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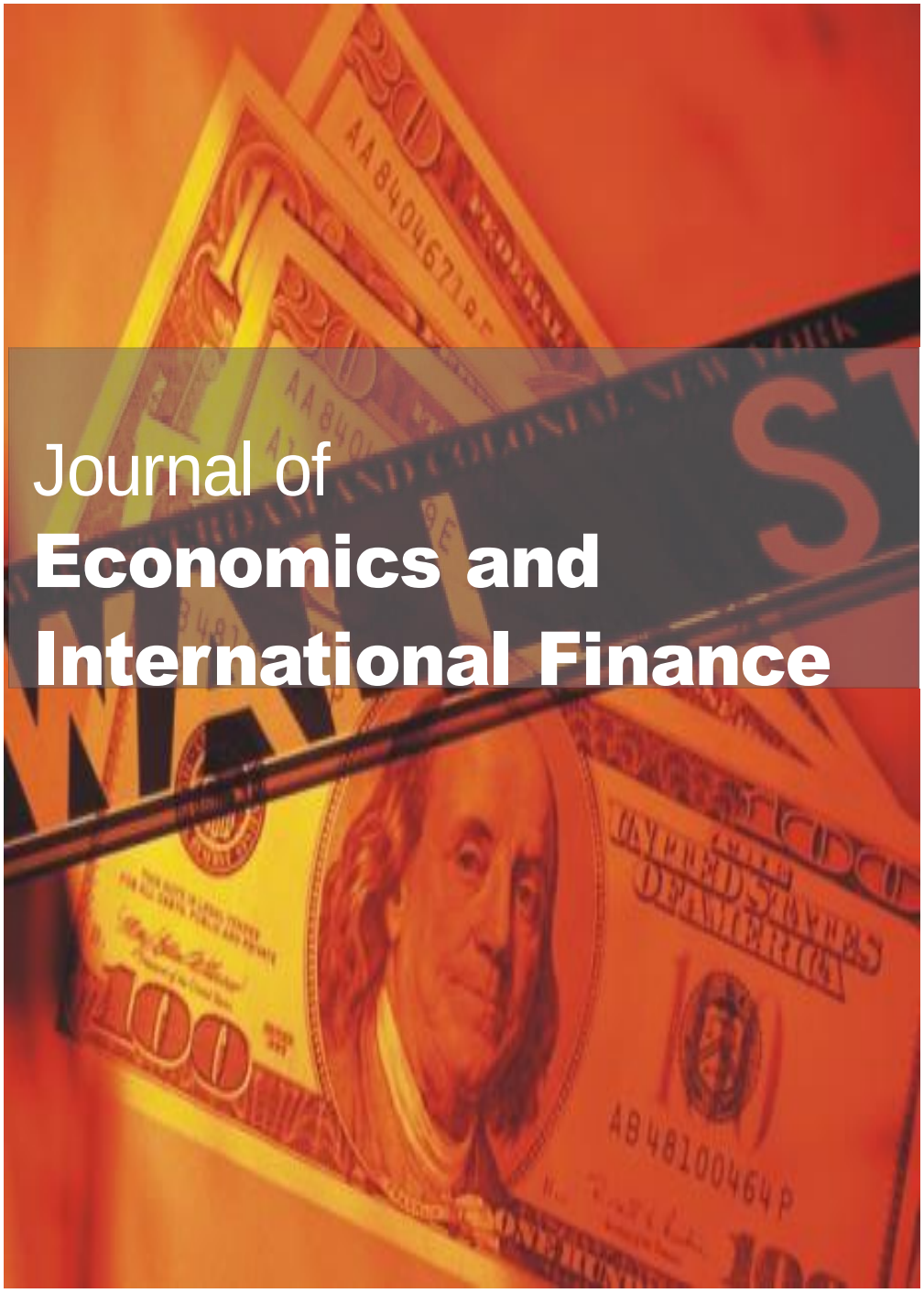

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Journal of Economics and International Finance

Full Length Research Paper

Further insights on monetary transmission mechanism in Nigeria

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This study investigated the response of the different monetary policy channels to several macroeconomic variables in Nigeria and established the dominant channel on output from the period of 1986 to 2017 using quarterly data. Variables such as private sector credit, inflation rate, monetary policy rate, exchange rate, all share index and real output were used to carry out this investigation. The study adopted the structural break and structural VAR methods in achieving the objectives and found a significant standard deviation real effect on each monetary policy channel in the short term, while it also found that innovations arising from a channel itself caused the greatest shock on its future values. The findings further demonstrated that each monetary policy channel had a weak influence on output, with interest rate channel being the dominant channel of monetary policy on output. Finally, the paper suggested that the monetary authority should keep using interest rate as the major policy anchor through which monetary impulses are transmitted into the economy.

