



Monetary Policy, Institutional Quality and Economic Growth: The Ghanaian Narrative

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Abstract

The multiplicate role of institutional quality in the monetary policy-economic growth nexus from the Ghanaian perspective has remained unexplored. This investigation explores two objectives. First, to analyse the effect of monetary policy on economic growth and second, to examine the multiplicative role of institutional quality in the monetary policy-economic growth nexus in Ghana. The study used secondary data collected from 1990-2021 and employed the bound testing to cointegration and ARDL technique. The result revealed a positive significant effect of monetary policy rate on economic growth in both the short and long run. However, money supply showed a statistically significant positive effect on economic growth in the long run yet a negative effect in the short run. Additionally, the rule of law and regulatory quality demonstrated a significant positive moderating role in the long run but a significant negative role in the short run in the monetary policy-economic growth nexus.

Subject Areas

Monetary Economics

Keywords

Monetary Policy, Ghana, Economic Growth, Cointegration, Institutional Quality

1. Introduction

Monetary policy is a pecuniary policy taken by the government regularly through the Central Bank to impact the economy. Its goal is to create stability in the economy and encourage financial development, which has been the quest of every country [1]. Monetary policy alludes to government activity undertaken

explicitly to control the value, circulation and direction of money in the economy while thinking about the predominant economic circumstance [2] [3]. Institutions are agencies and frameworks that are put in place to monitor and control the activities of government and other non-governmental agencies in an economy [4]. The presence of quality institutions ensures that governmental bodies and other corporate organisations are kept on their toes in engaging in appropriate practices to ensure sustained economic advancement [2].

The concept of monetary policy has attracted a lot of interest in the past from various scholars as it is a significant subject in macroeconomic studies [5] [6]. In macroeconomic theory, monetary policy is expected to impact the economic conditions prevailing through the changes in the rate of interest, which would result in variations in the prices of investments as well as that of the capital in the production sector [7]. However, the establishment of these policies on money and their objective is recognised as a driving factor, especially for the economists and the opinions of the integration of all the central banks since they are the ones charged with the responsibility of providing domestic currency to the economy as well as the applying these monetary policies [8]. In addition, despite the implementation and frequent review of monetary policy transmission tools, the economic performance of some of the developing world has been poor for years [9].

The main objective of the Bank of Ghana (BOG) is to achieve stability in the general level of prices, as stated in the BOG Act 2002 (Act 612) subsection 3(1). To ensure this, the Central Bank of Ghana adopted inflation targeting in 2007 as its main monetary policy framework. According to [10], a study carried out between the period of 2002 to 2014 on monthly data to review the effectiveness of the monetary policy rate; the results indicated that the monetary policy rate had the potency to effectively signal the market interest rate both in the long and the short run in Ghana within the period of the study [11]. The study also indicated that inflation is mostly driven by interest rate shock over the medium to long term as a result of the impact of monetary policy. In the short term, however, exchange rate shocks have a relatively larger impact on inflation than that resulting from the market interest rate.

On the contrary, output is largely driven by shocks in credit and asset prices. This suggests that an agent's knowledge about future output prospects is often immediately reflected in asset prices before they impact output. The paper, therefore, agrees with policies that would promote strong macroeconomic and financial stability to help accustom effective monetary policy transmission in Ghana. In 2011, the growth of the Ghanaian economy was about 14%, the highest recorded in the last two decades, this growth rate reached its lowest of 2.2% in 2015, within the same period, the monetary policy rate saw an increasing pattern from 12.5% to about 25.5% [11]. This is to say that, within the period of a steady increase in the monetary policy rate, the Ghanaian economy also concurrently saw a reduction in its growth rate. After the period of 2015, the growth of the economy started performing quite better compared to the previous years.

During this same period, the monetary policy committee reviewed the downward monetary policy rate on several occasions (see **Figure 1**). It is, therefore, evident from the trends in the monetary policy rate and economic growth that during periods of higher monetary policy rate, economic growth has been stunted [12].

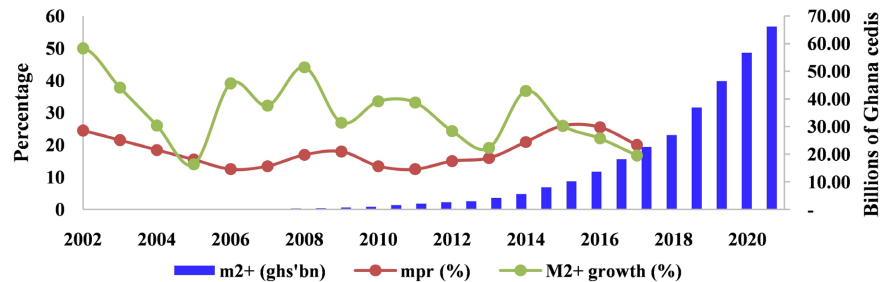


Figure 1. Trend in M2+, growth in M2+ and MPR, Source: Author's construct.

The rising significance of monetary policy has made it useful in influencing economic growth by most governments. Numerous writers have studied the effect of monetary policy rates on sustainable economic growth and development in several countries, including developed and developing economies. While others encourage a positive effect of monetary policy rate on economic growth [5] [7] [13] [14], some researchers show evidence in favour of negative impact [15] [16] [17]. Notwithstanding the lack of agreement among economists on how the monetary policy rate really works and on the extent of its effect on the economy, there is a strong agreement that it has some degree of effect on the economy [8]. Beyond this, there is a dearth of literature on the moderating role of institutional quality in the causal relationship between monetary policy and economic growth in Ghana. The need to conduct this assessment rides on the fact that strong institutions have the potency to ensure that prudent monetary policy decisions are taken, which will subsequently stimulate economic growth [5]. Again, the growing literature on monetary policy-economic growth seems to have neglected the moderating role of institutional quality. However, the discovered significant effect of institutional quality on economic growth by [4] implies that it can serve as a conduit through which the impact of monetary policy can be translated to economic growth.

Nevertheless, this assertion remains a conjuncture until a scholarly apprehension to verify its veracity; therefore, there is an urgent need to examine the multiplicative role of institutional quality. The choice of Ghana as the study's focus lies on the onus that the performance of the financial system of Ghana, which is largely impacted by the monetary policy, has been shambolic over the years, leading to the collapse of some tier banks [18]. Again, hyperinflation, which efficient institutions and effective monetary policies can mitigate, has been the highest among countries in the West African sub-region as cited by [19]. This, therefore, feeds into our motivation to investigate the relationship between monetary policy and economic growth and further assess the moderat-

ing role of institutional quality in the monetary policy-economic growth nexus from the Ghanaian perspective. This study is, thus, distinct and unique as it departs from the norm by assessing the extent to which the quality of institutions determines the strength and direction of the effect of monetary policy on economic policy. The remaining part of the study is segregated into Literature review, methodology, results and discussion and conclusion and recommendations.

