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Abstract
This study examines the impact of monetary policy on economic growth among ECOWAS’ member countries over the period 1980 – 2016. Among the specific objectives set for the study are to examine how changes in interest rates affect the economic growth of selected ECOWAS’ member states as well as evaluates the impact of exchange rate fluctuations on the economic growth of selected ECOWAS’ member states over the study period. To achieve the main and the specific objectives, annual time series data on interest rate (INTR), real exchange rate (EXCH), real gross domestic product (RGDP)) and inflation rate (INFL) were collected from the publications of the Central Bank of Nigeria (CBN), Bank of Ghana (BOG), Central Bank of Sierra-Leon (CBS), Central Bank of Gambia (CBG) and Central Bank of Liberia (CBL) and were analyzed using panel co-integration, Johansen co-integration and Fully Modified Least Squares (FMOLS). The result of co-integration reveals that there is a long-run relationship between the variables of the study. The result of FMOLS reveals mixed result on the impact of monetary policy on the individual members of ECOWAS investigated. For example, LEDR over the study period significantly impacts the GDP of Ghana, Gambia, and Liberia but not Sierra Leon and Nigeria. Result also shows that, though, EXCH was significant in influencing GDP only in Liberia the panel result shows that it is significant for all the countries of ECOWAS investigated. It is therefore recommended, among another thing, that the Central Banks of ECOWAS member-States should sustain their monetary policy reforms to enhance their overall economic performance and inflation should be used as an operational guide in evaluating the effectiveness of monetary policy implementation. In addition, domestic government borrowing from the banking system is severely affecting the cost of credit and crowding out the private sector, and this should be curtailed. Keywords: Monetary policy, Lending rate, Real Exchange Rate, Real GDP, Economic Growth.

1. INTRODUCTION

Globally, monetary policies have undergone dynamic changes, in African countries this begun in the early 1980s and early 1990s where there were conscious moves away from the direct control measures to indirect monetary policy. In the specific case of members of Economic Community of West African States (ECOWAS), such as Nigeria, Ghana, and Gambia, among others, monetary policies have evolved from the use of direct instruments to the market-based approach where the main target of policy is the money supply [1]

The conduct of monetary policy in ECOWAS is similar to that found in other regional monetary unions and integrations. The objective has been to achieve sound monetary integration among members States and the economic growth of all member states. The Economic Community of West African States (ECOWAS) came into being in 1975 when sixteen West African countries signed its treaty in Lagos, Nigeria. The countries were Benin, Burkina Faso, Cape Verde, Cote D’Ivoire, Gambia, Ghana, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. The formation of the Community, among other things, was against the over-riding need to accelerate economic growth and monetary integration among the member States.

The Economic Community of West African States (ECOWAS) member states being an import dependent economy are faced with stagnated growth, unstable business cycles, and economic fluctuation. This usually results in unemployment, inflation, unproductivity, and balance of payment disequilibrium. The government
of states had in one way or the other regulated and controlled the economy to maximize the welfare of the citizens by way of ensuring that the resources are efficiently allocated and used. Like any other developing country, they adopt three types of public policies to carry out the objective of income distribution and allocation of resources. These tools of public policy include monetary policy, fiscal policy, and income policy tools. Their government has always relied on monetary policy as a way of achieving the certain economic objective in the economy such macroeconomic objectives include; employment, economic growth, and development, the balance of payment equilibrium and relatively stable general price level. The reason for choosing monetary policy is the fact that monetary policy has very serious implications for both fiscal and income policy measures.

Monetary policy refers to the combination of measures designed to regulate the value, supply and cost of money in an economy in consonance with the level of economic activities. It can be described as the art of controlling the direction and movement of monetary and credit facilities in pursuance of stable price and economic growth in the economy [2]. There is no consensus among economist as to whether government intervention through the use of monetary policy will bring about economic stabilization. This disagreement divided the economy into different schools of thought. They are the classical school, the Keynesian school, and the monetarist school. Each of them has its view on how variation in monetary aggregates could affect the economic stabilization.

The classicists believe that given the equation of exchange and stability in the velocity of money plus the assumption that economy operates at full employment, the change in the money supply will only affect price without any effect on real demand, investment, and output.

The Keynesians, on the other hand, believe that variations in the money supply could lead to an increase or decrease in interest rate. A decrease in interest rate will affect aggregate investment and enhance aggregate income and output. This is based on the belief that the interest rate is the key determinant of investment in the market economy. The investment process involves the employment of factors such as labor and capital which lead to an increase in total employment.

The monetarists base their views on money supply as the key factor affecting the wellbeing of the economy. They believe that an increase in money supply will lead to an increase in nominal demand, and where there is excess capacity they believe that output will be increased. In the long-run, the monetarist position is that the increase in money supply will be inflationary without any effect on investment, employment and aggregate demand [3]

In spite of these controversies, member states government in collaboration with their monetary authority still adopts a monetary policy to regulate the economy. Thus adopting a monetary policy in manipulating the fluctuations experienced so far in the economy, Central Bank of member states undertake both contractionary and expansionary measures. The reason for this action is because monetary policy has been successfully being introduced and implemented in developing the economy. Therefore, it becomes necessary to examine how variations in monetary policy (interest rate) can be used to influence output.

The examination has the major objectives of monetary policy in all member states as stabilization of economic growth. Member states government has adopted various monetary policies through their Central Bank over the years to achieve economic growth. Despite the increasing emphasis on manipulation of monetary policy the problem surrounding its economic growth still persists. Such problems include the high unemployment rate, low investment, high rate of inflation and unstable foreign exchange rate. These perceived problems are being claimed to have caused a fast decline in the economic growth. It, therefore, becomes necessary to highlight the monetary policy and examine the extent to which it has actually contributed to the growth in the economy. This study examined the extent to which variations in interest rate had been and can be used to influence output in selected member states.
Objectives of this study are to access the effects of interest rate, exchange rate fluctuations and economic growth of selected ECOWAS’ member countries over the study period; And whether there is a long run relationship between interest rate, exchange rate and economic growth among the selected ECOWAS’ member states over the study period

To achieve the above objectives, pertinent research questions that this study seeks to answer are:

1. How does a change in interest rate affects the economic growth of selected ECOWAS’ member countries over the study period?
2. What is the impact of exchange rate fluctuation on economic growth of selected ECOWAS’ member countries over the study period?
3. Does a long run relationship exist among interest rate, exchange rate and economic growth of selected ECOWAS’ member countries over the study period?

The hypothesis to be tested is thus:

i) changes in interest rate do not significantly affect the economic growth of selected ECOWAS’ member countries over the study period;
ii) Exchange rate fluctuation does not have a significant impact on the economic growth of selected ECOWAS’ member countries over the study period;
iii) A long run relationship does not exist between interest rate, exchange rate and the economic growth of selected ECOWAS’ member countries over the study period.