Key words: Monetary transmission mechanism, interest rate channel, exchange rate channel, credit channel, expectations channel, asset price channel, output, structural vector autoregressive (SVAR).

INTRODUCTION

Monetary policy is an intentional act by the apex bank to influence the magnitude, cost and accessibility of money in order to attain both internal and external balance within an economy (CBN, 2011). In many developing countries, including Nigeria, the major purpose of monetary policy is to ensure stable prices and sustainable growth. In order to achieve these objectives, the Central Bank of Nigeria (CBN) has employed different frameworks over the years. The first was the exchange rate targeting framework which was in effect from 1959 to 1973. This framework however gave way to the monetary targeting framework in 1974 due to the failure in the adoption of Bretton Woods fixed exchange rate system in 1972 and the switch in policy stance to control inflation and improve Nigeria's balance of payment (CBN, 2011). Since 1974, monetary targeting strategies have been implemented in Nigeria.

The channel through which monetary policy affects real economic activity is often referred to as the Monetary Transmission Mechanism (MTM). The mechanism predicts how monetary policy changes (for instance, a change in money supply or interest rates) transmit to

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economic activity and inflation in an economy (Lättemäe, 2003). There are several channels through which this can occur. These include: the credit channel, the traditional interest rate channel (money channel), asset price channel, exchange rate channel and expectation's channel (Mishkin, 1995, 2004; Kuttner and Mosser, 2002; Williams and Robinson, 2016). These channels are not mutually exclusive as the effect of one channel could amplify or moderate its effect on another. These channels are also not time invariant; they evolve alongside changes in the overall economic and financial conditions of an economy (Tuaño-Amador et al., 2009).

In Nigeria, these channels have been used for the transmission of monetary policy into the economy. Furthermore, monetary policy instruments have been used as the policy anchor through which its policies affect the financial system and the economy at large. In between the anchor and the outcomes (output and prices) are the different instruments and channels through which the anchor achieves the intended outcomes as displayed in Figure 1. The different monetary policy channels are stationed to show how they affect output and inflation in an economy. Figure 1 shows that the decisions taken by the monetary authorities in their quarterly Monetary Policy Committee (MPC) will affect the transmission of monetary policy to the real economy (proxied by output and prices). In essence, this transmission process gives a description on how the different channels of monetary policy affect real economic activity within an economy. Indeed, these channels serve as the conduit through which monetary policies are implemented in an economy. It would further provide an insight on which channel will be more dominant on output in the course of the paper. The issue regarding the investigation of monetary transmission mechanism is as a result of its potential association with output and inflation in an economy. Economists do not however agree on the exact functioning of these channels in the literature (Olteanu, 2015)[1]. Some studies believe the influence of monetary policy may transmit into the financial sector in different ways (Lattemae, 2003; Mies and Tapia, 2003; Apergis et al., 2012), while some others believe the transmission channels may also overlap and this makes it difficult to differentiate them empirically (Tuano-Amado et al., 2009; Williams and Robinson, 2016; Lattemae, 2003). However, the crux of the debate regarding money transmission is related to its potential association with short-term real effects, since without such association, the contrast between real and nominal variables would lessen the macroeconomic stability objective desired by monetary authorities to a strategic framework that would only ensure price stability. An additional challenge may stem from the fact that some important factors that affect monetary transmission mechanism within an economy are not considered or measurable. For example, Lättemäe (2003) was of the opinion that there was no direct measure for the expectations channel.