2. Literature Review

2.1. Theoretical Postulates

This study is grounded on two related theories such as the Endogenous Growth Theory [20] and the New Keynesian Theory [21]. The key idea behind endogenous growth theory is that certain variables within an economy, including innovation and institutions, can be actively influenced and nurtured to promote economic growth. Endogenous Growth theory, therefore, emphasises the role of institutions in driving long-term economic growth. This theory suggests that strong institutions, including efficient legal systems and effective governance structures, create a conducive environment for investment, innovation, and entrepreneurship. Institutions that provide stability, promote fair competition, and protect intellectual property rights encourage long-term economic growth. Thus, this theory supports the view that once prudent monetary policy decisions are made in the presence of quality institutions characterised by efficient legal systems and better governance structures, economic growth is evident, *ceteris paribus*.

The New Keynesian theory emphasises the role of monetary policy in stabilising the economy [21]. The theory suggests that in the short run, monetary policy can affect real economic variables such as output and employment through its impact on nominal variables like interest rates and inflation. The presence of sticky prices and wages implies that monetary policy can have real effects on the economy by influencing the spending decisions of households and firms. Our study is situated within the confines of this theory as it amplifies the need for effective monetary policy for enhanced economic growth.

2.2. Empirical Evidence

2.2.1. Monetary Policy and Economic Growth

There exists a plethora of research evidence as far as monetary policy and economic growth are concerned [12] [22]-[25]. For instance, [22] aims to provide a comprehensive review of the international literature on the relationship between monetary policy and economic growth. The authors examine various empirical studies and theoretical frameworks to understand the channels through which monetary policy affects economic growth. The literature review reveals that there are different channels through which monetary policy influences economic growth, including the interest rate channel, credit channel, and exchange rate

channel. The authors also discuss the role of inflation targeting as a monetary policy framework and its impact on economic growth. The findings suggest that expansionary monetary policy, characterised by lower interest rates and increased credit availability, can stimulate economic growth. However, the effectiveness of monetary policy in promoting growth is contingent upon various factors such as the level of financial development, institutional quality, and prevailing macroeconomic conditions.

Additionally, [23] explored the impact of fiscal and monetary policy on economic growth in an emerging economy. The study employs econometric techniques to analyse the relationship between key fiscal and monetary policy variables, such as government spending, interest rates, inflation, and economic growth indicators. The findings reveal that both fiscal and monetary policy variables significantly influence economic growth. Expansionary fiscal policy, characterised by increased government spending, has a positive impact on GDP growth. Similarly, accommodative monetary policy, characterised by lower interest rates and inflation, stimulates economic activity. However, the study's limitation lies in its focus on a generalised analysis of an emerging economy without a specific country context. The diverse characteristics and institutional settings of different emerging economies may influence the relationship between policy variables and economic growth.

[24] focused on East Africa and examined the dynamics between monetary policy, external shocks, and economic growth in the region. The authors employ a structural vector autoregression (S-VAR) model to analyse the interplay of these variables. The findings suggest that monetary policy has a significant impact on economic growth in East Africa. Expansionary monetary policy, characterised by lower interest rates and increased money supply, stimulates economic activity and leads to higher GDP growth.

[25] study focuses on investigating the effect of fiscal and monetary policy on economic growth in Nigeria. The researchers use various variables, including government total expenditure, government total revenue, inflation, gross domestic product (GDP), interest rate, unemployment rate, and broad money supply. ARDL as the estimation technique, the findings indicate that money supply, government total expenditure, and government total revenue have a significant impact on economic growth in Nigeria. The findings of this study are in sync with [26], whose empirical focus was Nigeria, and found that lower interest rates and increased money supply significantly stimulate economic activity, which eventually leads to higher GDP growth.

[27] studied the effectiveness of monetary and fiscal policy instruments in stabilising the Nigerian economy using the ADF, Johansen's cointegration, and the Error Correction Model (ECM) for empirical analysis. The results indicate a long-run equilibrium relationship between monetary and fiscal policy instruments and economic growth in Nigeria. The analysis confirms a positive relationship between money supply, government expenditure, and revenue with economic growth. However, interest rates and budget deficits exhibit a negative

relationship with economic growth.

[28] investigated the games of inflation, monetary policy and the growth of the Ghanaian economy for the period between 1982 and 2017. The researchers used ARDL to cointegrate the model, and it was revealed that in the longrun, interest rate significantly influences the growth of the economy but in a negative direction. In relation to exchange rate, the long-run result indicated an insignificant negative effect on the growth of the economy. The general result suggested that macroeconomic variables that influence economic growth are interest rate and exchange rates.

2.2.2. Monetary Policy, Institutional Quality and Economic Growth

This study conceptualised institutional quality as those basic tenets that guide the operations of public and other private institutions in order to maximise wealth. [5] examined the role of institutional quality on economic growth. The study uses Generalised Method of Moments on a panel of 113 countries during 2006 -2016. It was found that government effectiveness, regulatory quality, tax burden, monetary freedom, financial freedom, trade freedom, the strength of auditing and reporting standards, efficacy of corporate boards, and strength of investor protection have a positive effect on economic growth. In the same fashion, [5] examined the impact of institutional quality on economic growth in developing economies of Asia. The study used Panel ARDL for the period 1990-2013. Findings show that institutional quality exerts a positive influence on economic growth in addition to causality running between institutional quality and economic growth. This study supports the work by [29] [30] and [12] which revealed that sustainable improvement in good institutions is associated with rising growth and per capita income and that government effectiveness, voice and accountability exert a positive and significant relationship with economic performance respectively.

Extending the scope, a bit wider [2] analyses the impact of institutional quality on economic growth and development in Sub-Saharan Africa, East Asia and Pacific, Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, South Asia, and North America. Using pooled and fixed effect regression models, results show that institutional quality does influence positively economic growth. The impact (size or magnitude) of the institutional quality differs across regions.

In conclusion, there have been many empirical studies on the relationship between monetary policy and economic growth around the world. Most of these studies used OLS analysis, while a few used co-integration analysis and error correction models, including ARDL. This study is unique in that the context of the study is Ghana, and it makes use of more current data and employs a more efficient ARDL model.

