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Assessing the Impact of Monetary Policy on Stock Returns at Ghana Stock Exchange

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Abstract
The paper examines the impact of monetary policy on stock returns at the Ghana Stock Exchange. Due to the fact that, central bank of Ghana is embarking on expansionary monetary policies, yet the Ghana Stock Exchange continued to record a bearish performance. We accessed data from World Bank's World Development Indicators, the United States' (US) International Energy Statistics, and the Central Intelligence Agency's (CIA) Factbooks from 1990 to 2019. An autoregressive distributed lag (ARDL) structure is utilized to decide the long-and short-run effect of the chose framework stock and quality lists on Ghana's monetary development. Findings reveal a unidirectional movement between stock returns and inflation, from 1990 to 1992; stock returns were negative when inflation decreased sharply till 1993.From 2000 the pattern of stock returns and inflation was similar until there was a sharp decline in 2005. Whilst money supply tends to be steady in the long-run, stock return looks very volatile in the same period from 1990 to 2019 in a similar pattern.The study recommends that potential investors should consider the movements of these monetary policy variables when deciding on investing in the stock market. Also, when the central bank is considering its monetary policy direction, they are advised to take a critical consideration into the movement of the stock market since any decision will have a bearing on the wealth of stakeholders.
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1. Introduction

Financial experts, academicians, and organizational researchers have established that the capital market has a very significant task to play in the development of every economy through mobilization of surplus funds and resources. Unlike other factors that affect the development of every nation, variables such as stock market index has a straightforward effect on the wider economy even to the extent of private individuals or households. An overview of monetary policy of previous years revealed that up till 2006, monetary policy execution of Ghana was established on the monetary-targeting framework. Within this framework, monetary aggregates were the target with the intention of controlling the objective variable, which is inflation. Moreover, two alternatives of this method were used with regard to the fundamental operating mechanisms. Until to 1992, the basic operating instrument was domestic credit while between 1992 and 2007, (quantitative) open market operations (OMO), remained the fundamental instrument (Bank of Ghana, 2017).

Monetary policies are implemented together with fiscal policies to guarantee the achievement of economic growth, while other macroeconomic issues are equally dealt with. For the sake of relevance, these policies and schemes have adapted to changes and are consistent with global trends. Monetary policy aims at controlling the value, stock, and cost of money consistent with the anticipated economic activity levels (Quartey & Afful-Mensah, 2014 and Strum, 2009). The common objectives of monetary policies may comprise stability of price, maintaining equilibrium in balance of payments, employment creation, growth of output, and sustainable development. Monetary policy may involve direct and indirect controls. Direct controls use act of law and fixed exchange rate to control money supply whereas indirect controls use indirect instruments to regulate money supply (Bassey et al., 2018; Berument and Froyen, 2008). Due to the challenges the central bank encountered n using monetary targeting, in 2007, it made a formal decision to move from monetary targeting to Inflation Targeting (IT). Inflation Targeting unswervingly aims at inflation and does not use monetary aggregates as a pathway (Mohammed et al., 2019). The major tool used in inflation targeting is an interest rate that central banks regularly adjust for achieving this purpose. In Ghana, the central bank of Ghana has made way for the Policy Rate (PR), which signifies the base rate for advancing short-term credit to banks and consequently serves as the standard for all other forms of interest rates in the economy (Bank of Ghana, 2017).

However, the irregularities and volatilities of macroeconomic factors for example, currency depreciation, inflation, and interest rate have had basic impact on Ghana's stock exchange (Barnor, 2014). Generally, the returns

on stock market is influenced by these indicators thus when found to be adverse, it can possibly discourage investors. This is because the uncertainty surrounding returns is increased (Barnor, 2014). This study consequently seeks to ascertain the influence of monetary policy on stock market performance.

2. Statement of the Problem

The latest massive shakeup in the global financial industry has called for several issues that ought to be discussed. Organizational researchers have asserted that the banking sector which is ruled by monetary policies of the country affect the stock returns on the capital market that are achieved at the close of each trading section (Zhang, 2021). The reduction of investment in stocks have not just only sent shocks through the veins of investors in Ghana but have also deterred many from wanting to invest in the various financial houses. Understanding the patterns of stock market returns is very essential in evaluating all events in the financial sector and monitoring the wider economy on the whole.

However, stock returns are consistently affected by various types of economic and financial variables. Information on these variables or indicators arrive at random intervals and depending on its nature may either affect stock performance positively or negatively. A typical type of this information regards movements in consumer prices, interest rate, and exchange rate (Ikoku and Husseini, 2013; Iqbal et al., 2012). Uncertainties regarding movements in these macroeconomic indicators are a key source of risks for companies listed on the bourse which further extend to affect individual stock returns. For example, (Liu and Shrestha, 2008; Ullah et al., 2014; Tursoy et al.,2008) realized that rates of interest prevailing in an economy affects stock market return. (Otieno, 2017) discovered that consumer price index and currency movements have a negative bearing on stocks in Kenya. (Modise, 2013) also found out that interest rates predict stock returns in South Africa. This assertion leaves much to be sought for so far as this field of enquiry is concerned.

Investigation into the interaction existing between stock market performance and some macroeconomic variables have been limited despite the contribution of Ghana's only formally organized financial market to the local economy. It is against this setting that the current study sought to establish the bearing of monetary policy on stock market returns.

