"The nexus between monetary policy and economic growth in Nigeria: a causality test"

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The nexus between monetary policy and economic growth in Nigeria: a causality test

Abstract

Monetary policy is an economic strategy taken by the government normally through the apex bank of a nation – Central Bank to influence the economy. It is geared towards creating stability in the economy and fostering economic growth which have been the quest of every nation. Monetary policy refers to government action or fiat created specifically to control the circulation and direction of money in the economy at any point in time. It can also be referred to as the regulation of money supply and interest rates by a nation's monetary authority so as to avoid currency depreciation and ensure inflationary pressure is not at an economy-threatening level. This study thus evaluates the nexus (link) between the Nigerian economic growth and monetary policy from 1981 to 2012. It measures economic growth using gross domestic product and the indices of monetary policy that include: cash reserve ratio, monetary policy rate, exchange rate, money supply, and interest rate. The co-integration test result shows that the variables are cointegrated with one other and the test for causality indicates that monetary policy has a noticeable influence on the growth of the economy, while economic growth does not influence monetary policy equally significantly. This suggests that the monetary policy transmission mechanisms contribute positively to the productivity of the Nigerian economy – thus enhancing economic growth.

Introduction

Monetary policy is an economic strategy taken by the government normally through the apex bank of a nation – Central Bank to influence the economy. It is geared towards creating stability in the economy and fostering economic growth which have been the quest of every nation. Monetary policy refers to government action or fiat created specifically to control the value, circulation and direction of money in the economy whilst considering the prevailing economic situation. It can also be referred to as the regulation of money supply and interest rates by a nation's monetary authority so as to avoid currency depreciation and ensure inflationary pressure is not at an economy-threatening level. The introduction and implementation of monetary policy is aimed at influencing macroeconomic objectives such as economic growth, price stability, balance of payment equilibrium, availability of full and sustainable employment – amongst others. The Central Bank of Nigeria (CBN) through an Act of the CBN enacted in 1958 is vested with the responsibility to control the economy through monetary policies. A critical question is – have the CBN monetary policies actually achieved the above macroeconomic objectives?

The prime aim of monetary policy is to make sure that supply of money is in consonance with the growth level of the economy, without committing errors

(Nzotta and Okereke, 2009). Monetary policy by the CBN has facilitated the introduction of an active money market where treasury bills (a financial instrument used for open market operation) and raising debt for government have grown in size and value, hence becoming prominent earning assets for investors and a source of balancing liquidity in the market. The most effective area of monetary policy in Nigeria is to control inflation – which is also known as price stabilization of goods and services by consumer demand and supply of the producers. The decision to apply a monetary policy on the economy depends on the magnitude and flow of money supply in the economy at that particular time.

Financial instability is reflected in rising inflation in nearly all nations – either developed or developing countries. Global economic trends have repercussions for the economy of each country, and yet the level of the impact varies and depends on numerous internal factors, such as a system of macroeconomic regulation, current monetary and fiscal policies, and achieved macroeconomic results. The main task in the current economic situation is taking steps to achieve the objectives of monetary policy – which then theoretically impacts on economic growth positively.

Notwithstanding the dispute among economists on this relationship, there is strong presumption that monetary policy is associated with economic growth. Monetary policy is without doubt an important tool for enhancing growth in the economy. It influences aggregate demand and aggregate supply, so affecting economic growth accordingly (Gul, Mughal & Rahim, 2012). The primary problem facing the CBN is implementing correct and timely policies that can boost economic growth. The inabil-

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ity of the CBN to duly act in accordance with the current economic situations could imperil the nation. The CBN implements policies which primarily assist in stabilizing the economy – but a spill-over result on the economic productivity may be in doubt due to time lag and the level of economic and financial development. Therefore, it is important to investigate the causal link between economic growth and the Nigerian government monetary actions and policies.