2.3. Conceptual Framework and Hypothesis Development

The extensive review of the empirical and theoretical literature inspires this

conceptual framework (see **Figure 2**). From the review, it was clear that prudent monetary policy has the tendency to influence the growth of the economy positively. It was also revealed that the presence of quality of institutions characterised by regulatory quality and the rule of law could determine the nature and direction of the relationship between monetary policy and economic growth. This framework has three parts of interest: monetary policy, institutional quality, and economic growth. Monetary policy was proxied by money supply (MS) and monetary policy rate (MPR), whereas institutional quality was represented by rule of law (RoL) and regulatory quality (RQ). Economic growth was proxied by GDP growth (GDPG). In order to enhance the robustness of the model, the inflation rate (INFL), real exchange rate (REX) and Total Reserve (TR) were controlled. This framework may be used as a guide by academicians and practitioners in understanding the mechanisms through which monetary policy from good-quality institutions contributes to economic growth. Considering the evidence available in both the theoretical postulates and empirical efforts, the following hypotheses are tested:

H₁: *Monetary policy has a significant positive effect on the economic growth of Ghana;*

H₂: *Institutional quality significantly moderates the relationship between monetary policy and the economic growth of Ghana.*

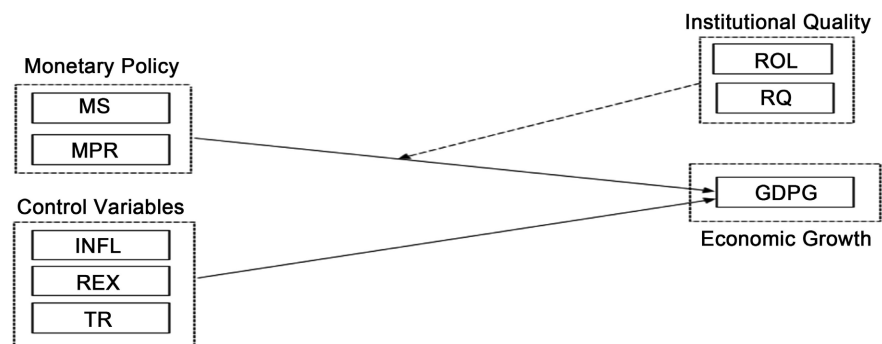


Figure 2. Conceptual framework. Source: Authors' construct.

3. Methodology

This section highlights the methodological approach deployed to achieve the objective of the study. The approaches include the data and data sources, empirical model and estimation techniques.

3.1. Data and Sources of Data

The study used 31 years of secondary time series data spanning 1990-2021 for all variables for Ghana, which includes Money supply (MS), Monetary Policy Rate (MPR), Regulatory Quality (RQ), Rule of Law (RoL), Total Reserves (TR), Capital (CP), Exchange Rate (EXR) and Labour Supply (LF). The 31years data frame was considered appropriate based on the empirical evidence given by [31], who posited that using a data period of 10 years and above for statistical analysis is

necessary for achieving reliable and robust results as confirmed by [32]-[37] who used a data period of 10 years and above and achieved robust in their studies. The data for the study were retrieved from the World Development Indicators section of the world bank database and the Bank of Ghana website as used by previous study [38].

3.2. Model Specification

The objectives set for the study and the data analysis tool adopted give rise to the following baseline model.

$$\begin{aligned} \text{GDP}_t = & \delta + \beta_1 \text{MS}_t + \beta_2 \text{MPR}_t + \beta_3 \text{RoL}_t + \beta_4 \text{RQ}_t + \beta_5 \text{TR}_t \\ & + \beta_6 \text{C}_t + \beta_7 \text{LF}_t + \beta_8 \text{EXR}_t + \varepsilon \end{aligned} \quad (1)$$

Equation (1) above models the interrelationships among the various regressors with the regressand and connects the objectives of the study. Where:

GDP = Economic growth, MS = Money Supply, MPR = Monetary Policy Rate, RQ = Regulatory Quality, RoL= Rule of Law, TR = Total Reserves, CP = Capital, LS = Labour Supply, and EXR = Exchange Rate of the Ghanaian to the United dollar. t denoted the time series factor of the variables, $\beta_1 - \beta_8$ are the elasticities for coefficients, δ is the intercept, whilst ε is the disturbance term. The above model is further decomposed into 3 models specifically, a model without any of the intervening variables, a model with RoL as an intervening variable, a model with RQ as an intervening variable, and a model with both RoL and RQ to examine their composed intervening role in the examined nexus. Mathematically;

$$\text{GDP}_t = \delta + \beta_1 \text{MS}_t + \beta_2 \text{MPR}_t + \beta_3 \text{TR}_t + \beta_4 \text{C}_t + \beta_5 \text{LF}_t + \beta_6 \text{EXR}_t + \varepsilon_t \quad (2)$$

$$\text{GDP}_t = \delta + \beta_1 \text{MS}_t + \beta_2 \text{MPR}_t + \beta_3 \text{RoL}_t + \beta_4 \text{TR}_t + \beta_5 \text{C}_t + \beta_6 \text{LF}_t + \beta_7 \text{EXR}_t + \varepsilon_t \quad (3)$$

$$\text{GDP}_t = \delta + \beta_1 \text{MS}_t + \beta_2 \text{MPR}_t + \beta_3 \text{RQ}_t + \beta_4 \text{TR}_t + \beta_5 \text{C}_t + \beta_6 \text{LF}_t + \beta_7 \text{EXR}_t + \varepsilon_t \quad (4)$$

3.3. Estimation Technique

Several econometric estimation techniques have been used for examining causal nexus among variables; this investigation could have used the Ordinary Least Square technique; however, it resorted to the ARDL. The ARDL approach is a time series estimator that requires that the lag values of the regressand and the regressors are concurrently linked in the model [39]. The adoption of this approach was premised on the certain peculiar strength of the approach. These notable pros of the model are. The approach does not require conformity of the order of variables, thus making it applicable to data series with orders I (0) and I (1) of integration. Again, the approach is capable and robust in running both small and large time series datasets, as empirically confirmed by [40] [41]. Also, the technique is consistent in estimating long and short-run effects by combining the lag and substituting the error-lagged terms [40]. Furthermore, the technique can estimate the error correction term through a linear transformational process [42]. Moreover, the introduction of the lag term in the model results in

the endogeneity problem; the ARDL method is capable of dealing with this problem and other time series-associated problems, such as serial correlation [21] [43]. Besides, the adoption of the ARDL technique is a result of its consistent use in extant literature see [28] [40]. The assumptions stated above are demonstrated in the mathematical notions below to assess the linear relationships among the variables in the study.

$$\begin{aligned} \text{GDP}_t = & \alpha + \beta_1 \sum_{i=1}^{\rho} \text{GDP}_{t-1} + \beta_2 \sum_{i=0}^k \text{MS}_{t-1} + \beta_3 \sum_{i=0}^k \text{MPR}_{t-1} + \beta_4 \sum_{i=0}^k \text{RoL}_{t-1} \\ & + \beta_5 \sum_{i=0}^k \text{RQ}_{t-1} + \beta_6 \sum_{i=0}^k \text{TR}_{t-1} + \beta_7 \sum_{i=0}^k \text{C}_{t-1} + \beta_8 \sum_{i=0}^k \text{LF}_{t-1} + \beta_{10} \sum_{i=0}^k \text{EXR}_{t-1} \quad (5) \\ & + \gamma_1 \text{MS}_{t-1} + \gamma_2 \text{MPR}_{t-1} + \gamma_3 \text{RL}_{t-1} + \gamma_4 \text{RQ}_{t-1} + \gamma_5 \text{FR}_{t-1} + \gamma_6 \text{C}_{t-1} \\ & + \gamma_7 \text{LF}_{t-1} + \gamma_8 \text{EXR}_{t-1} + \varepsilon_t \end{aligned}$$