Furthermore, there is a dearth of research incorporating structural breaks within the monetary transmission process, especially in Nigeria. Extant literature on monetary transmission mechanism (Olowofeso et al., 2014; Ogun and Akinlo, 2010; Chuba, 2015; Kelikume, 2014; Kyari and Chenbap, 2015)[2] in Nigeria did not include structural breaks within their methodological framework. The inclusion of structural breaks in monetary policy formulation and transmission is methodologically imperative since it captures periods of structural or policy shift within the monetary formulation and transmission process[3]. In addition, this study will examine the channels of money transmission within a structural vector autoregressive (SVAR) framework. The rationale for using the SVAR method is due to its superiority in identifying and understanding the economic relationships among the observed variables. In light of the above, it becomes expedient to examine how monetary policy channels are influenced by aggregate macroeconomic variables and to establish which channel(s) is/are more dominant on economic activity in Nigeria. This is with the view to improve the frontier of knowledge on monetary transmission mechanism in Nigeria[4]. In essence, the objective of this study is to examine how the five different monetary policy channels respond to macroeconomic shocks within the economy and to establish the dominant monetary policy channel on output for Nigeria using a structural break and SVAR approach.

EMPIRICAL ISSUES ON MONETARY TRANSMISSION MECHANISM

This paper provides a summary of previous empirical studies on monetary transmission mechanism in developed and developing economies. Many attempts have been made to examine monetary transmission mechanism. These studies made use of VAR methods and variables such as credit to the private sector, the policy rate, exchange rate, all-share index and consumer price index as proxies for the credit channel, interest rate channel, exchange rate channel, asset price channel and expectations channel respectively. These variables

[1] Romer and Romer (1990), Lattemae (2003), Sinclair (2004), Vymyatnina (2005), Dabla-Norris and Floerkemeier (2006), Aslanidi (2007), Tuano-Amado, Glindro and Claveria (2009), Ogun and Akinlo (2010), Cevik and Teksoz (2012), Mishra and Montiel (2012), Montiel (2015), Olteanu (2015), and Williams and Robinson (2016).

[2] Ogun and Akinlo (2010), Okaro (2011), Nwosa and Saibu (2012), Bernhard (2013), Bature (2014), Kelikume (2014), Olowofeso, Bada, Bassey and Dzaan (2014), Chuba (2015), Hassan (2015), Kyari and Chenbap (2015), Obafemi and Ifere (2015), Lucky and Uzah (2017). Please visit section two for the outcomes of these papers.

[3] Periods of structural or policy shifts may be due to a change in government such as the 1999 change to a democratic rule, periods of the 2008 financial crisis, or the bank capitalization and consolidation policies. These periods affected monetary formulation and implementation. The structural break point test will be used to model structural break within the paper.

[4] Okaro (2011), Bernhard (2013), Bature (2014) and Hassan (2015), and Apanishile (2016). These studies however did not consider the impacts of aggregate macroeconomic variables on the transmission process and the impacts of structural breaks in their methods.