The study intends to investigate whether monetary policy engendered growth in the Nigerian economy from 1981 to 2012. There is a dearth of studies – especially in Nigeria – on how the nation's monetary policy affects its economic growth and vice-versa. Hence, this study is driven by the need to reveal the causal link between CBN's monetary policy transmission mechanism and economic growth in Nigeria. It is envisioned that this study will provide more knowledge to literature existing on this discourse in transitional economies – and Nigeria in particular. The study is outlined as follows: section 1 reviews empirical evidence from previous researchers, section 2 constructs the methodological framework, section 3 deals with the empirical findings, section 4 presents the conclusions while the final section six makes some recommendations.

1. Review of related empirical studies

Onyeiwu (2012) investigated monetary policy and economic growth during 1981-2008. The regression analysis indicated that supply of money caused a rise in gross domestic product and balance of payments but failed to suppress inflation in the Nigerian economy. The study provides inference of a positive influence of monetary policy on economic growth and its weakness to ensure macroeconomic stability. Imoughale and Ismaila (2014) examined how the performance of Nigerian manufacturing sector was influenced by monetary policies implemented between 1986 and 2012. The individual variables were: external reserve, exchange rate and inflation rate, which were statistically significant to manufacturing sector output (MSO) – while broad money supply (M_2) and applicable rate of interest have no statistical significance on the sector's output. Interest rate, exchange rate, and external reserve impacted negatively on the sector, but M_2 and inflation rate affected the sector positively. The Granger causality test suggested that only exchange rate and external reserve generate manufacturing output. It was also discovered that the manufacturing sector contributed insignificantly to economic growth.

The outcome of Okoro (2013) revealed that interest and inflation rates were inversely proportional to

level of economic output while foreign exchange rate, money supply and total credit were directly proportional and these variables were related on the long run to economic growth. Fasanya, Onakoya and Agboluaje (2013) investigated the growth process of Nigeria as affected by the country's monetary policies spanning from 1975 to 2010. The findings revealed the existence of long-run association among monetary parameters (external reserve, money supply, interest rate, exchange rate, and inflation rate) and economic growth. In addition, it was shown that only money supply and interest rate did not drive economic growth considerably. Akanbi and Ajagbe (2012) investigated the influence of CBN's monetary policies on commercial banks in Nigeria. Data spanning from 1992 to 1999 are collected using a sample of three commercial banks. The result showed that a rise in interest rate led to a fall in lending rate – while liquidity ratio and cash ratio were statistically significant to the profit of the selected banks.

Saibu and Nwosa (2011) examined the growth of Nigerian sectoral output caused by monetary policy from 1986 to 2008. The results indicated that the manufacturing sector is not receptive to monetary policy and the agricultural sector is sensitive to changes in exchange rate. In addition, it was discovered that improvement in the performance of the mining sector is largely determined by interest and exchange rates and that the exchange rate variability and total loan disbursed by bank are key factors in predicting the behavior of the construction/building sector. On the whole, the most influential monetary measure is the exchange rate. The assessment of Chimobi and Uche (2010) on how money and inflation are related to output in Nigeria reflected bidirectional causality between output and money likewise inflation. It also identified that money supply increase resulted in the growth of the economy.

Chuku (2009) used real effective exchange rate, minimum rediscount rate, and broad money (M_2) to determine how output and prices in Nigeria are affected by shocks arising from monetary policy implementation and showed that M_2 is the most significant among the three policy instruments. The comparative analysis of Ajisafe and Folorunso (2002) revealed that it was monetary actions rather than fiscal actions that influence economic activities in Nigeria and suggested that government emphasis on fiscal action has caused more instability in the nation economically. The above review shows that empirical studies on monetary policy – as it relates to economic growth and some macroeconomic variables – are still few and inconclusive in Nigeria. The causal relationship has also not been fully established and this calls for a further study like this.