Equation (5) above shows the unrestricted lag estimations related to the ARDL model where $\beta_1 - \beta_{10}$ shows the coefficient of the lag variables calculating the short-run effect and $\gamma_1 - \gamma_9$ shows the elasticities of the variables in the long run, and $t - 1$ denotes lag. The ARDL is also built on the assumption that a long-run cointegration exists among the variables, which is tested through the F-statistics against the upper and lower critical values. The long-run cointegration is built on the hypothesis that there is no long-run cointegration. The null is accepted if the F-statistics value in the bound test is less than the upper and lower critical values at 5%. However, if the F-Stat is greater than the upper and lower bound critical values, the alternative hypothesis is accepted. The F-statistic critical value at 5% that falls between the upper and lower bound means the cointegration test is inconclusive.

$H_0: P = K = K = K = K = K = K = K = K = 0$. $H_1: P = K = K = K = K = K = K = K = K \neq 0$.

Error Correction Model

The error correction model can be employed to assess the relationship among the regressand and the regressors. Again, the Error Correction Term (ECT) can be deployed to assess the long-run variations in the model whilst the coefficients of the lag variables show the short-term effect of the variables [39] [44]. It is worthy of note that the ECT depicts variations in the short run and shows the rate at which disturbances in the series can be restored to equilibrium with an acceptable margin of falling between -1 and 0 and should be significant [40] [45]. Mathematically, the ECT is incorporated in the short-run estimation below.

$$\begin{aligned} \text{GDPG}_t = & \alpha + \beta_1 \sum_{i=1}^{\rho} \text{GDPG}_{t-1} + \beta_2 \sum_{i=0}^k \text{TR}_{t-1} + \beta_3 \sum_{i=0}^k \text{MPR}_{t-1} + \beta_4 \sum_{i=0}^k \text{RoL}_{t-1} \\ & + \beta_5 \sum_{i=0}^k \text{RQ}_{t-1} + \beta_6 \sum_{i=0}^k \text{TR}_{t-1} + \beta_7 \sum_{i=0}^k \text{CP}_{t-1} + \beta_8 \sum_{i=0}^k \text{LF}_{t-1} \quad (6) \\ & + \beta_{10} \sum_{i=0}^k \text{EXR}_{t-1} + \text{ECT}_{t-1} + \varepsilon_t \end{aligned}$$

The stability of the model is assessed through the use of the CUSUM and CUSUMSQ based on the 5% critical value. The model is said to be stable if the CUMSUM and CUSUMSQ fall between the 5% critical margins.

The choice of formal institutions, thus, the rule of law and regulatory quality to measure institutional quality makes it a robust and standardised measure of institutions other than the use of informal institutions such as culture and media freedom, whose measurement can be subject to biases [3] [47]. Again, the state of culture and media freedom that leaves much to be desired in the Ghanaian narrative motivated the use of formal institutions (see **Table 1**).

Table 1. Variables description and measurement.

Variable	Measurement	Reference
Economic Growth	Gross domestic product growth per annum	[12] [22]
Money Supply	Quantity of broad money in circulation	[12] [24] [25] [38]
Monetary Policy Rate	Central Bank policy rate	[22] [27] [28]
Exchange Rate	Real effective exchange rate	[21] [22] [38]
Reserves	Total foreign reserves held by central banks	[38]
Rule of law	Index of rule of law	[2] [46]
Regulatory quality	Regulatory quality index	[5] [38]
Labour Force	Quantity of labour supplied	[38]
Capital	Supply of credit	[38]

Source: Authors' construct.

4. Result and Discussion

4.1. Descriptive Analysis

The Descriptive analysis is the first step in explaining statistical results, which is important because it describes the characteristics of the variables under study. According to descriptive **Table 2**, capital recorded the highest average followed by the highest maximum and minimum values, indicating that there has been a high supply of capital to the productive sector of the economy. The lowest average was recorded by regulatory quality followed by the rule of rule of law, indicating that Ghana has had an abysmal regulatory framework for the years under study. Economic growth recorded a peak at 589.090, showing that growth has been slow for Ghana in the years under consideration. The monetary policy rate registered the highest value of 14.768, implying that the policy rate has been high compared to that of the United Kingdom and the United States. Also, most of the variables recorded lower standard deviations, implying that the series was not far from a symmetrical distribution. The skewness checks also confirmed this conclusion. The Jarque-Bera probability showing the normality of the data revealed that most of the variables had p-values above 0.05, indicating the series is normal.

Table 2. Descriptive statistics.

	GDP	MPR	MS	LF	CP	TR	EXR	RQ	RoL
Mean	107.596	5.482	25.988	5.38E+09	9030303.000	3.038	97.255	-0.184	-0.175
Median	26.469	5.509	25.717	4.00E+09	10000.000	3.168	94.170	-0.098	0.020
Maximum	589.090	14.768	34.108	2.00E+10	1000000.000	4.430	144.000	0.128	0.150
Minimum	0.481	0.500	14.142	8.00E+08	600000.000	1.067	68.180	-0.892	-4.000
Std. Dev.	153.484	3.137	4.837	5.12E+09	1271.769	0.906	20.112	0.290	0.769
Skewness	1.602	0.667	-0.448	1.366180	-0.862	-0.454	0.584	-1.293	-4.600
Kurtosis	4.637	4.221	2.683	4.445178	2.254	2.503	2.621	3.351	23.082
Jarque-Bera	71.187	17.996	4.972	19.383	52.549	5.889	8.303	37.462	2195.684
Probability	0.094	0.124	0.083	0.620	0.876	0.053	0.016	0.057	0.049
Observations	132	132	132	132	132	132	132	132	108

Source: E-views estimate GDP = Economic growth, MPR, MS = Monetary Policy, LF = Labor, GCP = capital, Foreign Reserve, EXR = Exchange rate, RQ = regulatory quality and RoL = Rule of law. Note that the meaning of the symbols applies as used in all tables.

4.2. Correlation Analysis

A correlation test is used to assess the strength of the relationship between a variable and each other in a series with an acceptable rate of 0.7 [48], whilst others assert an acceptable threshold of 0.8 [49]. A correlation coefficient of more than the acceptable threshold indicates the presence of multicollinearity. Per the pairwise correlation results presented in **Table 3**, the highest correlation of -0.713 was recorded between economic growth and exchange rate, whilst the weakest correlation of -0.002 was registered between capital and monetary policy rate. Since the highest correlation was not more than the threshold of 0.7, we conclude that the series is free of multicollinearity as line in with [50].