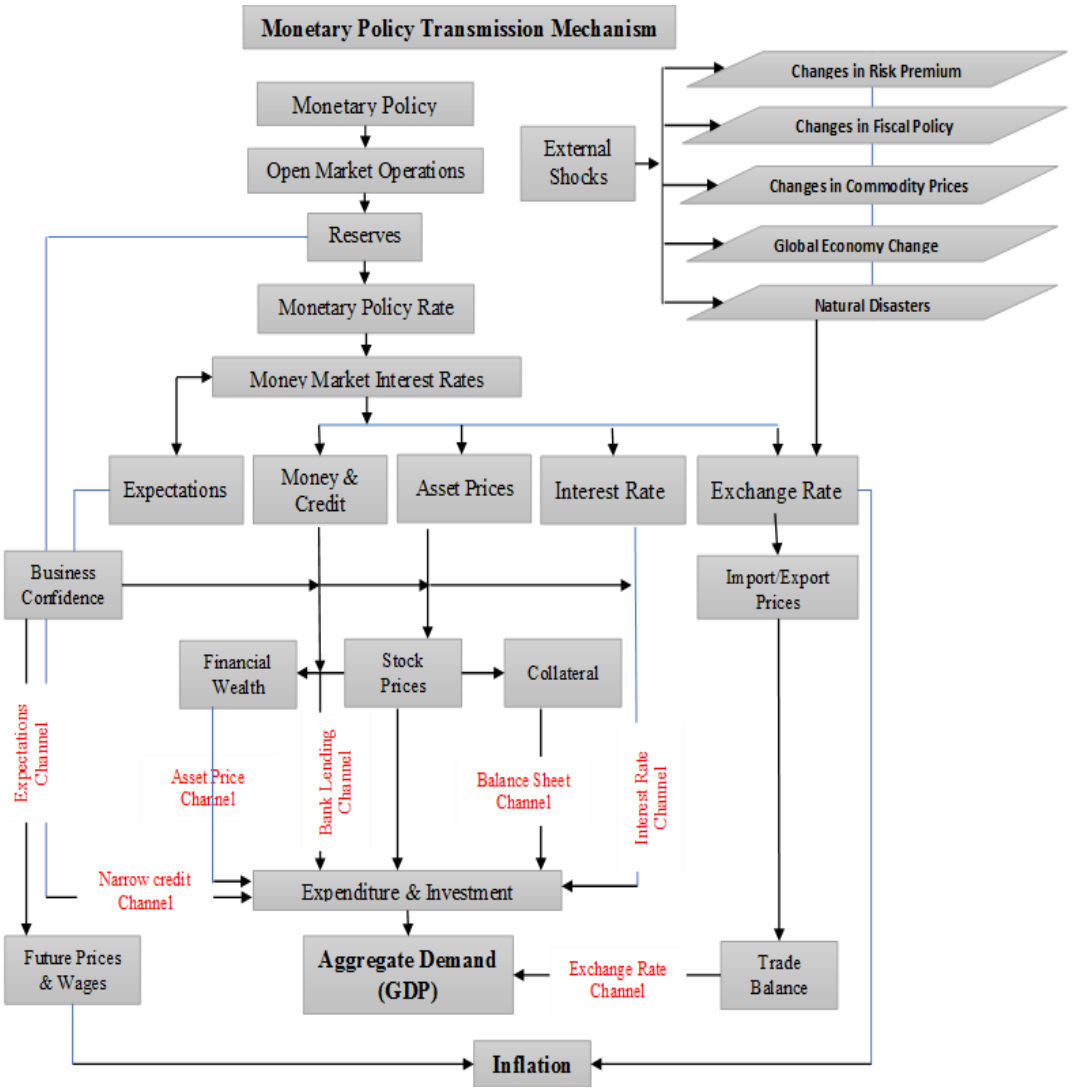

Figure 1. Monetary transmission mechanism.
Source: Adapted from European Central Bank (2016).

served as aggregate macroeconomic variables used to represent each channel of monetary policy. Some of the earliest works were provided by Romer and Romer (1990). Their study did not find any evidence of a narrow lending point of view for the US. The paper therefore concluded that monetary policy has little influence on bank lending due to the fact that banks have alternative means of sourcing funds. Kuttner and Mosser (2002) also found a similar outcome for the US. However, Vymyatnina (2005) found that the interest rate channel and exchange rate channels were channels through which monetary policies could be transmitted into the economy of Russia, while Apergis et al. (2012) found out that output and inflation expectations affected the European Central Bank's decision in achieving the target rate, thereby affecting lending within Europe. Finally, Fu and Liu (2015) in China found out that asymmetric effect existed when examining the monetary policy channel while there were no asymmetric effects when examining the credit channel.

In developing economies, Loayza and Schmidt-Hebbel (2002) found the interest rate channel to be the most dominant channel on output for Chile. This outcome was further boosted by studies such as Lattemae (2003), Aslanidi (2007), and Maturu and Ndirangu (2013) since they also found the interest rate channel to be the dominant channel on output for the economies of Estonia, Thailand and Kenya respectively. However, Sinclair (2004) was of the view that there were doubts on the existence of the interest rate channel in developing countries. This outcome was further reinforced by Dabla-Norris and Floerkemeier (2006) in Armenia and Aslanidi (2007) in CIS-7 countries, since their studies also found the interest rate channel to be very weak. On the

contrary, Aleem (2010) found the credit channel to be more dominant on the economy of India. This outcome was further supported by Mishra et al. (2012) and Montiel (2015) for low income countries, while studies such as Mishra and Montiel (2012), Davoodi et al. (2013) gave inconclusive outcomes on monetary transmission mechanism for developing economies.