3. Objectives of the Study

The general objective of this study was to assess the impact of monetary policy on stock market returns from 1990 to 2019. To achieve this generic objective, the under listed specific objectives are set for this course:

1. to investigate the trend of monetary policy and stock market returns in Ghana
2. to determine the short-run relationships between monetary policy and stock returns
3. to ascertain the long-run relationships between monetary policy and stock returns

4. Research Questions

The study sought to find answers to the ensuing research questions below;

- How is the trend of monetary policy and stock market returns in Ghana?
- What are the short-run relationships between monetary policy and stock returns?
- What are the long-run relationships between monetary policy and stock returns?

5. Theoretical Review

The major theory underpinning monetary policy and stock returns which is reviewed in this study is the Efficient Market Hypothesis (EMH). The EMH is a principle in financial economics which expresses that asset prices completely replicate all accessible data. The resulting hint that it is not possible to "outgain the market" regularly on a risk-adjusted basis as market prices should only respond to new information.

(Fama,1970), who advanced Efficient Market Hypothesis stated that at a fair value stocks were always traded; therefore, it is not possible for stockholders to either buy undervalued stocks or offer stocks at inflated amounts. As a result, it ought not to be possible to over perform the broader market via a proficient choice of financial assets or market timing, as such it takes chance or purchase of riskier investments for an investor to obtain a relatively higher return. Kenneth French and Fama and French in a study in 2012 held an opinion, revealing that the surge of unusual returns in United States mutual funds was so close to what might have been anticipated if fund managers did not have any talent and for the EMH to hold, this was a necessary condition.

There are three different kinds of the hypothesis namely the strong, semi-strong, and the weak forms. The strong type of the EMH explains how prices immediately self-adjust to both insider information and information that is already in the public domain. The semi-strong form of EMH asserts that the current price of a financial asset indicates all openly obtainable data and also prices directly adjust to show new public information. The weak type of EMH also asserts that prices on traded assets such as bonds, property and or stocks reflects all previous publicly accessible data (Bergen and Jason, 2004).

Considering the domestic credit control method that was instituted until 1992, a target was fixed for money

supply centered on inflation as the principal objective and growth as the subordinate objective. The central bank observed the lending of banks on a monthly basis. Regularly, on the other hand, it approved desires of banks to diverge their sectoral limits as required to meet lending considered to be a main concern. Alternatively, the monetary policy framework likewise directed to money supply as a pathway to realize the inflation and growth aims between 1992 and 2007. In principle, it was thus called a monetary targeting framework (Quartey & Afful-Mensah, 2014).

(Coleman and Agyire-Tettey, 2008) investigated the influence of some macroeconomic indicators such as Treasury, inflation, lending and exchange rates on the performance of Ghana's stock market. The research employed a time series data on a quarter-on-quarter basis from the start of 1991 to the close of 2005. (Adam and Tweneboah, 2008) investigated macroeconomic indicators and the movement in stock market. The study utilized quarter-on-quarter data from the start of 1991 to the last quarter of 2006. The econometric techniques used included Johansen's multivariate cointegration tests and impulse response function was utilized to trace the short-run dynamics. (Kpanie et al., 2014) considered the connection between the performance of the stock market and macroeconomic factors in Ghana. The study utilized quarterly time series data from quarter one of the years 1995 to quarter four of the year 2011. The main econometric techniques employed were the ADF co-integration analysis and Error Correction Model. (Ibrahim and Musah, 2014) conducted an analysis of the effect of certain macroeconomic elements on stock market returns within the Ghanaian economy.

6. Methodology

Secondary data was employed for this study. Year-on-year time series data from 1990 to 2019 of the selected variables was used. The yearly interval was selected due to availability of complete data on all the variables. Data on the GSE returns (All share index) was acquired from the exchange's annual reports database. Data on macroeconomic variables such as inflation, exchange rate and real gross domestic product were obtained from the World Bank Development Indicators.

In different circumstances, data on the prime rate, money supply and 91-day government bill rates were collected from various Bank of Ghana issuances such as; monetary policy committee press releases, statistical bulletin, banking sector report, and annual reports of the central bank of Ghana. A data collection schedule was prepared to assist in gathering this information. The data was collected over a period of twenty-nine (29) years from 1990 to 2019. This duration is appropriate since, over this period, different monetary policy tools had been implemented. During this period, the monetary policy rate had soared as high as 45% and as low as 12.5% in tandem with the various phases of monetary policy regimes which the economy of Ghana has undergone.

6.1 Model Specification

The general time series regression model is specified as

$y_t = \propto + \beta X_t + \varepsilon_t$ ..... (1)

Where y represents the explained variable, $\propto$ is the constant term, β is a parameter estimate, X is an explanatory variable, ε_t is an error term and t is the time dimension.