Table 3. Correlation test.

	GDP	MPR	MS	LF	CP	TR	EXR	RQ	RoL
GDP	1.000								
MPR	0.483	1.000							
MS	0.130	-0.064	1.000						
LF	0.480	-0.272	0.289	1.000					
CP	0.677	-0.002	-0.228	0.574	1.000				
FR	0.333	-0.141	0.114	0.449	0.198	1.000			
EXR	-0.713	-0.051	-0.299	-0.582	-0.631	-0.257	1.000		
CC	-0.101	-0.373	-0.112	-0.339	0.034	-0.027	-0.139	1.000	
RL	0.159	0.265	-0.003	0.008	0.188	-0.151	-0.175	-0.101	1.000

Source: E-views estimate.

As a robustness and a confirmatory check, we employed the Variance Infla-

tion Factor (VIF) test, which tests the correlation of each variable with the series. Existing studies assert that a variance inflation value of 8 indicates the absence of a multicollinearity problem, whilst others advocate that a VIF value above the threshold of 10 shows the presence of multicollinearity [51]. The VIF test presented in **Table 4** had the highest value of 7.01 recorded by the labour force within the group, the lowest of 1.1 registered by the rule of law, and a mean VIF of 3.18 still below the threshold of 10 complies with the assertion of [52]. This result confirms the earlier findings recorded with the pairwise correlation in **Table 3**.

Table 4. Variance inflation factor.

Variable	VIF	1/VIF
LF	7.01	0.1426
EXR	3.91	0.2555
GCF	3.65	0.2742
CC	3.49	0.2862
MPR	2.79	0.3581
MS	1.99	0.5012
FR	1.4	0.1768
RL	1.17	0.8547
Mean VIF		3.18

Source: E-views estimate.

4.3. Unit Root Analysis

The presence of unit roots in a data set can lead to spurious results. The study adopted the conventional Philip-Perron (PP) test as used by [53] and the Zivot and Andrews unit root tests to assess the stationarity of the variables, which test the null that the series is non-stationary and rejected at a 5% level of significance (see **Table 5**). Thus, $H_0: \epsilon = 0$, $H_1: \epsilon \neq 0$. Where ϵ refers to the variables in the series. The adoption of these techniques is a result of the strength possessed by the technique, such as the ability to detect breakpoints [54]. Testing at level found that only capital was stationary; this led to testing at first difference where the remaining variables attained stationarity. Based on this result, we conclude that the variables are stationary at mixed orders of I (0) and I (1). This justifies the use of the ARDL technique and aligns with [40]. The unit root results are presented in **Table 6**.

On the breakpoint, the Zivot and Andrews test revealed that breaks for economic growth were recorded in 2015. This could be a result of distortions experienced in Ghana's economy prior to the elections in 2016. The monetary policy rate experienced a break in 2004, this can be attributed to the expansionary policies pursued by the country's central bank before the election in 2004. The break in the money supply recorded in 2006 could possibly be a result of contractionary measures pursued by the central bank. On the exchange rate, the

overdominance of the country on imported goods resulted in the break-in 2004, and the break in capital formation in 2013 can be attributed to the aftermath adverse effect of the financial sector meltdown, which took time before restoration in developing economies like that of Ghana. The break in the rule of law in 2017 is logical, intuitive, and expected by the study. It was a result of the delays and irregularities recorded in the previous year's election, which delayed parliamentary proceedings and delayed elected government taking over office.

Table 5. Bound testing to cointegration.

Model	Bound Test F-statistics	5% Critical Value	Decision
GDP = f(MS, MPR, TR, LF, C, EXR)	6	Upper (3.6) Lower (3.61)	Cointegration Exist
GDP = f(MS, MPR, RoL, TR, LF, C, EXR)	7	Upper (3.5) Lower (2.32)	Cointegration Exist
GDP = f(MS, MPR, CC, TR, LF, C, EXR)	7	Upper (3.5) Lower (2.32)	Cointegration Exist
GDP = f(MS, MPR, RoL, CC, TR, LF, C, EXR)	8	Upper (3.15) Lower (2.11)	Cointegration Exist

Source: E-views estimate. Note: *, ** and *** denotes significance at 10%, 5% and 1%.

Table 6. Stationarity test.

Variable	Philip-Perron			Zivot-Andrews			
	Level	1 st Difference	Oder	Level	1 st Difference	Order	Breakpoint
GDP	4.68(0.1)	-14.76(0.000***)	I (1)	0.17(0.262)	0.17(0.002**)	I (1)	2015Q1
MPR	-1.45(0.84)	-12.40(0.000***)	I (1)	-5.17(0.000***)	-3.17(0.000***)	I (0)	2004Q1
MS	-2.52(0.32)	-11.40(0.000***)	I (1)	-3.94(0.001***)	-2.69(0.000***)	I (0)	2006Q1
RL	-3.43(0.05*)	-0.43(0.000***)	I (1)	-2.84(0.050*)	-1.98(0.001***)	I (1)	2017Q2
CC	-2.19(0.49)	-11.35(0.000***)	I (1)	-4.33(0.000***)	-9.42(0.000***)	I (0)	2009Q1
LF	-1.64(0.77)	-12.26(0.000***)	I (1)	-6.79(0.000***)	-7.96(0.000***)	I (0)	20054Q1
GCF	-3.60(0.034**)	-16.69(0.000***)	I (0)	-5.96(0.000***)	-5.96(0.000***)	I (0)	2013Q1
EXR	-3.04(0.13)	-11.43(0.000***)	I (1)	-3.15(0.057*)	-12.15(0.000***)	I (1)	2004Q1
FR	-3.12(0.11)	-11.28(0.000***)	I (1)	-4.20(0.004**)	-6.89(0.000***)	I (0)	1997Q1

Source: E-views estimate Note: *, ** and *** denotes significance at 10%, 5% and 1%.

4.4. Cointegration Test

The cointegration test presented in **Table 4** showed that the bound test F-statistics at 5% was greater than the upper bound for all four models tested. Based on this result, we reject the null for all four models and conclude that there is long-run cointegration among the variables. The existence of cointegration means that the variables are related and co-move in the long run. This gives justification for assessing the long-run effect of the regressors on economic growth.

4.5. Relationship between Monetary Policy and Economic Growth

To assess the short and long-run effect of monetary policy measures on economic growth in Ghana, we employed the ARDL estimation technique, which examines the effect of regressors on regressand together with the error correction term. To assess the fitness of the models in examining the intended effect, Model1 to Model4 recorded an R-square of 79%, 77%, 89%, and 86% as against adjusted R-square of 78%, 76%, 87%, and 84%, respectively. In statistical analysis, the R-square is used to measure the extent of explanatory power exhibited by the combined regressors.