This paper consists of eight sections; section two evaluate the conduct of monetary policy of the five ECOWAS’ member states selected for the study, section three discusses the literature review, section four focuses on the presentation of the modeling framework of the paper. Section five present techniques for Data analysis, the section thereafter present the empirical results, The penultimate section concludes, While the final section proffer recommendations

**2. The Conduct of Monetary Policy in the Five ECOWAS’ member State.**

**2.1. Monetary policy in Nigeria**

In Nigeria, the main objectives of monetary policy have been price stability and promoting non-inflationary growth. The framework used to achieve this objective has been monetary targeting, which involves setting aggregate money supply targets and reliance on Open Market Operations (OMO) and other policy instruments to achieve the target [4].

Since 1980 when the country was engulfed in a serious economic crisis, Nigeria’s economy has witnessed several structural changes that threat macroeconomic stability in the country. As part of its monetary policy strategy, the monetary authority in Nigeria has also been focusing on adjusting the monetary aggregates, the policy rate or the exchange rate, depending on the level of development in the economy, especially the financial sector, in order to affect the variables which it does not control directly. The policy process which is fairly complex in practice majorly involves using a price-based nominal anchor that targets the interest rate as a potent instrument for stabilizing inflation and output over the business cycle [5].

In November 2006, the Monetary Policy Committee (MPC) of the CBN adopted the Interest Rate Corridor approach, which resulted in the replacement of the Minimum Rediscount Rate (MRR) by the Monetary Policy Rate (MPR). The new framework became necessary as the MRR proved not to be sufficiently responsive to CBN’s policy initiatives, especially in tackling the problem of excess liquidity in the system. The MPR determined the lower and upper band of the CBN standing facility and was intended as the nominal anchor for all other rates in the market. The MPC meets bi monthly to review developments in the economy.

**2.2. Monetary policy in Ghana**

In Ghana, the goal of monetary policy has been the attainment of price stability. This is clearly stated in the Bank of Ghana (BOG) Law (2002). The Law gives a mandate to BOG to pursue an inflation-targeting objective. It is envisioned that the implementation of sound monetary and financial policies aimed at price
stability would create an enabling macro-economic environment for the promotion of sustainable economic growth and poverty reduction. The BOG formally adopted an inflation-targeting framework for its monetary policy operations to track underlying inflation, using a core measure of the Consumer Price Index (CPI), which excluded energy and utility prices in 2007. Prior to that, the strategy for monetary management was based on monetary targeting, i.e., the view that inflation is essentially a monetary phenomenon. The monetary policy regimes implemented since independence the inflation targeting regime (and the accompanying fiscal framework) has yielded the best performance thus far in terms of the key macroeconomic indicators. The Ghanaian economy was also more resilient to external shocks under the inflation targeting regime (2001-2008) than under the monetary targeting regime (1983-2001) and the direct controls regime (1957-1983). The Bank of Ghana’s inflation-targeting regime as implemented has been very supportive of economic growth [6].

2.3. Monetary policy in Sierra Leone
Monetary policy in Sierra Leone is conducted within the framework of a monetary targeting regime. Prior to 1990, monetary policy was conducted using direct instruments of monetary management. In 1990, The Bank of Sierra Leone in a bid to address emerging economic challenges shifted away from direct monetary controls (which was found to be financially repressive) to an indirect system of monetary management. The Bank of Sierra Leone seeks to achieve price stability objective by determining the monetary policy stance which is done by the Monetary Policy Committee. The Monetary Policy Committee consists of seven (7) members as provided for in the BSL Act, 2011 Section 21(2). They include the Governor, the Deputy Governor, three (3) persons appointed by the Governor and two (2) persons appointed by the Minister of Finance and Economic Development.

The Bank of Sierra Leone (BSL) currently adopts a monetary targeting framework that focuses on the growth rate of a defined monetary aggregate. In the case of Bank of Sierra Leone, reserve money is the primary operating target. The intermediate target or nominal anchor is broad money which includes foreign currency deposits. The money targeting framework is based on the premise that in the long term, price development is affected by money supply growth.

2.4. Monetary policy in the Gambia
The Central Bank of The Gambia (CBG) adopted an indirect monetary policy framework in the context of the economic and financial reforms undertaken since 1986. This involves the use of OMO in government and central bank securities as well as the imposition of reserve requirements in place of selective credit and interest rate controls. A treasury bills market (money market) was introduced in 1987 to facilitate the migration from direct to indirect monetary policy regime. The CBG used weekly auctioning of treasury and central bank bills through primary dealers for both government deficit financing and control of money supply while using reserve money as an intermediate target.

The independence of the bank in the conduct of monetary policy was enhanced under the revised statute of the Central Bank (2005), which also prescribed price stability as the overriding mandate of the Bank. Some of the innovations include the setting up of a Monetary Policy Committee (MPC) to oversee monetary policy formulation and implementation, as well as ensure that the price stability objective is given prominence in the monetary and exchange rate activities of the bank. Since its establishment, the MPC, though still defining its price objective in terms of headline inflation, also reports on core inflation as well as other indicators, as a barometer of underlining price developments.

2.5. Monetary policy in Liberia
The principal monetary policy objective of the Central Bank of Liberia (CBL) is exchange rate targeting. Given the weaker monetary transmission in dual currency regimes, the authorities recognize the strong role played by the exchange rate on price inflation, and therefore use the exchange rate as the main indicator of domestic conditions. Recent developments show that this objective was pursued by ensuring that growth in money supply is consistent with developments in macroeconomic fundamentals by maintaining foreign exchange rate targeting. The framework also aims at maintaining broad exchange rate stability as a means of managing consumer price inflation.
In order to ensure broad stability of the exchange rate, the CBL introduced a sales auction program in 2004. The auction system sought to smoothen the exchange rate and to respond to imbalances in the domestic money market. The major participants of the foreign exchange sale auction are commercial banks and Forex bureaus. The monetary authorities are at advanced stages in the establishment of Treasury Bills Market which was expected to be launched in 2013. This is with a view to increasing the number of monetary policy tools available for the conduct of effective monetary policy.

3. Conceptual, Theoretical and Empirical Literature

3.1. Conceptual Review

Say J.B. [7]. describe monetary policy as the combination of measures designed to regulate the value, supply, and cost of money in an economy, to match with the level of economic activities. It can also be described as the act of controlling the direction and movement of monetary policy and credit facilities in pursuance of stable price and economic growth in an economy.

Shoaib M. [8]. posits that monetary Policy is a set of monetary theories that manipulate the money supply and the rate of interest in such a way to achieve the goals of the manifestation of the ruling party. It provides a logical relationship between its variables stipulated to affects the outcomes regarding the Central Bank applies these tools to regulate the money creation, targeting the rate of interest to manage the pace of monetary circulation.

Ezema A. [9]. submits that monetary policy is the deliberate use of monetary instruments (direct and indirect) at the disposal of monetary authorities such as the central bank in order to achieve macroeconomic stability. A monetary policy shift tends, generally, to transmit a change for the future in the expected behavior of macroeconomic variables. In a developing or emerging economy, the monetary policy shift is often designed in response or reaction to undesirable shocks in the monetary system and macro-economy in order to restore equilibrium and achieve a set of objectives.