This study hypothesized that the monetary policy tools that predicts stock market returns includes inflation, money supply, interest rate, policy rate, and exchange rate. The model also controlled for real economic activity represented by the growth in real GDP. Consequently, the relationship existing between the study's explained and predictor variables is functionally stated as;

$$SR_t = f(INF_t, MS_t, INT_t, EXCHR_t, MPR_t, RGDP_t) \quad \text{..... (2)}$$

The empirical model in this study followed that of (Ibrahim and Musah, 2014; Kpanie et al., 2014; and Kwofie and Ansah, 2018) and is specified as follows:

$$SR_t = \propto + \beta_1 INF_t + \beta_2 MS_t + \beta_3 INT_t + \beta_4 EXCHR_t + \beta_5 MPR_t + \beta_6 RGDP_t + \varepsilon_{1t} \text{..... (3)}$$

Where;

α denotes the constant term in the equations above, βi denotes the parameter estimate of the regression coefficient

SR denotes GSE returns measured by the All share index, *INF* denotes the inflationary level

MS denotes money supply growth, *INT* indicates interest rate, *EXCHR* denotes exchange rate

MPR denotes the monetary policy rate, *GDP* denotes the real output growth rate, ε_{it} denotes the error term.

6.2 Definition of Variables

GSE Returns:

GSE returns was measured by the GSE All share index and it was the explained variable in this study. The exchange has two indices for measuring its performance. These are the All-Share Index (ASI) and the Financial Stock Index (FSI). Whiles the FSI focuses solely on financial stocks of banks, insurance companies and other financial service providing firms, the ASI takes into account all the quoted firms on the exchange. The All share index is estimated from the trading values of all the listed companies on the stock market and therefore it monitors variations in the market capitalization of the Ghana Stock Exchange. Thus, it is a parametric estimate that measures

in weighted terms the movement and performance of all the listed equities on the bourse.

Inflation rate:

Annual rates of inflation reflect the annual change in the price of obtaining a basket of predetermined goods and services by households in Ghana. Thus, inflation measure the changes in the general prices' levels over time. This study employed inflation rate that is measured as annual change in an index of consumer prices (the CPI). The year-end values for each fiscal year was selected to denote inflation for that year.

Money Supply:

Money supply is a key instrument monetary authority employ in an effort to regulate inflationary pressures. Money supply denotes the overall quantity of money in circulation in a country. Money supply within the Ghanaian context consist of narrow money (M1), and broad money (M2 and M2+). In this study, the broad money (M2) in Ghana was used. M2 denotes money outside the banking system, together with checking accounts, time deposits and savings accounts. Money supply was measured in this study as the percentage growth in broad money supply annually.

Interest rate:

The study used the yield on the 91- day Treasury bill to proxy interest rate. Interest rate is anticipated to have a negative effect on stock market performance based on both empirical and theoretical evidence. This is because a rise in interest rate will result in a rise in the opportunity cost of holding money. This may lead to investors holding interest-bearing securities resulting in the rise of cost of capital, thereby reducing investment.

Exchange Rate:

It is explained as the value of a domestic or any other currency with regards to another currency. In this study, the real exchange rate is used which is the proportion of the price of the United States Dollars to the Ghana cedi, where the dollar is converted to Cedis through the nominal exchange rate.

Monetary Policy Rate (MPR):

The prime rate is the rate of interest that the central bank lends short-term funds to deposit-taking money banks. The policy rate services as a reference point at which all other forms of interest are generated. A lower MPR indicates that a commercial bank can borrow at a cheaper rate and vice versa. The policy rate is determined and communicated by a Monetary Policy Committee arm of the Bank of Ghana. End-of-year figures were chosen to represent each year.

Real Output Growth Rate:

This study employed real Gross Domestic Product (GDP) growth rate to measure real output growth in Ghana. Annual growth rates in the real GDP of Ghana for the specified period was used. This is adjusted for inflation and expressed as a percentage.

7. Empirical Strategy

This study used a number of time series regression analysis methodologies for carrying out the objectives of the study. Initially, stationarity tests were employed to test for the existence of unit roots among the study variables, bounds co-integration test was utilized to test for co-integration and Autoregressive Distributed Lag (ARDL) model was also used to ascertain the long-run and short-run relationships among the variables.

7.1 Stationarity Test

Time series data usually use past data to determine the linkage between variables. In instances, where the future tends to be unlike the previous, then these relationships may be unsuitable for projections. This usually happens once the variables are non-stationary. Consequently, variables that are employed for time series researches have to be stationary and show a stochastic process. A stochastic process for a variable y_t is said to be stationary if it's mean and co-variance are time invariant. Variables have to be stationary so as to prevent spurious outcomes which have no economic connotations (Davidson and Mackinnon, 2004). The commonly used tests include the Augmented Dickey-Fuller (ADF) (1979) test, Phillips-Perron (PP) (1988) test, KPSS, ADF-GLS test and Zivot-Andrews (1992) test. In this study, the ADF test is used.

The ADF test is commonly used because it is simple and thorough thus, this study employed it to test for evidence of unit roots among the variables.

The computed regression for Dickey-Fuller test is stated as:

$$\Delta Xt = \beta + \rho t + \delta Xt_1 + \sum_{v=0}^{\rho} \gamma v + \Delta Xt - 1 \quad + \mu t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.3)$$

If the null hypothesis: δ=0 (the variables under consideration is not stationary) is not rejected, then it gives an indication that the variable is a non-stationary series. Where the alternative hypothesis: H_1: δ<0 is not rejected, then the variable under consideration does not have unit roots.