In another twist, studies such as Montiel (2013) and Gitonga (2014) found out that the policy rate exerted a weaker influence on output and prices for Uganda and Kenya respectively, while studies such as Jeon and Wu (2014) for seven Asian economies and Engler and Giucci (2015) for Moldova found that monetary transmission mechanism improved the economies of the aforementioned countries. In Nigeria, empirical studies such as Okaro (2011), Bature (2014) and Hassan (2015) found the credit channel as a very important channel of money transmission; while Bernhard (2013) and Apanisile (2016) found interest rate channel to be more dominant on output. However, Nwosa and Saibu (2012) found the interest rate and exchange rate channels as more dominant on influencing output, while Obafemi and Ifere (2015) found the interest rate and credit channel as the most dominant channels on output in Nigeria. In light of the above reviews, it is evident that monetary transmission mechanism has been a topic of discussion over the past decades; however, most of these studies majorly focus on monetary transmission mechanism and its effectiveness on real economic activity. This study will further improve this discussion by checking the impact of aggregate macroeconomic variables on monetary transmission mechanism, incorporating structural breaks in validating monetary transmission mechanism and establishing the dominant monetary policy channel on output in Nigeria.

DATA AND METHODOLOGY

This paper applied quarterly data series from 1986 to 2017 on private sector credit, consumer price index, monetary policy rate, exchange rate, all share index and real output. These data were sourced from the Central Bank of Nigeria's (CBN) Statistical Bulletin (2017). The rationale for selecting the CBN statistical bulletin was due to its reliability and the availability of quarterly data to estimate the economic relationship among the cited macroeconomic variables. The rationale for choosing quarterly data was because they are appropriate in estimating models that incorporates structural breaks, since the periods of policy shift are better identified within a quarterly framework. Furthermore, this paper adopts a VAR approach to investigating monetary transmission mechanism in Nigeria. However, VAR models do not allow for the identification of the existing or underlying relationships that exist among the variables and hence, the structural form of the model may not be identified. An alternative framework which imposes restrictions on the range of economic relationships among the variables is the SVAR framework. This paper uses the SVAR framework in modeling monetary transmission mechanism in Nigeria in line with the underlying relationships among the variables. The restrictions that were imposed in identifying these relationships were in line with earlier studies such as Sims (1992), Christiano et al. (1999) and Davoodi et al. (2013).

The restrictions imposed in equation 1 require the policy rate to be the first variable within the model because it is the anchor through which monetary policy is transmitted into the economy. Next are private sector credits. This is because following a monetary policy shock, commercial banks delay their granting of loans by changing the loan terms (Christiano et al., 1999). Hence, credits are influenced by the policy rate. Furthermore, exchange rate is placed after the private sector credit because exchange rate responds to innovations in macro-fundamentals contemporaneously (Davoodi et al., 2013). Also, the all-share index responds to the above macro-economic variables contemporaneously, while inflation and output responds to shocks/innovations in monetary policy, private sector credit, exchange rate and all-share index simultaneously.

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{21} & 1 & 0 & 0 & 0 & 0 \\ \alpha_{31} & \beta_{32} & 1 & 0 & 0 & 0 \\ \alpha_{41} & \beta_{42} & \delta_{43} & 1 & 0 & 0 \\ \alpha_{51} & \beta_{52} & \delta_{53} & \lambda_{54} & 1 & 0 \\ \alpha_{61} & \beta_{62} & \delta_{63} & \lambda_{64} & \partial_{65} & 1 \end{bmatrix} \begin{bmatrix} u_t^{int} \\ u_t^{cch} \\ u_t^{exc} \\ u_t^{asp} \\ u_t^{p} \\ u_t^{y} \end{bmatrix} = \begin{bmatrix} \alpha_{11} & 0 & 0 & 0 & 0 & 0 \\ 0 & \beta_{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & \delta_{33} & 0 & 0 & 0 \\ 0 & 0 & 0 & \lambda_{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & \partial_{550} & 0 \\ 0 & 0 & 0 & 0 & 0 & \varphi_{66} \end{bmatrix} \begin{bmatrix} \varepsilon_t^{int} \\ \varepsilon_t^{cch} \\ \varepsilon_t^{exc} \\ \varepsilon_t^{asp} \\ \varepsilon_t^{p} \\ \varepsilon_t^{y} \end{bmatrix} \quad (1)$$

ANALYSIS AND PRESENTATION OF RESULTS

Presentation of results

The descriptive statistic results in Table 1 showed that the mean and median values lie within their maximum and minimum values showing a good level of consistency, while interest rate displayed the least variability. The skewness statistics revealed that all the variables were positively and negatively skewed, while the kurtosis statistic all exceeded three, meaning that the series follows a leptokurtic distribution. The correlation matrix results in Table 2 showed that each variable was weakly correlated to each channel of monetary policy. Furthermore, this paper adopted both the Zivot-Andrews (1992) and Perron (2006) unit root tests in line with ADF and PP statistics since it incorporates structural breaks within the framework. The results in Table 3 confirm that the variables were stationary in their level form based on the evidences from the unit root tests. For the purpose of the analysis, the Perron (2006) structural break test results[5] were considered due to its superiority over other methods. Finally, the study also chose a lag length of one