This means that the sampled variables closely explain economic growth in Ghana. The F-statistics that measure the significance of the entire model recorded a p-value of 0.000***. Since this value is less than 0.05, the study concludes that the model is very significant in examining the hypothesised nexus. The described result is presented in **Table 7**.

Table 7. ARDL results for economic growth (GDP).

Variables	Long Run				Short Run			
	Model 1 gdp ≠ rl ≠ cc	Model 2 gdp = rl ≠ cc	Model 3 gdp ≠ rl = cc	Model 4 gdp = rl = cc	Model 1 gdp ≠ rl ≠ cc	Model 2 gdp = rl ≠ cc	Model 3 gdp ≠ rl = cc	Model 4 gdp = rl = cc
C	-26.47* (0.098)	30.43* (0.020)	-21.05* (0.132)	-34.14*** (0.076)	-26.47* (0.192)	30.43* (0.011)	-21.05* (0.015)	9.37*** (0.105)
MPR	1.797 (0.476)	10.48*** (0.026)	2.68 (0.384)	15.96*** (0.251)	6.03*** (0.542)	10.11*** (0.093)	4.84** (0.100)	7.44*** (0.098)
MS	4.256** (0.008)	5.39*** (0.541)	4.39** (0.018)	5.214*** (0.014)	-0.84** (0.029)	-1.26*** (0.091)	-0.85** (0.312)	-1.35*** (0.017)
LF	0.000*** (0.031)	0.00 (0.010**)	0.00* (0.010)	0.00 (0.377)	0.00*** (0.901)	0.00** (0.022)	0.00** (0.148)	0.00 (0.386)
CP	0.000*** (0.106)	0.001*** (0.800)	0.00*** (0.019)	0.00*** (0.079)	0.00 (0.54)	0.00* (0.013)	0.00 (0.431)	0.00** (0.213)
FR	-5.034 (0.299)	19.41 (0.060)	-4.07 (0.401)	16.39*** (0.093)	4.49** (0.101**)	3.48* (0.099)	4.87** (0.109)	3.60 (0.018)
EXR	-0.589	-0.15 (0.682)	-0.57 (0.183)	0.21 (0.552)	-0.43** (0.020)	0.04 (0.684)	-0.43** (0.040)	-0.05 (0.551)
RoL		28.43*** (0.087)		22.12*** (0.156)		-6.63*** (0.024)		-5.72*** (0.091)
RQ			4.34 (0.856)	5.83** (0.104)			-13.98 (0.077*)	-1.44** (0.013)
ECT					0.196 (0.000***)	0.233 (0.000***)	0.194 (0.000***)	0.259 (0.000***)
R-Square					0.79	0.77	0.89	0.86
Adj.R.S D-Wat	1.51				0.78	0.76	0.87	0.84
Prob (F-Stat)					0.000***	0.000***	0.000***	0.000***
HTS	0.527							

Source: E-views estimate. Note: *, **, and *** denote significance at 10%, 5%, and 1%. NB: figures in parenthesis are probabilities, whilst those without are coefficients.

In examining the effect of monetary policy on economic growth, Models 1 and 2 recorded significant coefficients in both the short and long run, indicating the effect when all regressors remain zero, as presented in **Table 6**. In the long run, the monetary policy rate registered a positive insignificant relationship with economic growth at a coefficient of 1.797 in Model 1. This shows that a unit rise in the policy rate would trigger an increase in economic growth. Again, the monetary policy rate was found to affect economic growth positively and significantly in all four models in the short run, indicating the same direction of effect recorded in the long run, however, at different rates. The recorded positive effect implies that when the Bank of Ghana raises the policy rate, it slows inflationary pressures to stimulate savings, which is mobilised by the banks and given out in the form of a credit to businessmen to expand their scale of production, which leads to economic growth. The positive result in both the long and short run means that growth in the interim period is sustained and translated to the long run. The ascertained positive relationship justifies the growth of the Ghanaian economy, though at a lower rate in the last decade, which led to Ghana being ranked as one of the fastest-growing economies in Africa until the inception of the novel covid-19, which turned the growth trajectory. The positive relationship is consistent with the Endogenous growth theory [20]. Thus, the Bank of Ghana, as an institution, can help stimulate economic growth by pursuing prudent monetary measures. Moreover, the result affirms the prepositions of the Endogenous theoretical framework because once prudent monetary policy decisions are made in the presence of quality institutions characterised by efficient legal systems and better governance structures, economic growth is evident, with all things being equal.

Similarly, the positive finding is in line with the expectation of the New Keynesian theory [21], which asserts that economic growth indicators can be greatly impacted by specific monetary policy measures pursued by the monetary regulators. The positive result verifies the assertion of the New Keynesian framework since the Bank of Ghana's attempt to raise the policy rate calms inflationary pressures and uncertainties, which encourages savings and spurs economic growth in the long run. The ascertained positive relationship is consistent with the account of [22] and [12], who found that monetary measures stimulate economic growth. Nevertheless, our result is inconsistent with the negative findings recorded by [27] in Nigeria. The deviation of the result from that of the present study is attributed to the country's spatial effect. Moreover, the positive effect contradicts the negative effect of interest rates on economic growth in Ghana [28].

Monetary supply recorded a positive and statistically significant association with economic growth in Model 1 through Model 4 in the long run. This signifies that a rise in the quantum of broad money supply in the economy stimulates economic growth. The positive relationship is intuitional because an increase in money supply makes excess liquidity available to banks to be granted as loans to businessmen at affordable rates to expand their production capacity, which fos-

ters economic growth in the long run. Practically, the rise in money supply increases the availability of capital to both existing and start-up businesses; both business types get the financial muscle to invest, hire more labour, and produce more for local and international markets, and this leads to overall economic expansion in the long run. The positive relationship justifies the proposition of the Endogenous theory because an active and efficient bank of Ghana, in an attempt to stimulate economic growth, would increase the quantum of money supplied and direct commercial banks to allocate a percentage of their credits to businessmen and other productive sectors of the economy to engage in production to drive economic growth. Additionally, the recorded positive effect of money supply on economic growth satisfies the expectation of the New Keynesian framework in the sense that increasing the money supply in the economy encourages large-scale production and raises wages and salaries for labour, which increases their purchasing power and spending patterns as well as savings which stimulate economic growth in the long run.

Conversely, money supply registered a significant inverse association with economic growth in the short run in all four models. The plausible reason for this relationship is that doubling the money supply escalates inflation pressures and inflation uncertainty in the economy, which increases the cost of production and discourages investment and contract economic activity since producers cannot afford the cost of production to produce more for the local and international market in the interim period. Again, the negative effect implies that inflationary pressures resulting from excess money in the economy reduce the purchasing power of consumers and raise the cost of living. This, in effect, reduces consumers' spending patterns, savings, and overall economic transactions, which contract economic growth.