7.2 Autoregressive Distributed Lag (ARDL) Technique

Basically, the ARDL technique involves a few steps. Initially, it involves the testing of the long-run relationships between the variables under consideration by the use of F-statistic. This is ascertained by modeling a conditional error correction version of the ARDL model for the specification concerned. Surely, to check for long run relationships, the study used the ARDL bounds testing to test for the presence of co-integration among the variables. In order to do this, an F test is computed. The computed F-statistic is matched with the critical values at 0.01, 0.05 and 0.1 levels. The decision rule is that when the F-statistic is above the upper critical value, there is cointegration. Conversely, when the F-statistic is below the lower bound critical value, there is no cointegration and in a case where it falls between the lower bound and the upper bound critical value, the results is unsettled. Furthermore, when the null hypothesis is overruled, it implies that there is co-integration among the variables.

The ARDL error correction is completed after the confirmation of cointegration equation. An Error Correction Model (ECM) is specified as this

$$\Delta SR_t = \gamma_{01} + \sum_{i=1}^{p}\gamma_{1i}\Delta INF_{t-i} + \sum_{i=1}^{p}\gamma_{2i}\Delta MS_{t-i} + \sum_{i=1}^{p}\gamma_{3i}\Delta INT_{t-i} + \sum_{i=1}^{p}\gamma_{4i}\Delta lnEXCHR_{t-i} + \sum_{i=1}^{p}\gamma_{5i}\Delta MPR_{t-i} + \sum_{i=1}^{p}\gamma_{6i}\Delta RGDP_{t-i} + \phi ECT_{t-1} + \omega_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 3.4$$

Where ECT_{t-1} is the error correction term with ϕ as the speed of adjustment parameter

$$ECT_{t-1} = (SR_{t-1} - \theta X_t) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 3.5$$

θ which is the long run parameter is given by $\frac{\sum_{i=0}^{p}\beta_i}{\psi}$

ϕ is given $(1 - \sum_{i=1}^{p}\delta_i)$

$\gamma_{1i} \dots \dots \gamma_{6i}$ are the models adjustment to the long-run equilibrium by the short-run coefficient

The long run model takes this form.

$$SR_t = \propto_{01} + \sum_{i=1}^{p}\eta_{1i}INF_{t-i} + \sum_{i=1}^{p}\eta_{2i}MS_{t-i} + \sum_{i=1}^{p}\eta_{3i}INT_{t-i} + \sum_{i=1}^{p}\eta_{4i}EXCHR_{t-i} + \sum_{i=1}^{p}\eta_{5i}MPR_{t-i} + \sum_{i=1}^{p}\eta_{6i}RGDP_{t-i} + \sigma_{tt} \dots\dots\dots\dots 3.6$$

In case of no cointegration, which indicates no long run relationship, the ARDL model is specified as below for the short-run relationship

$$\Delta SR_t = \gamma_{01} + \sum_{i=1}^{p}\gamma_{1i}\Delta INF_{t-i} + \sum_{i=1}^{p}\gamma_{2i}\Delta MS_{t-i} + \sum_{i=1}^{p}\gamma_{3i}\Delta INT_{t-i} + \sum_{i=1}^{p}\gamma_{4i}\Delta EXCHR_{t-i} + \sum_{i=1}^{p}\gamma_{5i}\Delta MPR_{t-i} + \sum_{i=1}^{p}\gamma_{6i}\Delta RGDP_{t-i} + \omega_{tt} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 3.7$$

The ARDL model has some advantages which helped in this study. This include the vital role it plays in analyzing economic data, where a change in one economic variable causes a change in others beyond time. The variation in a variable is not what manifests instantaneously, but it distributes over future periods. The ARDL models address the distributed lag difficulty more proficiently than other models as it addresses collinearity by allowing the lag of the response variable in the model to be correlated with the other explanatory variables and their lags.

7.3 Diagnostic and Stability Tests

To ensure the reliability of the model, some diagnostic tests was conducted. Basically, test for serial correlation or autocorrelation, heteroskedasticity, and model stability were the tests that were performed to make sure that the chosen model is tough and reliable for making inferences.

Autocorrelation occurs when the residual terms in a time series component transfer from adjacent period to another. This problem leads to inefficient estimates and extremely small standard errors. The tests used to check for serial correlation include a plot of residuals e_t against t, a Durbin-Watson test, the Breusch-Godfrey test, a Correlogram and the Moran's I statistic. In this study the Breusch-Godfrey test which is based on the notion of the Lagrange multiplier is used to test for autocorrelation.

Heteroscedasticity occurs when sub populations have different variance and it is simply the absence of homoskedasticity assumption underlying a linear regression model. It is a major concern because heteroscedasticity undermine statistical tests for significance which assumes that the errors are constant, thus their variances may not vary with the effects being modeled. In this study the Breusch-Pagan (1979) test is used to test for heteroscedasticity

The stability tests were conducted using plots of the Cumulative Sum (CUSUM) and the Cumulative Sum of Squares (CUSUMSQ) as postulated by (Brown et al. 1975). Instability of estimated coefficient and parameter variance over the specified time frame is concluded if the movements of the CUSUM and CUSUMSQ residuals lie outside the critical lines. Alternatively, stability is concluded when the movements lie within the critical lines.

8. Results and Discussion

Stock market performance as measured by the GSE All Share Index recorded a mean of 0.29 over the 29-year study period. Its degree of dispersion about the mean measured as the standard deviation recorded a value of 0.49.

This was subsequently the least value recorded among the study's variable indicating that stock market returns recorded the least volatility over the study period among all the other variables in this study.