Ubi W. [10]. have suggested that monetary policy should be consistent and transparently defined in response to the dynamics of the domestic and global economic development. For example, the Central Bank of Nigeria’s monetary policy shifted from quantitative easing in 2010 to monetary tightening in 2011, in response to the apparent threats of inflationary build-up. Tight monetary policy aimed at moderating the anticipated inflationary pressures, expected to be triggered by the pre-election spending and the high liquidity injections into the banking system through the purchase of non-performing loans (NPLs) by the Asset Management Corporation of Nigeria (AMCON).

Olorunfemi S. [11]. posits that monetary policy has emerged as one of the most critical government responsibilities; monetary policy is seen as providing a flexible and powerful instrument for achieving medium-term stabilization objectives, in that it can be adjusted quickly in response to macroeconomic developments.

Adolphus and Deborah [12]. note that monetary Policy is associated with interest rate and availabilities of credit, the instruments used include short-term interest rates and bank reserves through the monetary base. There are two forms of monetary policy they argued; Decision about coinage and Decision to print papers money in order to create credit. The interest rate as part of the monetary authority was not generally coordinated with the other forms of monetary policy. It was seen as an executive decision and was generally in the hands of the authority with power to coin. The ability to set the price could be enforced by law even if it’s different from the market price.

Peter J. [13]. posits that monetary transmission mechanism describes how policy-induced changes in the nominal money stock or the short-term nominal interest rate impact on real variables such as aggregate output and employment. Specific channels of monetary transmission operate through the effects that monetary policy has on interest rates, exchange rates, equity, and real estate prices, bank lending, and firm balance sheets. Recent research on the transmission mechanism seeks to understand how these channels work in the context of dynamic, stochastic, general equilibrium models.
Cats C.A. [14]. submits that monetary transmission refers to the process by which a central bank’s monetary policy decisions are passed on, through financial markets, to businesses and households. He added that a crash of the financial market could affect the transmission process of monetary policy. In 2012, the problem was particularly pronounced in the Eurozone periphery, where businesses and households in countries such as Italy and Spain face dramatically higher borrowing costs.

Wong and Kyung [15]. describes the monetary transmission mechanism as the way in which interest rate changes affect economic activity and inflation. The main impact is through the level of aggregate demand. Higher interest rates limit people's ability to spend and so reduce aggregate demand. However, there are a variety of other effects as well through expectations, asset prices and the exchange rate.

According to the European Central Bank [16]. the transmission mechanism of monetary policy is the process through which monetary policy decisions affect the economy in general and the price level in particular. The transmission mechanism is characterized by long, variable and uncertain time lags. Thus it is difficult to predict the precise effect of monetary policy actions on the economy and price level.

Cevik and Teksoz [17]. posit that the efficacy of monetary policy transmission channels provides central banks with pertinent insight for better decision-making. Unless policymakers know more about how monetary policy decisions influence macroeconomic variables such as aggregate output, employment, and consumer prices through the different channels of monetary transmission, they will always be facing greater uncertainty about the timing and effectiveness of policy actions and consequently in maintaining macro-financial stability.

3.2. The concept of Economic Growth

The economic growth of a nation is measured by Gross Domestic Product (GDP). The term economic growth is described as the positive and sustained increase in aggregate goods and services produced in an economy within a given time period. When measured with the population of a given country, then economic growth can be stated in terms of per capita income according to which the aggregate production of goods and services in a given year is divided by the population of the country in the given period [18].

Baks S. [19]. submits that economic development is the process by which an economy experiences three main phenomena namely – sustained growth in output, structural changes and institutional changes. If these three phenomena take place, it will lead to a rise in the standard of living of the populace. That is why growth could be enjoyed by many countries but not all experience development.

According to Ibe [20]. the term ‘economic growth’, is used throughout to describe the positive and sustained increase in aggregate goods and services produced in an economy within a given time period. When accompanied by positive changes in the standards of living of the people, it translates into economic development.

According to Dwivedi [21]. economic growth is a sustained increase in per capita national output or net national product over a long period of time. It implies that the rate on the increase in total output must be greater than the rate of population growth. Another quantification of economic growth is that national output should be composed of such goods and services which satisfy the maximum want of the maximum number of people. Economic growth can be determined by four important determinants namely, human resources, national resources, capital formation, and technological development.

Kuznet [22]. submits that economic growth is characterized by six factors occurring, which are further grouped into three categories. The first category consists of two aggregate economic variables; high rates of growth of per capita output and population, high rate of total increase in total factor productivity. The second category includes two structural transformation variables; high rate of structural transformation of the economy and high rate of social and ideological transformation. The last category presents the two factors affecting the spread of international growth which are; the propensity of economically developed countries to reach out to the rest of the world for market and raw materials, the limited spread of this economic growth to only a third of the world population. From the foregoing review on economic growth, it
is clear that economic growth implies a positive increase in both quantitative and qualitative variables persisting over a sustained time period.

3.3. Theoretical framework

Economists of the classical tradition to whom the theory of monetary policy is credited include Smith (1776) and Say (1850) and Marshall (1890) and Fisher (1911), among others. The theory was based on the notion that reductions in the quantity of outside money raise real rates of return. This, in turn, reduces investment because fewer profitable projects are available at higher required rates of return. This leads to a movement along a fixed marginal efficiency of investment schedule.

This theory actually points to a measure of money that is rarely studied, most empirical investigations of monetary policy transmission focus on M2, but the logic of the portfolio view suggests that the monetary base is more appropriate. It is also worth pointing out that investigators have found it extremely difficult to measure economically significant responses of either fixed or inventory investment to changes in interest rates that are plausibly the result of policy shifts. In fact, most of the evidence that is interpreted as supporting the money view is actually evidence that fails to support the lending view.

Theoretical framework to be adopted in this study is the theory of monetary integration which postulates a wide array of channels through which the impact of the monetary union on the economies sharing a common currency may be exerted. However, the three most important of these channels are potential transaction savings, effects on interest rates and bilateral trade expansion. Foregoing an independent currency will bring about significant gains in Gross Domestic Product (GDP) growth through the following key channels: reduced transaction costs, expansion of foreign trade, a drop in real interest rate and the easing of the current account constraint. In addition, by joining monetary union, the countries would be less vulnerable to sudden reversals of capital flows, which make the implementation of independent monetary policy more costly and less successful than a more or less appropriate imported policy. This will provide a tentative assessment of the long-run growth effects that would be triggered by these channels.

Associated with the theory of Monetary Integration, is the Optimum Currency Areas (OCA) Theory. The OCA theory, according to Ant.Ego w. [23], identifies certain criteria that a region should fulfill for it to be economically optimal to let go of the adjustment tool of a national currency. These criteria include whether the countries have similar production and trade patterns, whether economic supply and demand shocks are likely to be asymmetric across the countries and whether economic cycles are symmetric across borders. The set of OCA criteria is very restrictive. However, it has often been argued that once a common currency is introduced, the synchronization of economic cycles will follow due to the derived boost of trade integration.