Studies conducted outside of Nigeria are also reviewed to provide further evidence on how monetary policy affects the economy. Chipote and Makhetha-Kosi (2014) explored the role played by monetary policy in promoting growth of the South African economy. The study showed that long-term connection existed among the variables and money supply, repo rate and exchange rate are insignificant monetary policy instruments that drive growth, while inflation is significant. Ivrendi and Yildirim (2013) investigation of macroeconomic parameters and monetary policy shocks in a cross-section of 6 rapidly emerging nations: Turkey, South Africa, Brazil, China, India, and Russia. Adopting a Structural VAR model, it found that tight monetary policy in most countries increases the value of legal tender, interest rates and reduces inflationary pressure and output. There is no fact of exchange rate, price, trade and output relationship. The study affirmed exchange rate as the most important transmission mechanism in the six countries.

Chaudhry, Qamber and Farooq (2012) investigated the relationships of monetary policy, inflation and growth of the Pakistani economy from 1972 to 2012. The results indicated that credit to the private sector, financial depth, real exchange rate, and budget deficit were elastic and significant in terms of influencing the real GDP. It also revealed a bidirectional link between real gross domestic product and real exchange rate, while one-way directional link existed from real GDP to financial depth, domestic credit and budget deficit. Gul, Mughal and Rahim (2012) reviewed how the decisions of monetary authorities were influential on stabilizing price, economic growth, curtailing deficits in balance of payments and reducing unemployment level. The regression analysis showed that contractionary monetary policies with balanced adjustment of explanatory variables exerted favorable influence on the explained variable.

Arora and Cerisola (2000) quantified the effect of alterations occurring in monetary policies emerging from the US economy on less developed countries. The study explored how monetary policies in the US, country-specific fundamentals and international capital market conditions relate to sovereign bond spreads (proxy for country risk). It was found that the peculiar nature of each country is prominent in explaining the variations in its risk and that the monetary policy predictive ability in the US are also necessary for stabilizing the flows of capital, conditions in the capital market and promoting growth in less developed economies.

2. Methodological framework

The study utilized a quantitative method in the analysis. The steps taken in the methods of analysis are described below.

2.1. Specification of model. The model measures economic growth using gross domestic product (GDP), which is dependent on exchange rate (EXGR), cash reserve ratio (CRR), money supply (MS), interest rate (INTR), and monetary policy rate (MPR) (all being indices of monetary policy). A Granger causality test is conducted on the model to determine the directional link between GDP and each of the indices of monetary policy. An index of monetary policy has causation on GDP if the lagged value of the index is significant in the equation for economic growth. The model is functionally represented as:

$GDP = f(CRR, MPR, EXGR, MS, INTR)$.

The Granger equations for the model are presented as:

$$GDP_t = \sum_{i=1}^{n} \beta_i CRR_{t-1} + \sum_{j=1}^{n} \alpha_j GDP_{t-j} + u_t \tag{1}$$

$$CRR_t = \sum_{i=1}^{n} \lambda_i CRR_{t-1} + \sum_{j=1}^{n} \delta_j GDP_{t-j} + u_t$$

(2)

$$GDP_t = \sum_{i=1}^{n} \beta_i MPR_{t-1} + \sum_{j=1}^{n} \alpha_j GDP_{t-j} + u_t$$

(3)

$$MPR_t = \sum_{i=1}^{n} \lambda_i MPR_{t-1} + \sum_{j=1}^{n} \delta_j GDP_{t-j} + u_t \tag{4}$$

$$GDP_t = \sum_{i=1}^{n} \beta_i EXGR_{t-1} + \sum_{j=1}^{n} \alpha_j GDP_{t-j} + u_t \tag{5}$$

$$EXGR_t = \sum_{i=1}^{n} \lambda_i EXGR_{t-1} + \sum_{j=1}^{n} \delta_j GDP_{t-j} + u_t \tag{6}$$