Table 1. Descriptive Statistics of Variables

	Mean	Std. dev.	Variance	Skewness	kurtosis	No. of obs
Stock Returns	0.291	0.494	0.244	0.836	3.086	29
Inflation	23.57	14.092	198.612	2.581	10.736	29
Money Supply	33.292	12.129	147.105	0.259	2.141	29
Interest Rate	18.336	8.354	69.786	0.749	2.26	29
Exchange Rate	1.144	1.239	1.534	1.421	4.143	29
MPR	24.696	9.908	98.172	0.733	2.615	29
RGDP	5.525	2.392	5.72	1.908	6.758	29

Source: Author's computation using data (2019)

A mean value of 23.57% was recorded for inflation rate which indicates that consumer prices have relatively been higher over the past two decades as compared to present times where the rate of inflation has widely stayed in the single digits. Inflation recorded a standard deviation of 14.10 and a variance of 198.61.

The mean of broad money supply over the study period was 33.29% with a standard deviation of 12.13. The mean value of 33.29% recorded for the annual growth in Ghana's broad money supply indicates that over the past 3 decades, moneys outside the banking system together with various deposits and accounts recorded an average growth rate of 33.29%. This is somewhat in tandem with the average inflation rate of 23.57% over the same period confirming the assertion that growth in money supply may lead to inflation in the near future (Barnor, 2014).

Interest rate as measured by the yield on the 91-day Treasury bill averaged 18.34% over the study period. It recorded a standard deviation of 8.35. Whilst exchange rate, measured by the cost of the Cedi in terms of the US Dollar had a mean of 1.14 with a standard deviation of 1.24.

The monetary policy rate had an average score of 24.70% with a standard deviation of 9.91. The high value of the policy rate as compared to the prime rates of other sub-Saharan countries points to the high interest rate regime in Ghana. The real GDP growth rate from 1990 to 2019 averaged 5.53 with a standard deviation of 2.39. Lastly, it can be seen that all the variables are positively incorrect.

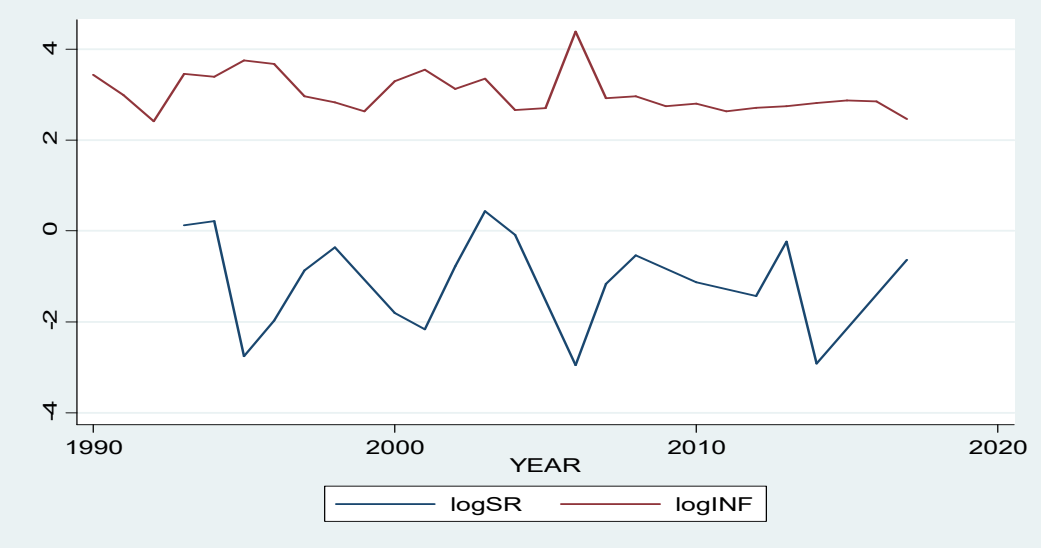
Research Question One: How is the trend of monetary policy and stock market returns in Ghana?

Trend Analysis

This vicinity focuses on trend analysis of monetary policy and stock returns in Ghana. Figure 1 shows stock market returns on Ghana's bourse and inflation rate over the past decade, figure 2 shows stock market returns and money supply and figure 4.3 shows stock returns and monetary policy rate from 1990 to 2019.