3.4. Empirical Review

Fantessi and Kiprop [24] study the relationship among monetary variables, financial development, and economic growth in the West African Economic and Monetary Union (WAEMU) for the period 1981-2010. Using the General Moment Method (GMM), the study found a positively and statistically significant effect of financial development on economic growth and the causality was bidirectional. In addition, the variable primary completion rate, foreign direct investment, and real exchange rate contribute positively to economic growth in the region while inflation and openness discourage the economic growth in the region. Based on the findings, the study recommends that in order to maintain sustainable economic growth in those countries under study, the reforms for financial system improvement and education sector should be implemented. The main drawback of this study is its failure to capture the transmission process of the monetary variables among WAEMU.

Alain [25] studies the monetary policy management of the three main central banks of the ECOWAS countries for the period 1980-1990. The aim of the study was to determine the extent to which
the three main central banks modify their interest rates in response to domestic economic conditions. The three banks considered in the study were the Bank of Ghana (BOG), the Central Bank of Nigeria (CBN) and the BCEAO. Using the technique of impulse response function (IRF), findings suggest that the BCEAO does react to domestic economic variables in a limited way, particularly to inflation and are consistent with an interpretation that the BCEAO matches first changes in French interest rates, but in the short run it retains significant freedom in reacting to domestic economic variables. The results of the BOG and the CBN reaction function estimations reveal a nuanced picture regarding monetary policy. The two central banks seem to react to inflation but not really to the output gap. It was also discovered that a number of variables that are identified ex ante the BOG and the CBN do not really seem to have an impact on the ex post setting of the monetary policy instrument. However, the study failed to provide evidence on the lag between monetary policy actions supply and the output of the response.

In a study for the African Economic Research Consortium (AERC), Kilindo [26]. investigated the links among fiscal operations, money supply, and inflation in Tanzania for the period 1775 to 1995. The findings reveal a strong relationship between the three variables. Based on the findings, the study recommends the adoption of a restrictive monetary policy in which the supply of money must be constrained to grow steadily at the rate of growth of real output.

Ehrmann [27]. using granger causality model examines monetary transmission mechanism in thirteen member countries of the European Union over the period 1991:1 to 1999:4 and finds the relatively fast transmission to prices for most of the countries between two and eight quarters. Only France, Italy, and the United Kingdom exhibit transmission lag between twelve and twenty quarters. Therefore, he concluded that transmission of monetary impulses to prices is faster than to other aggregate variables.

Elbourne and De-Haan [28]. investigate ten new European Union member countries for the period 1990 to 2002. The monetary variables they employed were interest rate, consumer price index, broad money supply, and credit. They found that the maximum effects of monetary policy shocks on prices occur between one and ten quarters after the shock.

Furthermore, Avranek and Runek [29]. in their study of monetary transmission lag typically looked at a small set of countries using estimates of transmission lags from a vast literature that provides evidence for thirty different economies during several decades. Employing a meta- Analysis approach, their results showed that the transmission lags reported in the literature really do vary substantially: the average lag, corrected for misspecification in some studies, is twenty-nine months, with a standard deviation of nineteen months. Post-transition economies exhibit significantly faster transmission than advanced economies, and the only robust country-specific determinant of the length of the transmission is the degree of financial development. In developed countries, financial institutions have more opportunities to hedge against surprises in monetary policy stance, causing greater delays in the transmission of monetary policy shocks.

Christiano, Eichenbaum, and Evans [30]. adopted the United State quarterly data over the period 1980:Q1 to 1990:Q4, to test the effect of monetary policy shocks. They adopted similar identifying assumptions as Sims (1992) and explicitly included commodity prices to avoid the price puzzle. The variables used include real GDP, the GDP deflator, commodity price, federal fund rate, non borrowed reserves, total reserves and net funds raised through financial markets. Their results confirmed that the initial effects of a positive shock to the federal funds rate is to increase net funds raised by the business firms for almost a year and it declined thereafter.

Another approach adopted for the study of the credit channel was provided by Kashyap and Stein (2000). They establish a simple model that explains that two necessary conditions must be satisfied if monetary policy is to impact on aggregate demand through a distinct lending channel. The conditions include:

First, loans and commercial papers must be imperfect substitutes to bank assets. Hence, banks cannot just reduce commercial papers in order to keep the supply of loans unchanged. Secondly, loans and commercial paper must be imperfect substitutes to corporate liabilities. Their empirical evidence concludes that both conditions were satisfied. A corollary to the above conditions is that there must be imperfect price adjustments in order to allow the monetary policy to affect real activity.

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Obi and Uzodigwe [31] examines the dynamic linkage between money supply and inflation in Economic Community of West Africa State (ECOWAS) member States; West African Monetary Zone (WAMZ) and West African Economic Monetary Union (WAEMU) for the period 1980-2012. They employ the Random Effect Model (REM) to test the relationship between the variables of the study. Findings for the ECOWAS Member States show that the impact of money supply on inflation is effective in the current and first period. While the impact is effective in the first period for WAMZ, WAEMU experiences an effective impact in the current period. The finding also reveals that there are significant specific-country effects on the variables. This implies that the objective of macroeconomic convergence is yet to be achieved. The study, therefore recommends that inflation should be used as an operational guide in evaluating the effectiveness of monetary policy and also a strong monetary cooperation programme among ECOWAS member states should be evolved.

Nabila and Zakir [32] use the ordinary least square (OLS) method to examine the channels through which financial development may influence economic growth in developing countries over the period of 1978-2012. The results revealed that there are strong evidence of the long-run relationship between financial development and economic growth in developing countries. In addition, there is bi-directional causation between financial development and FDI. Moreover, trade openness has an impact on financial development in all the countries, which calls for the introduction of effective policy measures to promote trade between countries.

Akinbobola [33]. studied the dynamics of the money supply, exchange rate and inflation in Nigeria. The study explored the cointegration and Vector Error Correction Mechanism (VECM) to find out if a long run relationship exists between monetary growth, exchange rate and inflation for the period 1986-2008. The study discovered that exchange rate is more relevant in price determination in Nigeria than monetary expansion and real output production. Real exchange is found to have a negative and significant effect on the inflation rate. It also revealed that money supply has negative effect on the price level, a case which raises question about the usual theoretical linkage between money supply and price (i.e., money should have a positive and significant effect on price level in the long run) through the short run analysis revealed that only money supply has a significant effect on the price level.

Olorunfemi and Adeleke [34]. estimate and test the relationship between inflation and money supply in Nigeria, using Vector Autoregressive (VAR) model. The paper also evaluates the key determinants of inflation such as money supply, real exchange rate, real interest rate, oil revenue, and government expenditure, all within the period 1970-2008. The study reveals a unidirectional causality from money supply to inflation: from exchange rate to inflation: from interest rate to inflation. Their results provided supportive evidence of a positive link between money supply and inflation rate. The result for the VAR model shows that own shock raise malfunction in the first two years that came down to negative and slightly rose to flatten out. The shock in money supply had no early effect on inflation rate but later had a slight positive effect on inflation. There is a general consensus in Literature that money supply affects inflation either positively or negatively.