$$GDP_t = \sum_{i=1}^{n} \beta_i MS_{t-1} + \sum_{j=1}^{n} \alpha_j GDP_{t-j} + u_t \tag{7}$$

$$MS_t = \sum_{i=1}^{n} \lambda_i MS_{t-1} + \sum_{j=1}^{n} \delta_j GDP_{t-j} + u_t \tag{8}$$

$$GDP_t = \sum_{i=1}^{n} \beta_i INTR_{t-1} + \sum_{j=1}^{n} \alpha_j GDP_{t-j} + u_t \tag{9}$$

$$INTR_t = \sum_{i=1}^{n} \lambda_i INTR_{t-1} + \sum_{j=1}^{n} \delta_j GDP_{t-j} + u_t \tag{10}$$

2.2. Estimation technique, variables, samples and data source. The study adopted an econometric approach to examine how monetary policy influences economic growth. The data employed are secondary in nature and the CBN Statistical Bulletin is the source of data. Annual time-series data sets on gross domestic product (GDP), exchange rate (EXGR), money supply (MS), cash reserve ratio (CRR), interest rate (INTR), and monetary policy rate (MPR) from 1981 to 2012 were collected. The econometric techniques employed were the Johansen cointegration test, the Granger Causality Test and the Augmented Dickey-Fuller (ADF) unit root test.

3. Empirical findings and discussion

3.1. Unit root test. The unit root test applies Augmented Dickey-Fuller (ADF) method to assess that the data did not contain unit root. The method established that the data is free from unit root when the test statistic value of ADF exceeds the 5% Mackinnon critical value (at absolute term). The ADF test results are reported in Table 1.

Table 1. Result of ADF test

Variable	Test statistic value @ level	5% Mackinnon critical value @ level	Test statistic value @ 1st difference	5% Mackinnon critical value @ 1st difference	Test statistic value @ 2nd difference	5% Mackinnon critical value @ 2nd difference
GDP	-0.528023	-2.963972	-4.721858*	-2.963972	----------	----------
CRR	-2.789736	-2.963972	-1.897984	-2.963972	-6.577837*	-2.971853
MPR	-2.860141	-2.963972	-5.326063*	-2.963972	----------	----------
EXGR	-1.832767	-2.963972	-4.762491*	-2.963972	----------	----------
MS	0.811938	-2.963972	-3.288131*	-2.963972	----------	----------
INTR	-2.766767	-2.963972	-5.560485*	-2.963972	----------	----------

(*) denotes data is stationary at 5% Mackinnon critical value
Source: authors' estimation from E-views

Table 1 (above) shows that unit root is present in all the variables at level, but was established to be stationary after differencing. GDP, MPR, EXGR, MS, INTR were stationary at first difference; therefore they are series I (1) while CRR was stationary at second difference i.e. series I (2).

3.2. Johansen co-integration test. The null hypothesis (H_0) and the alternative (H_1) are presented as:

H_0: There is no co-integration;
H_1: There is co-integration.
The existence of co-integration means that variables trend collectively over a long period. The condition for this test is that the trace statistic value should be larger than 0.05 Mackinnon critical value for co-integration to be said to exist.

Table 2. Result of trace test

Expected CEs	Trace	0.05	
	Statistic	Critical value	p-values**
None *	128.7435	95.75366	0.0001
At most 1 *	81.03406	69.81889	0.0049
At most 2	41.60975	47.85613	0.1700
At most 3	23.43485	29.79707	0.2254
At most 4	10.89947	15.49471	0.2177
At most 5 *	4.907451	3.841466	0.0267

Trace test reveals 2 co-integrating equations at the 0.05 level
* signifies H_0 rejected at the 0.05 level
**MacKinnon-Haug-Michelis (1999) *p*-values
Source: Authors' estimation from E-views

The test indicated the presence of two co-integrating equations, which means there was co-integration which led to the rejection of the null hypothesis (H_0) – hence, H_1 was upheld. This implies that the variables move together over a long time in a stationary manner. Granger causality exists in a minimum of one way when co-integration is established among variables (Engle & Granger, 1987).