Trend Analysis of Stock Returns and Inflation Rate

Figure 1: Stock Returns and Inflation from 1990 to 2019

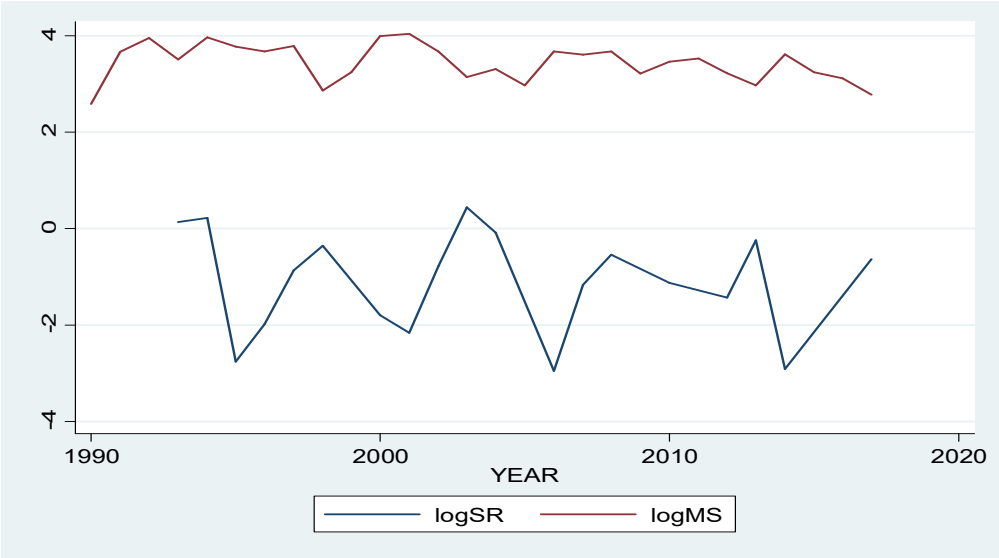


Source: Author's computation using data (2019)

It can be observed from figure 1 that stock returns and inflation rate tend to move in a similar pattern. From 1990 to 1992, stock returns were negative when inflation decreased sharply till 1993. From 2000 the pattern of stock returns and inflation was similar until there was a sharp decline in 2005. From there, the movement in the two variables were the same.

Trend Analysis of Stock Returns and Money Supply

Figure 2: Stock Returns and Money Supply from 1990 to 2019

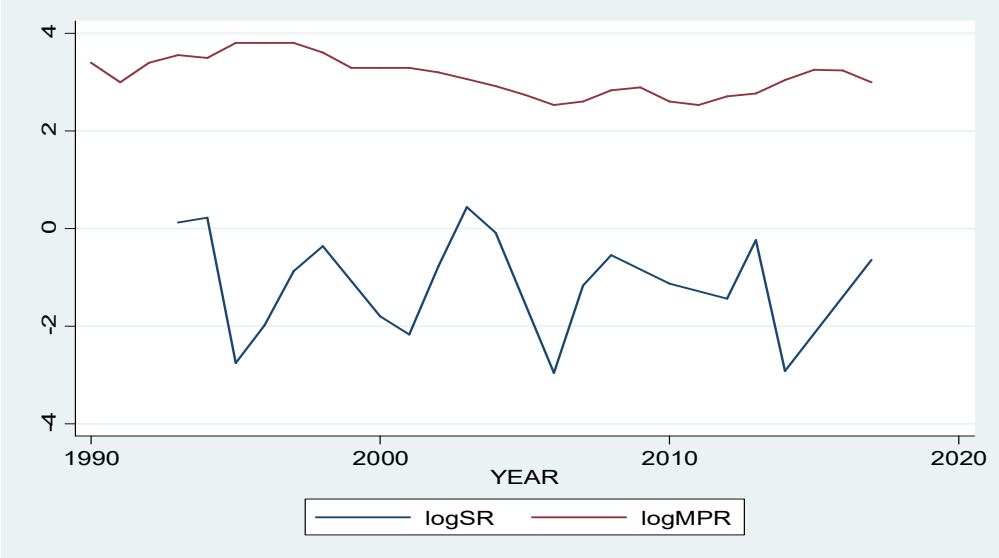


Source: Author's computation using data (2019)

A critical look at figure.2 reveals that stock returns and money supply from 1990 to 2019 moved in a similar pattern. It can be observed that the movement in money supply was steady as it rose and fell throughout the period. However, the movements in stock returns were sharp as it rose and fell throughout the period.

Trend Analysis of Stock Returns and Monetary Policy Rate

Figure 3: Stock Returns and Monetary Policy Rate from 1990 to 2019



Source: Author's computation using data (2019)

It can also be observed from the figure above that the movement in monetary policy rate was steady as it rose and fell throughout the period. However, the movements in stock returns were sharp as it rose and fell throughout the period.

Stationarity Test

As specified in chapter three, the study's series or variables were to be subjected for a test to assess the existence of unit roots. The Augmented Dickey Fuller (ADF) test was utilized to conduct the stationarity test. The results of the ADF test at levels and at first differences are presented in the tables below respectively.

Table 2: ADF Test Results for Stationarity at first difference

Variables	Coefficient	P-value
Stock Returns	-1.19	0
Inflation	-1.433	0
Money Supply	-1.17	0
Interest Rate	-1.034	0
Exchange Rate	-0.448	0.025
MPR	-0.904	0
RGDP	-1.315	0

Source: Author's computation using data (2019)

Based upon the output from the stationarity at levels, a first difference was subsequently taken and the ADF test was conducted on the differenced series. It is detected that all variables became stationary after first differencing as shown by their respective p-values which confirmed that all the series were statistically significant at 5% and 1% levels. Therefore, the order of integration of the variables were a combination of I(0) and I(1).

Results for Cointegration Test

After testing for stationarity, the study went ahead to test for co-integrating relationships among the dataset. This was achieved using ARDL bounds test technique for co-integration. The outcomes have been summaries in the table below.

Table 3: Summary of Bounds Test for Co-integration

F Statistic		10%	5%	1%
5.341	Lower bound	2.543	3.111	4.536
	Upper bound	3.885	4.665	6.619

Source: Author's computation using data (2019)

The decision rule for the bounds test states that if the associated F-statistic is bigger than the upper bound there is co-integration whereas if the F-statistic is lesser than the lower bound, there is no cointegration. It can be observed from the table above that, the F-statistic (5.341) of the stock market return model is larger than the upper bound at critical values of 10% and 5%. Consequently, it can be settled that there is cointegration thus a long-run connection exists among the variables.