4.Model Specification

To achieve the broad and the specific objectives of the study the study employs the fully modify ordinary least square (FMOLS) method of estimating and testing hypotheses for co-integrating vectors in dynamic time series panels. The model was originally designed in the work of Phillips and Hansen [35]. to provide optimal estimates for co-integrating regressions. Phillips and Hansen (1990) note that the FMOLS accounts for serial correlation effects and for the endogeneity in the regressors that result from the existence of the co-integrating relationship. The advantage of this method, according to Pedroni [36]. is that it accommodates considerable heterogeneity across individual members of the panel.

Indeed, one important advantage to working with a co-integrated panel approach of this type is that it allows researchers to selectively pool the long run information contained in the panel while permitting the short run dynamics and fixed effects to be heterogeneous among different members of the panel. Also, in addition to producing asymptotically unbiased estimators, the FMOLS also produces nuisance parameter free standard normal distributions. In this way, inferences can be made regarding common long run
relationships which are asymptotically. The co-integrating regressions in heterogeneous panels for a panel of \( I = 1, \ldots, N \)

Members is specified as:

\[
Y_{it} = \alpha_i + \beta X_{it} + \mu_{it} \quad (1)
\]

\[
X_{it} = X_{it-1} + \xi_{it} \quad (2)
\]

Where:

\[
Y_i (RGDP) = X_i (\beta_1 \text{INFL}, \beta_2 \text{EXCH}, \beta_3 \text{LEDR}) \quad (3)
\]

The expression in (3) above is a vector of the dependent and the independent variables which are said to co-

integrate for each member of the panel, with co-integrating vector \( \beta \) if \( Y_{it} \) is integrated of order one. \( X_i \) is a
dimensional vector of regressors, which are not co-integrated with each other.

\( \alpha_i = \) the intercept which allows the co-integrating relationship to include member specific fixed effects.

\( \xi_{it} = (\mu_{it}, \lambda_{it}) \) is the vector error process which is stationary with asymptotic covariance matrix \( \theta_i \), defined as:

\[
\theta_i = \begin{bmatrix}
\theta_{11i} & \theta_{12i} \\
\theta_{21i} & \theta_{22i}
\end{bmatrix} \quad (4)
\]

\( \xi_{it} = (\mu_{it}, \lambda_{it}) \) is partition so that the first element is a scalar series and the second element is an \( m \) dimensional vector of the differences in the regressors \( \lambda_{it} = X_{it} - X_{it-1} = \Delta X_{it} \), so that from the asymptotic
covariance matrix, \( \theta_i = \begin{bmatrix}
\theta_{11i} & \theta_{12i} \\
\theta_{21i} & \theta_{22i}
\end{bmatrix} \), \( \theta_{11i} \) becomes the scalar long run variance of the residual \( \mu_{it} \), and \( \theta_{22i} \)
is the \( m \times m \) long run covariance among the \( \lambda_{it} \), and \( \theta_{21i} \) is an \( m \times 1 \) vector that gives the long-run covariance
between the residual \( \mu_{it} \) and each of the \( \lambda_{it} \).

5. Techniques of Data Analysis

5.1. Panel Unit Root Test

The study will adopt the panel unit root tests developed by Breitung and Levin et al. [37]. This is on

the basis that the approach has the highest power and smallest size distortions of any class of the so-called

first generation panel unit root tests Berhard [38]. The Breitung (2000) panel unit root test is given as:

\[
y_{it} = \eta_{it} + \sum_{k=1}^{p+1} \beta_{ik} x_{it-k} + \varepsilon_t \quad (5)
\]

The test statistic examines the null hypothesis that the process difference stationary:

\[
H_0: \sum_{k=1}^{p+1} \beta_{ik} - 1 = 0 \quad (6)
\]

The alternative is that the panel series is stationary; that is \( \sum_{k=1}^{p+1} \beta_{it} - 1 < 0 \) for all \( i \).

The Breitung (2000) uses the following transformed vectors to construct the test statistics:

\[
Y_{i}^* = AY_i = [y_{i1}^*, y_{i2}^*, \ldots, y_{iT}^*] \quad (7)
\]

\[
X_{i}^* = AX_i = [x_{i1}^*, x_{i2}^*, \ldots, x_{iT}^*]' \quad (8)
\]

The standardized form of (6) and (7) above is given as:
5.2. Panel Co-integration

The panel co-integration model was adopted in this study to test for the existence of a long-run relationship among the variables of the study. The choice was on the basis that the panel data analysis offers major advantages over cross-sectional analysis. For example, it incorporates changes into the model and by so doing, allows individual changes in the variables of the study to be measured directly. The panel co-integration model that was adopted in this study follows that of the earlier study by Pedroni (1999). The original model is stated as:

$$Y_{it} = \alpha_{it} + \beta_{it}t + \gamma_{it}X_{it} + e_{it}$$  \hspace{1cm} (10)

Where

\[ i = 1, 2 \ldots N, \ t = 1, 2 \ldots T, \ N = \text{finite sample size}, \ T = \text{time period} \]

\[ Y_{it} = \text{vector matrix of dependent variables with (N x T) x 1 dimension for each member} \]

\[ X_{it} = \text{vector matrix of independent variables with (N x T) x m dimension for each member} \]

\[ \alpha_{it} \text{ and } \beta_{it} = \text{fixed effects for each country of the study} \]

\[ t = \text{deterministic trend,} \]

\[ e_{it} = \text{the stochastic error term.} \]

To test for the null hypothesis of no co-integration, Pedroni (1999) develops two types of asymptotic tests (the within- dimension approach and the between- dimension approach) that allow for heterogeneity among individual members of the panel, and heterogeneity in both the long-run co-integrating vectors. The ‘within-dimension approach’ comprises four panel statistics which are the panel v-statistic, the panel ρ-statistic, the panel PP-statistic, and the panel ADF-statistic.

On the other hand, the ‘between-dimension approach’ includes three statistics which are group q-statistic, group PP-statistic, and group ADF-statistic. The mathematical notation for the various statistic(s) is as follows:

**Panel v-statistic**

$$Z_v = \left( \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^2 \hat{e}_{it-1}^2 \right)^{-1}$$  \hspace{1cm} (11)

**Panel ρ-statistic**

$$Z_{\rho} = \left( \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^2 \hat{e}_{it-1}^2 \right)^{-1} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^2 (\hat{e}_{it-1} \Delta \hat{e}_{it} - \hat{\lambda}_i)$$  \hspace{1cm} (12)

**Panel PP-statistic:**

$$Z_t = \left( \hat{\sigma}^2 \sum_{i=1}^{N} \sum_{t=1}^{T} L_{11i}^2 \hat{e}_{it-1}^2 \right)^{-1} \sum_{i=1}^{N} \sum_{t=1}^{T} L_{11i}^2 (\hat{e}_{it-1} \Delta \hat{e}_{it} - \hat{\lambda}_i)$$  \hspace{1cm} (13)

