficient of 0.1619 indicates that it moves positively with a rise in monetary policy rate. This situation is typically rare and occurs during a period of stagflation, a situation where the economy experiences high unemployment and high inflation. To deal with inflation, the central bank would have to raise the policy rate in order to slow down the economy since reducing the rate would increase the amount of money in circulation and cause higher levels of inflation.

The adjusted R-square is approximately 0.7461 depicting that approximately 74% of the variation in policy rate in the current period is explained by the variables used, when the increasing effect of additional explanatory variables are taken into account.

Table 5: Diagnostic Test

Test	Prob. Value
Heteroscedasticity	0.2671
Auto-correlation	0.0672
Multicollinearity	1.018(VIF)
F-statistic	28.92
F-critical	10.22

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In Table 5, the p-value of 0.2671 from the Breusch-Pagan test for heteroscedasticity was determined to be statistically significant at the 5% level. Heteroscedasticity is therefore implied to be nonexistent. Additionally, serial correlation is not present in the model, according to the results of the Breusch-Godfrey test. A p-value of 0.0672 was found to be statistically significant at the 5% level. Lastly, the Variance Inflation Factor (VIF) of 1.018 showed that there were no multicollinearity problems in the regression model.

Furthermore, it was discovered that the regression results in Table 5 are statistically significant overall at the 5% level since the F- statistic (28.92) is higher than the F-critical value (10.22). This implies a close correlation

between the base rate and its factors, particularly past levels of unemployment and foreign direct investment.

The results of the third model are also given below

Table 6: Dependent Variable, Unemployment rate

Variable	Coefficient	Standard Error	Test Statistic	Prob. Value
Monetary Policy	0.23131	0.02231	10.368	0.0000
Lagged U.	0.16851	0.35931	0.469	0.645
Note: Lagged U. is Lagged Unemployment				

R-Squared= 0.8642

Adjusted R-squared= 0.8483

F-Statistic= 54.11

Prob(F-Statistic) = 0.0000

AIC= 78.20344

From Table 6, policy rate has a coefficient of 0.23131 which is significant, suggesting that in Ghana, the reference rate set by the central bank positively impacts unemployment in the current year. A high monetary policy rate's effect is that entrepreneurs and businesses are deterred from increasing production because the cost of borrowing funds is made higher than it normally is. The model also suggests that the policy rate, in comparison with past unemployment levels, led to a greater amount of unemployment in the current year. This result is consistent with a priori expectations. Possible factors for this could include:

An upward movement in the number unemployed people due to the large number of graduates coming from tertiary institutions.

Higher current unemployment levels resulting from frictional unemployment, which is the period of time it takes for workers to find new employment after leaving their previous jobs.

An upsurge in unemployment when the reference rate is raised by the government during stagflation.

The adjusted R-square is approximately 0.8483 depicting that approximately 84% of the total variation in unemployment in the current period explained by the variation in the variables used, when the increasing effect of additional explanatory variables are taken into account.

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Table 7: Diagnostic Test

Test	Prob. value
Heteroscedasticity	0.769
Auto-correlation	0.0672
Multicollinearity	1.016(VIF)
F-statistic	54.11
F-critical	10.22

Heteroscedasticity was checked using the Breusch-Pagan test and Table 7 displays a probability value of 0.769, which is statistically significant at the 5% level. It is assumed that there is no heteroscedasticity. The BreuschGodfrey test also reveals no serial correlation in the model. A p-value of 0.0672 was determined to be statistically significant at the 5% level. The regression model's Variance Inflation Factor (VIF) of 1.016 indicated that multicollinearity issues are not present.

Because the F-statistic (54.11) was higher than the F-critical value (10.22), the regression results in Table 7 were

deemed to be statistically significant overall at the 5% level. This suggests a strong correlation between the unemployment rate and its determinants, namely the monetary policy rate and lagged unemployment.

FINDINGS, RECOMMENDATIONS AND CONCLUSION

Overview

An overview of the study, as well as a summary of its key findings, conclusions, recommendations and contributions to knowledge, was highlighted in this chapter. Also presented were suggestions for further research. Using annual time series data of 21 years spanning from 2003, the interplay among the monetary policy rate, FDI and unemployment within the Ghanaian economy was examined. The study's purpose was pursued with the help of the following research objectives.

1. To assess the influence of reference rate and previous foreign direct investment on future investments in Ghana.
2. To investigate the effect of lagged unemployment and FDI on policy rate in the current year within the country.
3. To ascertain how policy rate and previous years' unemployment influences unemployment in the current year.

The study employed the use of Autoregressive distributed lag models to bring out the relationships between the variables specified in the research objectives.

Summary of the major findings

The key findings are spelt out in accordance with the research questions of the study as follows:

With respect to the first research question, past foreign direct investments was found to play an important role in the volume of prospective investments by individuals and corporations unlike monetary policy rate. All things being equal, as long as the Ghanaian economy attracted a significant amount of foreign direct investment, it signaled other potential investors that the economic space of Ghana is favorable which in turn lead to more inflows. This could be due to factors such as shared knowledge, the establishment of supply chains and the positive outlook that previous investors have built. That being said a large stock of existing investment implied

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a stable and proven business environment which reduces the perceived risk for new investors. While theoretically, a higher monetary policy rate could attract foreign investment by increasing returns on financial assets, this effect is overshadowed by other factors. Investors seemed more interested in the macroeconomic stability of Ghana, its institutional quality, laws and market size. A higher monetary policy rate might signal economic uncertainty or an existing issue with inflation which can deter long-term or capital intensive investments.