Analysis of Regression Results

Based on the order of integration of the variables, that is a combination of I (1) and I (0), the justification for using ARDL was provided. The study therefore adopted the Autoregressive Distributive Lag (ARDL) to generate the empirical results.

Short Run Results

The short-run outcome of the linear regression has been presented in this sub section. An ARDL lag structure of 1 0 0 0 0 0 was used for this model which had stock market returns being the dependent variable. The results have been presented in the table below;

Table 4: Regression Results of Short-Run Model

Variables	Coefficient	Std. Err.	Prob.
Ecm(-1)	-0.897	0.234	0.001
Inflation	-0.1994	0.0082	0.033
Money supply	0.0679	0.0115	0
Interest rate	-0.0135	0.007	0.081
Exchange rate	-0.0997	0.1172	0.405
MPR	0.0153	0.0235	0.522
RGDP	0.1953	0.0545	0.003

Source: Author's computation using data (2019)

It is evidenced from the output above that the error correction term (Ecm-1) is negative and statistically significant at 1% and therefore affirms the short run relationship suggested by the bounds test for cointegration. The coefficient of the error correction term indicates that in the occurrence of shocks to the explanatory variables, the speed with which stock returns adjusts to equilibrium is 89.7 percent.

Also, it can be observed that in the short-run inflation has a statistically significant effect on stock returns at 5% level of significance as shown by its p-value of 0.033. A negative coefficient (-0.1994) suggested that all things being equal, a unit raise in the rate of inflation results in a 0.20 decline in stock returns. This is because a rise in inflation to a certain level reduces purchasing power of consumers. When this happens spending on goods and services within an economy may reduce which may decrease the level of production. A decrease in production levels may decrease company profit thereby decreasing the returns on their stocks. Also, this in turn cumulates into a decline in the overall output in a country which is a measure of economic growth which directly influences

the stock market.

Interest rate measured by the yield on the 91-day Treasury bill had a statistically significant and negative impact on stock returns at 10% level of significance as shown by a p-value of 0.081. A negative coefficient (-0.0135) was realized which suggested that, all things being equal a percentage rise in interest rate causes stock returns to decline by 0.0135 in the short run. This was explained by the point that a surge in interest rate makes stocks unattractive to investors. Investors would rather invest in bonds that will provide them with high extra income than to invest in stocks. This depresses the transactions on the stock market and thus stock returns. Contrarily, a downturn in interest rate compels investors to shift their resources to stocks instead of purchasing bonds which they may gain little from. The finding in this study is consistent with (Ioannidis and Kontonikas, 2006; Adam and Tweneboah, 2008; Kpanie at al., 2014 and Kamal, 2018).

Further, real gross domestic product generated a statistically significant and positive effect on stock returns at 1% level of significance as shown by a p value of 0.003. A positive coefficient of 0.1953 suggested that, all things being equal an increase in real GDP growth rate increases stock returns by 0.1953 in the short run. This is because when GDP increases it signifies an overall healthy economy. A healthy economy means that investors are attracted to investing in stocks and corporate earnings increase as well thereby increasing the returns on stocks. Alternatively, when real GDP declines the pessimism that comes with it discourages investments in the economy depressing the stock market.

Nonetheless, there was no linkage between stock returns and exchange rate and stock returns and Monetary Policy Rate as shown by their p-values which were greater than 1%, 5% and 10% significance level. Whilst the absence of a significant relationship between the policy rate and stock market returns is somewhat anticipated, that between exchange rate and stock return came as a shock. The absence of a significant relationship between the prime rate and stock market could stem from the challenges the central bank of Ghana encounters in ensuring a monetary policy pass through. Due to the highly large informal sector of Ghana's economy, implementation of monetary policy tools is often a challenge. Under other conditions, the absence of a relationship between the exchange rate and stock market return could be as a result of a relatively smaller number of offshore investors participating on the local bourse where exchange rate volatilities is not really felt by these smaller group of investors.

Long Run Results

The long run results of the regression model have been presented in this sub section. An ARDL lag structure of 1 0 0 0 0 0 was used for this model which had stock returns being the dependent variable. The results have been shown in Table 5.

Table 5: Long Run Regression Results

Variables	Coefficient	Std. Err.	Prob.
Inflation	-0.0222	0.0093	0.034
Money supply	-0.0075	0.0126	0.556
Interest rate	-0.1501	0.0316	0
Exchange rate	-0.1111	0.0245	0
MPR	0.0171	0.0256	0.512
RGDP	0.0218	0.0618	0.729

Source: Author's computation using data (2019)

In the long-run, inflation had a statistically significant and negative link with stock returns as shown by a p-value of 0.034 and a coefficient of -0.0222. The negative coefficient indicates that a unit increment in the rate of inflation will cause stock returns to fall by 0.02 in the long-run, all things being equal. This discovery of an inverse proportion between stock market return and inflation further corroborates a similar relationship uncovered in the short-run model. This is so because lower inflationary periods help to promote financial and economic stability, boosts confidence and security in the entire economy which consequently encourages investment. Therefore, companies are able to raise enough capital from investments which can boost their production levels thereby increasing profit and the returns on their shares.