**Panel ADF**
\[ Z_t = \left( \hat{s}^2 \sum_{i=1}^{N} \sum_{t=1}^{T} L_{11}^{-2} \hat{e}_{it-1}^2 \right)^{-\frac{1}{2}} \sum_{i=1}^{N} \sum_{t=1}^{T} L_{11}^{-2} \hat{e}_{it-1}^2 \Delta \hat{e}_{it} \] (14)

**Group ρ-statistic:**

\[ \tilde{Z}_p = \sum_{i=1}^{N} \left( \sum_{t=1}^{T} \hat{e}_{it-1}^2 \right)^{-1} \sum_{t=1}^{T} (\hat{e}_{it-1} - \hat{\lambda}_i) \] (15)

**Group PP-statistic**

\[ \tilde{Z}_i = \sum_{i=1}^{N} \left( \hat{\sigma}^2 \sum_{t=1}^{T} \hat{e}_{it-1}^2 \right)^{-1/2} \sum_{t=1}^{T} (-\hat{\lambda}_i) \] (16)

**Group A DF**

\[ \tilde{Z}_i = \sum_{i=1}^{N} \left( \sum_{t=1}^{T} \hat{s}_{11} \hat{e}_{it-1}^2 \right)^{-1/2} \sum_{t=1}^{T} \hat{e}_{it-1} \Delta \hat{e}_{it} \] (17)

6. **EMPIRICAL RESULTS**

In order to evaluate the impact of monetary policy on economic growth of the selected five ECOWAS’ member countries (Nigeria, Ghana, Sierra-Leon, Gambia, and Liberia), a balanced panel of time series data for each country was used. The analysis begins with a test for the property of the data set for the study, using panel unit root test of the type suggested by I'm, Pesaran, and Levin [39]. This was followed by panel test of co-integration and then panel error correction model. Finally, post estimation statistics such as normality, and autocorrelation was provided to see the robustness of the results. E-views 9 statistical software was used for all the estimations.

Table 1.

**Result of Panel Unit Root Test**

<table>
<thead>
<tr>
<th>Variables</th>
<th>LLC Level</th>
<th>First difference</th>
<th>IPS Level</th>
<th>First difference</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>2.352</td>
<td>-14.18</td>
<td>-1.919</td>
<td>-14.92</td>
<td>I (1)</td>
</tr>
<tr>
<td></td>
<td>(0.990)</td>
<td>(0.000)</td>
<td>(0.068)</td>
<td>(0.000)</td>
<td></td>
</tr>
<tr>
<td>INFL</td>
<td>2.868</td>
<td>-13.59</td>
<td>1.545</td>
<td>-12.64</td>
<td>I (1)</td>
</tr>
<tr>
<td></td>
<td>(0.200)</td>
<td>(0.000)</td>
<td>(0.506)</td>
<td>(0.000)</td>
<td></td>
</tr>
<tr>
<td>EXCH</td>
<td>-6.988</td>
<td>-1418</td>
<td>1.226</td>
<td>-9594</td>
<td>I (1)</td>
</tr>
<tr>
<td></td>
<td>(0.421)</td>
<td>(0.000)</td>
<td>(0.212)</td>
<td>(0.000)</td>
<td></td>
</tr>
<tr>
<td>LEDR</td>
<td>-1.292</td>
<td>-9.709</td>
<td>-1.521</td>
<td>-10.09</td>
<td>I (1)</td>
</tr>
<tr>
<td></td>
<td>(0.098)</td>
<td>(0.000)</td>
<td>(0.064)</td>
<td>(0.000)</td>
<td></td>
</tr>
</tbody>
</table>

Values in parentheses are probability values

Source: E-views 9 output

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### Table 2.
The result of Unit Root Test for Individual Countries

<table>
<thead>
<tr>
<th>Countries/variables</th>
<th>ADF at levels</th>
<th>ADF at first difference</th>
<th>Order of integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHANA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>-2.066</td>
<td>-7.643**</td>
<td>I (1)</td>
</tr>
<tr>
<td>INFL</td>
<td>-1.469</td>
<td>-4.188**</td>
<td>I (1)</td>
</tr>
<tr>
<td>EXCH</td>
<td>-2.409</td>
<td>-7.166**</td>
<td>I (1)</td>
</tr>
<tr>
<td>LEADR</td>
<td>-1.084</td>
<td>-8.468**</td>
<td>I (1)</td>
</tr>
<tr>
<td>SIERRA LEON</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>-2.146</td>
<td>-6.756**</td>
<td>I (1)</td>
</tr>
<tr>
<td>INFL</td>
<td>-2.884</td>
<td>-8.431**</td>
<td>I (1)</td>
</tr>
<tr>
<td>EXCH</td>
<td>-1.139</td>
<td>-8.065**</td>
<td>I (1)</td>
</tr>
<tr>
<td>LEADR</td>
<td>-1.980</td>
<td>-4.736**</td>
<td>I (1)</td>
</tr>
<tr>
<td>GAMBIA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>-2.066</td>
<td>-7.643**</td>
<td>I (1)</td>
</tr>
<tr>
<td>INFL</td>
<td>-2.793</td>
<td>-6.034**</td>
<td>I (1)</td>
</tr>
<tr>
<td>EXCH</td>
<td>-2.410</td>
<td>-7.166**</td>
<td>I (1)</td>
</tr>
<tr>
<td>LEADR</td>
<td>-1.139</td>
<td>-6.034**</td>
<td>I (1)</td>
</tr>
<tr>
<td>LIBERIA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>-2.146</td>
<td>-6.756**</td>
<td>I (1)</td>
</tr>
<tr>
<td>INFL</td>
<td>-2.885</td>
<td>-8.431**</td>
<td>I (1)</td>
</tr>
<tr>
<td>EXCH</td>
<td>-0.811</td>
<td>-5.098**</td>
<td>I (1)</td>
</tr>
<tr>
<td>LEADR</td>
<td>-2.124</td>
<td>-7.926**</td>
<td>I (1)</td>
</tr>
<tr>
<td>Nigeria</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>-2.019</td>
<td>-3.832**</td>
<td>I (1)</td>
</tr>
<tr>
<td>INFL</td>
<td>-1.042</td>
<td>-6.022**</td>
<td>I (1)</td>
</tr>
<tr>
<td>EXCH</td>
<td>-1.593</td>
<td>-5.575**</td>
<td>I (1)</td>
</tr>
<tr>
<td>LEADR</td>
<td>-2.267</td>
<td>-6.524**</td>
<td>I (1)</td>
</tr>
</tbody>
</table>

**Source: E-views 9 Output**  
** means significant at 5 %
Table 1 presents the result of a panel unit root test of Stationarity for the data used for the study. The result of LLC and IPS tests show that at levels, GDP, EXCH, INFL, and LEDR, for all the countries, are not stationary because their probability values are greater than 5 percent level of significance. However, when converted to the first difference, the variables (GDP, EXCH, INFL, and LEDR) become stationary. This result confirms that all the four variables have the same order of co-integration of I(1).