3.3. Granger causality test. The idea of this test is to determine if the indices of monetary policy (CRR, MPR, EXGR, MS, and INTR) provide significant statistical information about economic growth. Causality occurs when there is a "surprise" in an index of monetary policy that leads to a later increase in GDP and vice-versa. In establishing Granger causality at threshold value of 5%, the *p*-value must not exceed 0.05 (*p*-value ≤ 0.05). Table 3 (below) shows the outcome of the causality test conducted on a two lag length.

Table 3. Result of causality test

H_0	p-value
CRR has no causal influence on GDP	0.8869
GDP has no causal influence on CRR	0.2480
MPR has no causal influence on GDP	0.0076*
GDP has no causal influence on MPR	0.4393
EXGR has no causal influence on GDP	0.0059*
GDP has no causal influence on EXGR	0.2850
MS has no causal influence on GDP	0.2059
GDP has no causal influence on MS	0.1339
INTR has no causal influence on GDP	0.0185*
GDP has no causal influence on INTR	0.9916

* signifies H_0 rejected at 5% threshold value (level of significance)
Source: Authors' estimation from E-views

The test for causality as revealed in the table above shows the absence of causal link between CRR and GDP i.e. CRR and GDP do not granger cause each other. This means that they do not influence each other significantly. MPR granger causes GDP; however, GDP does not granger cause MPR. This suggests a unidirectional link and also that MPR provides statistically significant information about the future value of GDP. EXGR granger causes GDP but GDP does not granger cause EXGR i.e. causation flows only from EXGR to GDP. Granger causality does not occur from money supply to GDP and vice-versa; hence, there is no causality between them, and they do not contribute significantly to future values of each other. Direction of causality

between INTR and GDP is unidirectional because only INTR granger causes GDP, implying that INTR provides statistically significant information about the future value of GDP. In summary, all indices of monetary policy except CRR and MS have causation on GDP, but GDP produces no causation on any of the monetary policy measures.

4. Conclusion

The research examined the directional link between monetary policy and economic growth and this is a significant addition to existing literature – especially in Nigeria – by providing empirical indication. The variables were confirmed to be devoid of unit root after differencing. There is existence of 2 co-integrating equations – thus establishing the incidence of a long-run equilibrium association among the variables. Meanwhile, the analysis did not fail in the establishment of the variables that cause the changes that occur in gross domestic product using the Granger causality test. The test revealed that monetary policy rate, exchange rate and interest rate are major contributors to fluctuations in economic growth, while cash reserve ratio and money supply do not influence economic growth significantly. However, economic growth does not significantly influence any of the indices of monetary policy. The outcome of this study is consistent with Okoro (2013) and Fasanya, Onakoya and Agboluaje (2013), although it follows a different methodological approach to these studies. These findings showed that economic growth is not linked to monetary policy, while monetary policy exerts significant influence on economic growth. This study has shown that monetary policy transmission mechanism plays a crucial part in the continuous growth process of the Nigerian economy which resultantly leads to sustainable economic development. It also revealed that CBN's action through monetary policy is a driver of economic growth.

Recommendation

Arising from the findings of this study, it recommends the following:

1. The growth of the economy should be the topmost consideration when implementing monetary policy measures. Strong macroeconomic policies should be pursued to maintain and stabilize the economy at large.
2. The regulatory and supervisory framework for the financial sector should be strengthened in order to assist the effectiveness of monetary policies of the government.
3. The monetary authority (CBN) should implement policies that increase the flow of money and direct it to sectors with higher propensity to contribute to national economic productivity.
4. In addition to the above, the CBN should endeavor to make more use of the cash reserve ratio in regulating the operations of commercial banks and interest rate policy should be such that banks can efficiently intermediate funds in the economy.

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