Similar to the short-run results, interest rate had a statistically significant and negative tie with stock returns as shown by a coefficient of -0.1501 and a p-value of 0.000. This shows that a unit increase in interest rate decreases stock returns by 0.1501. As explained earlier, investors would rather hold interest bearing securities than invest in shares of companies and this depresses stock market activities thereby decreasing returns on stocks in the event that an economy is in a high interest rate regime. Also, when interest rate increases the cost of capital also increases and this means production cost may increase in the long run. An increase in the cost of production may decrease profit which may negatively affect the returns on their shares. This finding is not consistent with (Galiy and Gambettiz, 2013, and Bissoon et al., 2016) who found a denial and significant correlation between interest rates and stock returns in the long run.

Exchange rate had a statistically significant and negative accord with stock returns at 1% as shown by a probability value of 0.000. A negative coefficient of -0.1111 suggested that a unit increase in exchange rate leads

to a 0.1111 percent decrease in stock market returns, all things being equal. The discovery of an inverse relationship between the exchange rate and stock returns is highly anticipated due to the basic fact that the Ghanaian economy is largely an import dependent economy where industries hugely depends on imported raw materials for production. This situation is further worsened by the fact that most firms in Ghana rely on technical and human skills support from their overseas development partners. Exchange rate depreciation or an increase in the exchange rate makes imports expensive and exports cheaper. This therefore implies that firms that rely heavily on imported products and foreign assistance will end up incurring relatively higher cost on their production. This may lead to a wearing-off of revenues and eat into profit levels. Thus, listed firms becomes less attractive to investors who may shun their stocks largely due to low profits. This finding is consistent with (Adam and Tweneboah, 2008; Kamal, 2018 and Kwofie and Ansah, 2018) who found a negative relationship between exchange rate and stock returns.

The absence of a significant relationship between the policy rate and stock returns further corroborates the findings in the short-run which basically stems from irregularities from monetary policy implantation within the Ghanaian context. Similarly, there was no factually huge connection between growth in the national output and stock returns. This result is unanticipated since a buoyant economy is often characterized by increases in stock market activities and hence returns made on the exchange.

Results of Diagnostic and Stability Tests:

The study conducted these three tests which include test for sequential relationship, heteroscedasticity, and practical type of the model.

Table 6: Results of Diagnostic and Stability Test

Test	Test statistic	P value	Conclusion
Breusch-Pagan test for Heteroskedasticity	0.61	0.4363	homoscedasticity
Breusch-Godfrey Serial Correlation LM Test	0.568	0.4512	No sequential relationship
Ramsey RESET test for Functional form			Correctly specified model
CUSUM			Stable
CUSUMS-Q			Stable

Source: Author's computation using data (2019)

From Table 6 the Breusch Pagan test show a probability value above 0.05 pointing out that the null hypothesis of constant variance cannot be rejected. It was therefore concluded that there is the absence of heteroskedasticity among the error terms. Also, it can be observed that the p-value of the Breusch-Godfrey LM test is greater than 0.05 which meant that the null hypothesis of no serial correlation cannot be rejected. It was therefore concluded that there was no autocorrelation among the variables of the study.

The Ramsey RESET test also had statistically insignificant results which indicated that the model was specified correctly. The CUSUM and CUSUMQ graphs for the model indicated variable stability at 5% significance level. This suggests that the parameter estimates are stable and are within the boundary of critical values.

9. Conclusion

The paper examines the impact of monetary policy on stock returns at the Ghana Stock Exchange, using autoregressive distributed lag (ARDL) structure with data ranging from 1990 to 2019. The study concludes that in the short-run, inflation, money supply, interest rate and real GDP growth rate significantly affect stock returns. In the long-run, inflation, exchange rate and interest rate significantly impact stock returns. The study has established that truly, monetary policy actions influence stock returns in the capital market confirming how monetary policy is transmitted through financial markets. The analysis concludes that inflation levels, interest rates and exchange rate are very essential components of monetary policy that should be considered by policy makers in order to ensure the development of the capital market. The overall growth of the economy is essential to the performance of the stock market as it impacts stock returns positively. It is worth noting that the post COVID-19 pandemic economic recovery is crucial and stock markets are engine for growth.

9.1 Recommendations

The study recommends that high inflationary levels in Ghana ought to be brought under control to enhance growth of the capital market. This is because high inflation has proven to be associated with low stock returns confirm several economic concerns of the adverse impact of high inflation on investments and hence, growth.

Furthermore, potential investors should also consider the movements of these monetary policy variables when deciding on investing in the stock market. They ought to critically examine trends and growth in money supply and Treasury bill rate (interest rates) since they have a retrogressing impact on the stock performance.

Lastly, the central bank should carefully examine the trade-offs between a higher rate on their short-term securities sold to the commercial banks and keeping rates low to encourage private sector borrowing for companies listed on the exchange.

9.2 Suggestions for Further Study

The current study can be improved along the following lines:

Since stock market dynamics keeps changing, conducting this research to cover many macroeconomic variables like oil pricing and fiscal policy will give a more elaborate impact of macroeconomic variables on stock pricing. Also, the examination of stock market response on macroeconomic and monetary policy shocks along with these linkages can be considered for future research.

Finally, it is indispensable that future examinations on this point consider nations with essentially extraordinary money related strategy system.

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