Similarly, table 2 shows the results of the unit root test of Stationarity for the individual countries selected for the study. The test was conducted using the ADF unit root option with no intercept and trend. The result shows that the entire variable for all the countries is stationary only at first difference. Hence, the variables are integrated of the same order of I(1). Based on the result, it is necessary to proceed to test for panel co-integration among the cross section units as well as co-integration for the individual countries to determine whether or not a long run relationship exists between GDP, EXCH, INFL, and LEDR.

Table 3.
Results of panel co-integration Test
Null hypothesis: no co-integration

<table>
<thead>
<tr>
<th></th>
<th>Panel (within dimension)</th>
<th>Group (between dimension)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics</td>
<td>Value</td>
<td>Prob.</td>
</tr>
<tr>
<td>Panel v-stat</td>
<td>6.674**</td>
<td>0.000</td>
</tr>
<tr>
<td>Panel PP-stat</td>
<td>-2.357**</td>
<td>0.009</td>
</tr>
</tbody>
</table>

**suggest rejection of null hypothesis at 5%

Source: E-views output

Table 4.
Results of co-integration Test for Individual Countries
Null Hypothesis: No co-integration

<table>
<thead>
<tr>
<th>Countries/ co-integration</th>
<th>λtrace</th>
<th>5% critical value</th>
<th>Prob.</th>
<th>Δmax</th>
<th>5% critical value</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHANA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None **</td>
<td>54.76</td>
<td>47.86</td>
<td>0.024</td>
<td>30.05</td>
<td>27.58</td>
<td>0.009</td>
</tr>
<tr>
<td>At most 1</td>
<td>24.70</td>
<td>29.79</td>
<td>0.132</td>
<td>17.93</td>
<td>21.13</td>
<td>0.172</td>
</tr>
<tr>
<td>At most 2</td>
<td>6.77</td>
<td>15.49</td>
<td>0.587</td>
<td>6.209</td>
<td>14.26</td>
<td>0.604</td>
</tr>
<tr>
<td>At most 3</td>
<td>0.559</td>
<td>3.841</td>
<td>0.454</td>
<td>0.559</td>
<td>3.841</td>
<td>0.454</td>
</tr>
</tbody>
</table>

| SIERRA LEON              |        |                   |       |      |                   |       |
| None **                  | 48.78  | 47.86             | 0.046 | 29.66 | 27.58             | 0.034 |
| At most 1                | 21.11  | 29.79             | 0.351 | 14.05 | 21.13             | 0.361 |
| At most 2                | 7.059  | 15.49             | 0.570 | 6.769 | 14.26             | 0.517 |
| At most 3                | 0.290  | 3.841             | 0.590 | 0.290 | 3.841             | 0.590 |

| GMABIA                   |        |                   |       |      |                   |       |

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Trace test for all the countries indicates 1 cointegrating eqn(s) at the 0.05 level;
Max-eigenvalue test for all the countries indicates 1 cointegration eqn(s)
at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level
λ Trace = Trace Statistic; λ max = Maximum eigenvalue
Source: Output of E-view 9

Table 3 presents the results of panel co-integration estimates, both within and between group dimensions, while table 4 shows the co-integration result for individual countries. The estimates in table 3 show that the entire tests reject the null hypothesis of no co-integration except panel rho and group rho. Considering the fact that the rho-statistics have lower power than the PP statistics, and other statistic rejected the null hypothesis; it may be reasonable to accept the existence of the long run co-integration among the series for all the countries investigated. Based on the result the long run co-integrating equation, fixed effect model can be estimated.

Similarly, the result of the estimated Johansson co-integration coefficients for individual countries reported in table 4 reveals that there is one co-integrating equation in the system for each country. Therefore, the null hypothesis of no co-integration is rejected in favor of the alternative hypothesis of the presence of co-integration among the variables of the study for each country. It is also evident from the cointegration results that there is the absence of full rank since the subtraction of the number of cointegrating equations and the variables under study do not equal to zero, implying that the model is good and is in functional form. Based on the result, the long run co-integrating equation was obtained by estimating the fixed effect model as reported in equation (18) below:

\[
\text{LnGDP} = 12.43 - 0.487\text{lnEXCH} - 1.065\text{lnINFL} + 0.444\text{lnLED}\quad (18)
\]

<table>
<thead>
<tr>
<th></th>
<th>None **</th>
<th>At most 1</th>
<th>At most 2</th>
<th>At most 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIBERIA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None **</td>
<td>42.34</td>
<td>47.86</td>
<td>0.149</td>
<td>28.59</td>
</tr>
<tr>
<td>At most 1</td>
<td>13.76</td>
<td>29.79</td>
<td>0.854</td>
<td>8.381</td>
</tr>
<tr>
<td>At most 2</td>
<td>5.375</td>
<td>15.49</td>
<td>0.768</td>
<td>5.262</td>
</tr>
<tr>
<td>At most 3</td>
<td>0.113</td>
<td>3.841</td>
<td>0.737</td>
<td>0.113</td>
</tr>
<tr>
<td>NIGERIA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None **</td>
<td>49.54</td>
<td>47.86</td>
<td>0.034</td>
<td>24.48</td>
</tr>
<tr>
<td>At most 1</td>
<td>25.06</td>
<td>29.79</td>
<td>0.159</td>
<td>18.66</td>
</tr>
<tr>
<td>At most 2</td>
<td>6.401</td>
<td>15.49</td>
<td>0.068</td>
<td>6.356</td>
</tr>
<tr>
<td>At most 3</td>
<td>0.044</td>
<td>3.841</td>
<td>0.834</td>
<td>0.044</td>
</tr>
</tbody>
</table>
### The long run elasticity reported in equation (1) shows that the estimated coefficients of explanatory variables for ECOWAS members investigated are highly statistically significant. The result shows that the elasticity of EXCH with respect to GDP is negative and inelastic (less than unity with a coefficient of about 0.49). This means that a unit increase in EXCH will decrease GDP by less than proportionate magnitude. The negative relationship supports the economic theory that appreciation of domestic currency makes exports costlier and as such reduces demand for exports. This reduces exports earnings and affects the economic growth of the domestic economy.

However, the elasticity of INFL with respect to GDP is negative but elastic (greater than unity with the estimated coefficient of about 1.07). This suggests that for a given increase in INFL, GDP decreases by more than proportionately. Therefore, inflation could be thought of as very disastrous to the growth of ECOWAS member countries investigated in this study. The view that inflation, especially double-digit inflation, dampens economic growth is shared by economists of the classical and the Keynesian traditions and has been accepted by other newly emerged schools of macroeconomic thought.

For lending rate, however, the positive sign of the estimated elasticity disagrees with the a priori expectation. However, the estimate, like EXCH, is inelastic with the estimated numerical value of about 0.44. This does not support the economic theory. Furthermore, the adjusted $R^2$ of 0.53 is within the acceptable limit as it fits the model fairly well. It indicates that about 53 percent variation in GDP has been explained by the EXCH, INFL and LEDR leaving only 47 percent variation in GDP to be due to other factors not included in the model.