Again, the prevailing of these factors would lead to the potential slowdown of economic activity in the short run. This adverse effect of money supply on economic growth on hand agrees with the Endogenous theory in that if institutions are not efficient and well-resourced, pursuing prudent monetary policies to spur economic growth would remain a mirage. Thus, always increasing broad money in circulation may defeat economic growth targets in the short run. However, maintaining a balanced and stable money supply is crucial to prevent inflationary pressures and ensure sustainable economic growth. This positive result of money supply, in the long run, is consistent with the findings of [12], [30] and [25] who found that increases in money supply promote economic growth. Our result, in the long run, is consistent with the findings of [23] and [24], who documented that accommodative monetary policy increases economic growth while the short-run results contradict the findings of the same studies.

On objective two of the study, which sought to assess the interaction role of institutional quality as measured by Rule of Law (RoL) and Regulatory Quality (RQ) on economic growth, Models 2 to 4 were used to test such effect in that regard. The introduction of the rule of law as a single moderating variable in Model 2 increased the extent of the positive effect of the monetary policy rate on

economic growth to 10.48, and it was statistically significant at 0.000*** in the long run. Besides the introduction of the rule of law in model 4, which included both moderating variables, monetary policy still recorded a significant positive relationship with economic growth at an increased rate. Institutional quality (RoL) positively moderates the effect of monetary policy (MPR) on economic growth. Practically, this result means that Ghana has strong legal frameworks, strong institutions, and workable governance structures like the parliament, Bank of Ghana, and other regulatory bodies. These institutions have the authoritative power to set sound monetary policies, such as pegging the policy rate at the appropriate threshold and setting automatic policy rate readjustment systems, which are capable of enhancing the financial sector.

The positive moderating role is intuitive and supports the posits of the Endogenous theory because the presence of strong institutions is expected to enact business-friendly rules and regulations that encourage large-scale production and attract foreign investors, as seen in Ghana since 2018 after the enactment of the automobile industry policy that attracted automobile operators like Volkswagen, Sino truck, Nissan and Toyota to establish assembly plant in Ghana. Meanwhile, the positive moderating role of the rule of law was short-lived, as its moderating effect was found to be negative in the short run. The adverse moderating role of the rule of law in the short run means that in the interim, powers entrusted to these institutions were misapplied through setting undesirable and contractionary rules and regulations that discourage investment and contract economic activities. The ascertained positive moderating role agrees with the postulate of [24], who discovered that economies thrive in the presence of quality institutions. Our result further confirms the findings of [5] who documented evidence that institutional quality fosters economic growth.

Institutional quality (RQ) demonstrated a positive significant interaction role in the monetary policy-economic growth nexus in the long run, notwithstanding the role being negative in the short run. The observed role of institutional quality means that when institutions are well-resourced, they can carry on their supervisory role to ensure that monetary policies are implemented transparently, effectively, and predictably. This increases trust in the financial system, promotes investment and fosters economic stability, thereby improving the direct impact of monetary policy on economic advancement. The observed positive moderating role of regulatory quality, in the long run, is a result of recent improvements in Ghana's institutional framework, such as the Bank of Ghana's security and legal systems. On the other hand, regulatory quality demonstrated an inverse interaction role in the monetary policy-economic growth nexus. The negative role means that the effectiveness of monetary policy in fostering economic growth is hampered by poor regulatory quality. In context, the transmission channels through which monetary initiatives impact the economy are undermined by regulatory lapses such as inadequate enforcement of laws. The positive moderating role of institutional quality supports the postulate of the endogenous growth theory in that strong institutions can carry on effective su-

pervisory duties in ensuring the productive sectors are engaging in the sound production of goods and services, which stimulates economic growth in the long run. However, the ascertained effect in the short run opposes the assertions of the endogenous growth theory since the result portrayed a rise in regulatory quality, undermining the impact of monetary policy on economic growth. The positive interaction role of regulatory quality in the examined nexus vindicated the assertion that monetary policy measures spur economic growth in the presence of quality institutions [22] [45]. The positive interaction role of institutional quality in the examined nexus confirms the findings of [46], whose study revealed that institutions positively impact economic growth.

The control variables recorded mixed results; the labour force showed no relationship with economic growth in all four Models for short and long periods. The absence of an association between the labour force and economic growth means that an increase in the labour force does not improve or slow economic growth. Increasing labour supply alone does not significantly drive economic growth. The plausible reason for this surprising observation is that Ghana, as a country, has been battling with an escalating unemployment ratio. Moreover, those who are actively engaged are even underemployed. This result of no relationship defeats the posit of the New Keynesian theory, which documents that labour can be used to spur economic growth. Surprisingly, capital also demonstrated no association with economic growth in all four models, both in the short and long run. This result implies that merely increasing capital investment does not lead to overall economic growth in Ghana unless it is used in combination with other factors of production, such as technology. Total reserves showed a negative statistically insignificant relationship in the long run; however, the effect was statistically significant and positive in the short run, which means that increasing the reserves of the country provides stability and confidence in Ghana's financial system, promotes inter-country trade, helps absorb external shocks, attract foreign investors, help maintain the stability of the domestic currency and provide an adequate buffer against potential economic meltdown, the aggregate effect spurs economic growth.

The recorded effect of total reserves on economic growth justifies the propositions of the endogenous growth theory [20]. Exchange rate as a control variable registered a negative effect in Models 1 to 3 but a positive yet insignificant relationship with economic growth in the short run. The exchange rate recorded a negative significant relationship with economic growth in Models 1 and 3 in the short run; however, the relationship was insignificant in the remaining Models in the short run. The observed inverse association means that depreciation of the local currency can have a contractionary impact on the economy in the interim period. Practically continuous decline in the value of cedi increases the cost of imported goods; this reduces the purchasing power of consumers and businesses that depend on imported raw materials. The aggregate effect is a reduction in consumption level, lower investment, and slag economic activities in the short run. This result agrees with the findings by [22] and [12]. Nevertheless, it is im-

perative to acknowledge that the exchange-economic growth nexus is complex and can be influenced by other exogenous variables such as monetary policy and trade dynamics.

The Error Correction Term (ECT), which measures the extent of adjustment to equilibrium after disturbances in the series, is expected to be statistically significant, with a negative coefficient falling between 0 and -1 . The coefficients for the ECT for all four Models were positive, which was opposite to conventional findings. Again, the rate of adjustment of distortions in economic growth to equilibrium was 19.6%, 23.3%, 19.4%, and 25.9% from Model 1 through Model 4, respectively; however, the ECT was statistically significant at a 1% level in all Models. The CUSUM and CUSUMQ tests were employed to test the stability of the models; the test revealed that the series lies in between the 5% margin, which is an indication that our models are stable. Besides, the CUSUMSQ test, also having the series lying within the 5% critical margin, confirms the stability of the models, as presented in **Figure 3**.