In response to the second research question, which sought to find the influence of lagged unemployment and FDI on the policy rate, it was found that a strong, statistically significant correlation exists between the base rate and previous levels of foreign direct investment. This shows that capital inflow is an indicator that is considered by the Bank of Ghana when the monetary policy rate is being set. Conversely, previous levels of unemployment might not significantly influence the reference rate, suggesting that the central bank is more concerned with price stability than unemployment, especially when the unemployment level is near the natural rate. Consequently, the base rate is being set by the Bank of Ghana in high response to past inflows as a measure to control inflation rather than unemployment.

A strong relationship was found to exist between the policy rate and the unemployment rate, which aligns with the third research question. This result was expected, given that a rise in the monetary policy rate makes borrowing costlier for both firms and households. Consequently, expenditure by these groups is reduced, which leads to a deceleration of economic activity in the country. Surprisingly, when considering only the association between the policy rate and lagged unemployment within the country's economy, the latter was found to be statistically insignificant despite its positive relationship with unemployment. This outcome could be explained by the sample size used, the exclusion of other variables (such as those from model 2), or a structural break in the time series data.

CONCLUSION

From the study's findings, a conclusion was drawn:

A statistically significant relationship was revealed between FDI and its lagged values by the foreign direct investment model. A stable level of investment is suggested by the intercept's positive coefficient of 0.33698. While a lack of significance was found among other variables, it is revealed that a country's current foreign direct investment is most reliably predicted by its past levels, which emphasizes the importance of good governance and a strong economy for attracting sustained capital flows.

The analysis of unemployment showed that its current levels are driven by its own past values, as evidenced by the statistically significant coefficient on lagged unemployment. Despite a positive connection with the policy rate and foreign direct investment, these relationships were not statistically significant. This outcome suggests that changes in monetary policy or foreign investment do not have a strong, immediate impact on the unemployment rate, which often responds slowly to broader economic shifts.

The central bank's policy rate appears to be positively and significantly influenced by lagged foreign direct investment but not by lagged unemployment. This conclusion indicates that the central bank places greater weight on past foreign investment trends when setting monetary policy, all things being equal, potentially as a forward-looking measure to manage capital flows and their inflationary or deflationary impacts. It also suggests that the central bank's reaction is not strongly dependent on past unemployment figures.

The last model highlights a notable link between the policy rate and unemployment. While unemployment in the previous years had a positive effect, the only statistically significant predictor was the base rate. This suggests that the central bank's policy actions have a direct and measurable impact on unemployment, making it a critical tool for labor market management despite the lack of a significant relationship with lagged unemployment.

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RECOMMENDATIONS

Based on the study's findings, specific proposals are being presented for the optimal use of the reference rate, unemployment and foreign capital inflow. The considerable influence of past inflows on current levels suggests that a stable and consistent policy environment is crucial for attracting and keeping foreign investment. Future investment could be hindered by unpredictable and unwanted policy changes, since a stable and clear political and business environment is highly valued by investors.

The dependency of unemployment indicates that monetary policy alone may not be sufficient to address it. Recommendations should therefore focus on structural reforms in the labor market through skills training programs and educational initiatives to improve labor mobility, which can address the underlying causes of unemployment more efficiently.

While the monetary policy rate was significantly influenced by past foreign direct investment, its relationship with unemployment was not statistically significant. This could indicate a policy oversight by government. Central banks should consider a wider range of indicators, including labor market metrics and their long-term trends, when setting monetary policy to ensure they are adequately addressing both their inflation and employment issues.

Suggestions for further research

To more effectively determine the directional association between FDI and the monetary policy rate, future studies could employ more detailed econometric methods, like Granger causality tests or Vector Autoregression (VAR) models. This approach would help reveal if the central bank's actions are a direct response to FDI or if FDI is simply a strong signal of economic conditions that require a shift in policy.

Since the model showed that unemployment is largely determined by its past values, future research should explore other potential drivers that were not included in this analysis. This could include factors like labor force participation rates, sectoral shifts in the economy or the effect of capital advancements and automation on the labor market.

Future studies could also consider including other policy instruments, such as fiscal policy variables such as government spending and taxation, to see how they interact with monetary policy and influence the outcomes of foreign direct investment and unemployment.

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Data On Variables Used for Econometric Analysis

Year	Policy Rate (%)	Unemployment rate (%)	Foreign Direct Investment (GDP in billions of $)
2003	25.3	7.72	0.14
2004	18.9	6.76	0.14
2005	16.3	5.82	0.14
2006	14.2	4.90	0.64
2007	12.8	5.09	1.38
2008	15.6	5.14	2.71
2009	18.4	5.35	2.37
2010	14.3	5.38	2.53
2011	12.8	4.23	3.25
2012	14.6	3.14	3.29
2013	15.8	2.17	3.23
2014	19.0	4.41	3.36
2015	23.6	6.81	3.19
2016	25.9	5.24	3.49
2017	22.3	3.37	3.25
2018	17.3	3.25	2.99
2019	16.0	3.16	3.88
2020	14.8	3.29	1.88

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2021	14.0	3.34	2.53
2022	2.0	3.08	1.43
2023	29.5	3.08	1.32

Note: Investment (%) is Foreign direct investment, net inflows (% of GDP)

Data Source: World Bank and Bank of Ghana

Web:www.macroeconomictrends.net/countries/GHA/ghana/foreign-direct-investment

www.macroeconomictrends.net/countries/GHA/ghana/unemployment-rate
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