### Table 5.
**Results of Fully Modified Least Squares (FMOLS) for Individual countries and Panel**

<table>
<thead>
<tr>
<th>Countries</th>
<th>EXCH</th>
<th>LEDR</th>
<th>INFL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghana</td>
<td>-0.009</td>
<td>1.553</td>
<td>-0.015</td>
</tr>
<tr>
<td>t-values</td>
<td>(0.077)</td>
<td>(1.794)*</td>
<td>(1.912)**</td>
</tr>
<tr>
<td>Sierra Leon</td>
<td>5.357</td>
<td>-0.270</td>
<td>0.033</td>
</tr>
<tr>
<td>t-values</td>
<td>(1.372)</td>
<td>(1.258)</td>
<td>(0.665)</td>
</tr>
<tr>
<td>The Gambia</td>
<td>-0.028</td>
<td>-0.019</td>
<td>0.181</td>
</tr>
<tr>
<td>t-values</td>
<td>(0.614)</td>
<td>(1.780)**</td>
<td>1.186</td>
</tr>
</tbody>
</table>
The results of FMOLS for individual countries and group panel estimates are reported in Table 5. The result of panel estimates without time dummy is reported at the bottom of the table. The result shows that for Ghana, the exchange rate (EXCH) is not significant, but lending rate (LEDR) and inflation (INFL) are statistically significant at 10 percent and 5 percent respectively. However, the sign of LEDR does not conform to the a priori expectation, but those of EXCH and INFL do. Thus in Ghana, the elasticity of GDP decreases by about 0.9 percent and 1.5 percent respectively following a one percent increases in EXCH and INFL but increases by about 1.6 with a percent increase in LEDR. What may be inferred from the estimated result for Ghana is that EXCH, over the study period, does not significantly influence GDP compared to LEDR and INFL and at the same time, it has the least impact in term of the magnitude of its elasticity compared to other variables used in the model.

For Sierra Leon, all the variables (EXCH, LEDR, and INFL) are not significant. Similarly, while the sign of LEDR conforms to the a priori expectation those of EXCH and INFL do not. The result suggests that a one percent increase in INFL increases GDP by one 3.3 percent. This may not be surprising when it is realized that a certain level of inflation in an economy is necessary to boost the output level in the economy. For example, the classical Phillips curve reveals that inflation cannot be zero, for that may implied that unemployment is 100 percent. Therefore, the result supports the classical Phillips hypothesis that to achieve economic growth, some small level of inflation in the economy must be tolerated.

Like Sierra Leon, the estimated coefficient of inflation for the Gambia is positively related to GDP with the elasticity of about 18.1 percent but statistically insignificant. However, EXCH and LEDR are correctly signed, but only the later is significant at 5 percent. Thus a one percent increase in EXCH and LEDR decreases the elasticity of GDP by about 2.8 and 1.9 respectively. The result for Liberia shows that all the estimated coefficients are not properly signed, though EXCH and LEDR are significant but not INFL. A unit increase in EXCH, LEDR, and INFL increases the elasticity of GDP by about 27.4 percent, 18.6 percent and 3.9 percent respectively.
In the case of Nigeria however, only INFL negatively and significantly influence GDP with the elasticity of about 4.8 units. This is as expected. Since the last quarter of 2015 up to the last quarter of 2016, the rate of inflation in Nigeria has been on the increase. This phenomenon has been blamed on naira-dollar exchange rate disequilibrium, the poor performance of the real sector leading to production at less than full capacity and imported inflation. However, LEDR and EXCH do not have a significant impact on GDP in Nigeria.

For panel result for the five ECOWAS members selected for the study, the estimates are different from those of individual countries. First, all the estimates are highly statistically significant. Second, all the estimates are correctly signed, and third, the size of the estimated values are fairly robust. From the result of panel estimates, exchange rate (EXCH) for the ECOWAS members investigated appears to have more influence on GDP than LEDR and INFL. The elasticity of EXCH, LEDR, and INFL with respect to GDP are all less than 1, implying that there is an inverse relationship between all the independent variables and dependent variable. In another word, a unit increase in EXCH decreases the elasticity of GDP by about 66 percent. This is because the rising exchange rate makes exports costlier relative to imports. Therefore, the demand for exports falls and foreign reserve reduces. The finding corroborates Obi and Uzodigwe [40].

The elasticity of LEDR for the ECOWAS members investigated with respect to GDP is negative and about 39.9 percent. This means that GDP fall with the rise in LEDR. When the cost of borrowing raises the desire to borrow fund by business firms is discouraged. Thus, output level falls, and GDP follows suit. This is similar to the finding of Nabila and Zakir [41]. Furthermore, like LEDR, the elasticity of INFL for the ECOWAS members investigated is negative and is about 4.4 units. This also satisfies the a priori expectation. Economic theory suggests that inflation hampers economic growth as it reduces the purchasing power of consumers which in turn, reduces aggregate demand. A fall in aggregate demand leads to falls in both investment and GDP.

7. CONCLUSION

Monetary policies have been pursued in ECOWAS to reorient the economy of member-States towards the path of sustainable growth. Consequently, the conduct of monetary policy in Ghana, Sierra Leon, Gambia, Liberia, and Nigeria have, over time, moved away from the use of direct control measures to indirect, market-oriented tools and recently to inflation targeting. The shift has impacted differently on the ECOWAS member-States investigated in this study. However, based on the findings of this study, the following conclusions are made:

GDP growth rates of the ECOAS member-States investigated respond to the monetary policy variable used in this study and such, policies that focus on reducing exchange rates, inflation and lending rates could accelerate the growth rate of economies of Ghana, Sierra Leon, Gambia, Liberia, and Nigeria. The results of this study support the Keynesian arguments lending rates is inversely related to investment demand. This implies that lowering the lending rates by the Central Bank of the investigated ECOWAS member-States will lower the money-market interest rates directly and lending and deposit rates set for customers by banks indirectly. The reduced interest rates will also increase investment decisions of households and firms as positive changes in consumption and investment will increase the level of domestic demand for goods and services.

The study concludes that these countries would be better-off to surrender its independence over these policy instruments to the planned regional body under appropriate monetary union arrangements.

8. Recommendations

Analysis of conduct of monetary policy of investigated ECOWAS member-States indicates that the countries need to sustain their monetary policy reforms to enhance their overall economic performance and to facilitate the process of economic convergence. Given the role of selected monetary policy variables in
the economic growth process. In addition, domestic government borrowing from the banking system is severely affecting the cost of credit and crowding out the private sector, and this should be curtailed.

Furthermore, exchange rate must be relatively stable to attract foreign investors into the economies of Ghana, Sierra Leon, Gambia, Liberia and Nigeria and to increase the confidence of the investors on the viability safety of their investments and this can happen through diversification of the economy to explore other sectors of the economic, e.g., the agricultural sector to augment the weak manufacturing sectors of the study countries, particularly in the case Nigeria that runs under mono-economic by over relying on the its petroleum sector which is doing the economy more harm than good. Finally, inflation should be used as an operational guide in evaluating the effectiveness of monetary and policy and also a strong monetary cooperation program among ECOWAS countries be evolved.

References