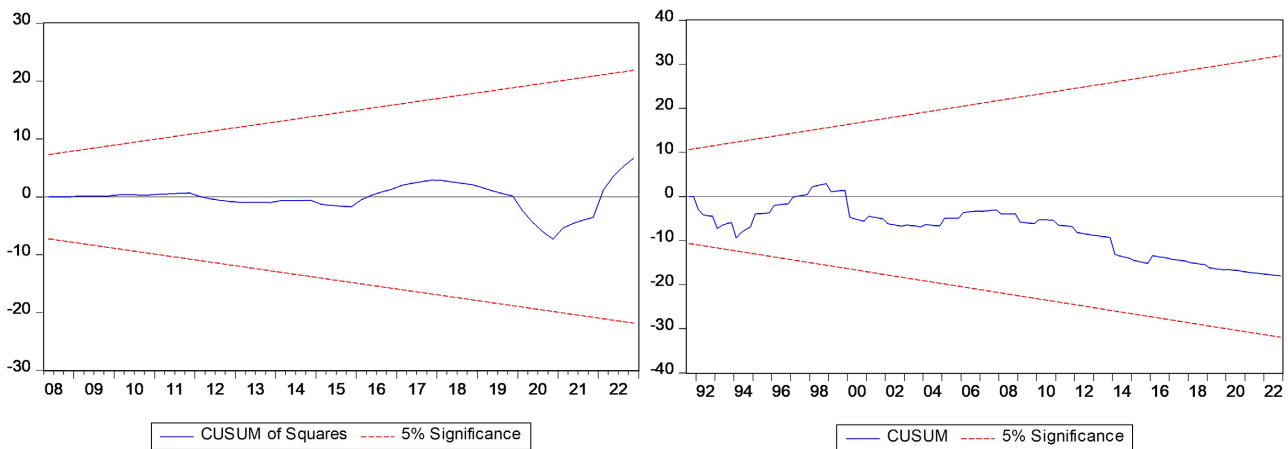


Figure 3. Model stability test.

4.6. Robustness Checks

The inquiry also tested for the presence of heteroskedasticity in the series. Since the p-value of 0.527 recorded by the test is greater than 0.05, we fail to reject the null and conclude that the series is homoscedastic. Again, the investigation tested for autocorrelation through the Durbin Watson Static with 1.510 presented in **Table 7**, since this result exceed the threshold of 1.5, the study failed to reject the H_0 and conclude that the residuals are independent and identically distributed, with no systematic pattern or correlation between adjacent residuals.

5. Concluding Remarks and Recommendations

Several countries, both developed and developing, have pursued various policies regarding how their financial system works to ensure a stable economy, as it is believed that the development of every economy hinges on appropriate monetary policies. This investigation is built on two objectives: one, to analyse the ef-

fect of monetary policies on economic growth, and second, to examine the multiplicative role of institutional quality on economic growth in Ghana. The inquiry dwelled on secondary time series data for the period 1990-2021, the bound testing to cointegration, PP, and Zivot and Andrews stationarity tests, ARDL estimation technique, and CUSUM and CUSUMSQ stability test were employed as data analysis methods. The results revealed a positive significant effect of the monetary policy rate on economic growth in Ghana both in the short and long run. Conversely, money supply showed a statistically significant positive relationship in the long run; however, the short-run relationship was negative. Based on this result, H_1 is accepted for monetary policy rate; meanwhile, on money supply, H_1 is only accepted in the long run but rejected in the short run.

We concluded, based on the ascertained result, that increasing the monetary policy rate calms inflation pressures and stimulates savings for investment, which fosters economic growth. Again, based on the mixed result revealed by money supply, we conclude that raising the quantum of money in circulation leads to severe economic repercussions such as soar in inflation, increased importation cost, eroded purchasing power, reduced aggregate consumption, reduced investor and consumer confidence, create economic instability leading to a decline in economic growth in the interim period. A stable and controlled increase in money supply makes adequate credit available for investment, restores investor confidence, and stimulates economic growth in the long run. On objective two, the study found institutional quality significantly and positively moderates the monetary policy-economic growth nexus in the long run; nonetheless, the moderation role in the short run is negative. H_2 is accepted in the long but rejected in the short run. We conclude that the impact of monetary policy in fostering economic growth thrives in the presence of quality institutions in the long run notwithstanding, we conclude on the short run result that Ghanaian institutions are weak and, therefore, reduce the efficacy of monetary policies in fostering economic growth in Ghana. Our results are conventional in that they support the positive findings brought to bear in extant literature.

Again, the positive effect of monetary policy is consistent with the posit of the endogenous growth theory, which asserts prudent measures undertaken by institutions to stimulate economic growth. Also, the results of objective one confirm the prepositions of the New Keynesian theory. Furthermore, the positive moderating role confirms the findings in the extant literature. It supports the assertions of the Endogenous theoretical framework in that strong institutions serve as catalysts for using monetary policy to foster economic growth. On the other hand, the negative moderating role in the short run contracts existing findings of a positive role. Our study is the first of its kind to examine the multiplicative role of institutional quality in the monetary policy-economic growth nexus in the Ghanaian narrative. Banks are advised as to the channel they should use, whilst policymakers would find the result useful as to what combination of

policies to pursue to fasten economic growth.

Per the ascertained results, the investigation recommends that banks should limit the amount of credit given to the business sector and increase the percentage of their credit to the manufacturing and agriculture sectors during inflationary periods since investment in these sectors takes time to yield a return. The Bank of Ghana should raise the policy rate to an appropriate level during the inflationary period to slow inflation and encourage savings to stimulate economic growth. The study also implores the financial sector regulator to raise the quantum of money in circulation in the long run in conjunction with a moderate policy rate. Also, the Bank of Ghana should adopt an automatic readjustment system that would regularly review the policy rate and the money in circulation to ensure a stable financial system. The government is implored to fully resource existing institutions with both human and logistics to strengthen them to carry on their supervisory mandate effectively. This would keep players in the financial sector on track to obey rules governing business in the sector to ensure a stable financial system. As found in empirical studies, our research is not without limitations. Some notable limitations associated with the study are failure to incorporate fiscal policy in the study to find its effect on economic growth. Again, economies do not operate alone; meanwhile, the study concentrated on Ghana alone. Also, myriad macroeconomic variables interplay to foster economic growth; meanwhile, this study concentrated on only a few of them. The study, therefore, calls for further investigation on the subject matter in neighbouring countries and economic blocs such as the ECOWAS. Again, future studies should also examine the role of fiscal policy in fostering economic advancement.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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