[5] Interest Rate – the 1992Q1 selected break point coincided with the period of interest rate liberalization.
Exchange Rate – 1999Q1 coincided with the period exchange rates were liberalized and the economy introduced the Interbank Foreign Exchange Market (IFEM) to deepen the exchange rate market and manage exchange rate fluctuations.
Inflation – In 1996, financial liberalization and deregulation policies were introduced to control high inflation rates during the military regime.
All-Share Index – The 2008 financial crises affected the performance on the nation's bourse crashing by a whooping 84% year on year.
Private Sector Credits – Private sector credits improved by a whopping 11% but its ratio to GDP reduced by 0.61% due to a rise in GDP figures by 7% year on year.
GDP – The break point test showed that improved output conditions were largely driven by improved agricultural produce (a rise by 10%) and improved domestic borrowing totaling about 19.6% of GDP.

Table 1. Descriptive characteristics of the variables.

	GDP	INT	CCH	EXC	ASP	IEC
Mean	145.9346	0.0165	371.1731	2.4010	295.1514	0.0789
Median	0.7124	0.0000	24.2912	0.0694	146.9130	-0.3000
Maximum	15154.65	5.5000	21922.70	94.5888	12535.77	43.2000
Minimum	-2540.978	-12.5	-1969.748	-7.6729	-15437.95	-43.80
Std. Dev.	1423.522	1.8794	2096.934	10.6523	2976.202	7.9830
Skewness	9.2289	-1.7642	8.9523	6.8826	-1.2098	-0.5895
Kurtosis	99.1201	18.7614	90.2381	54.6772	12.7926	22.6069
Jarque-Bera	50692.92	1380.446	41968.56	15134.26	538.4251	2041.624
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sum	18533.70	2.1000	47138.98	304.9317	37484.23	10.0261
Sum Sq. Dev.	2.55E+08	445.0698	5.54E+08	14297.49	1.12E+09	8029.736
Observations	127	127	127	127	127	127

GDP represents Real Economic Activity/Output, ASP represents Asset Price Channel, CCH represents Credit Channel, EXC represents Exchange Rate Channel, IEC represents Inflation Expectation's Channel, INT represents Interest Rate Channel.
Source: Author's Compilation from Eviews (2017).

Table 2. Correlation matrix.

VAR	DGDP	DINT	DCCH	DEXC	DASP	DIEC
DGDP	1					
DINT	-0.2204	1				
DCCH	-0.0955	0.0160	1			
DEXC	0.0613	0.0614	0.3758	1		
DASP	0.0506	0.0342	-0.1454	-0.1409	1	
DIEC	-0.0027	0.0891	0.0139	0.0428	-0.0342	1

GDP represents Real Economic Activity/Output, ASP represents Asset Price Channel, CCH represents Credit Channel, EXC represents Exchange Rate Channel, IEC represents Inflation Expectation's Channel, INT represents Interest Rate Channel.
Source: Author's Compilation from Eviews (2017).

based on the Akaike and Schwarz criteria in Table 4.

Figure 2 presents the estimated impulse response function for ten quarters. From Figure 2 (1), the result showed that a standard deviation shock originating from interest rates leads to a positive response on interest rate channel up to the third quarter. However, this shock dies out over the long term, that is, from the fourth to tenth quarter. For private sector credits, a standard deviation shock originating from private sector credits leads to a slightly positive response on interest rates between the first and third quarters. However, this response vanished over the long run since the interest rate channel did not respond to a standard deviation shock generated from private sector credits. The results of asset prices, inflation expectations and output are in line with the results generated from private sector credits. However, a standard deviation shock originating from exchange rate led to a slightly positive response on interest rate channel up to the fourth quarter, but this vanished over the long term. A major reason for this outcome may be due to the incorporation of structural break within the formulation of the analysis. The implication of this result is that the shocks derived from these variables only affect interest rate in the short term. However, in the medium to long run, these shocks vanish and the unresponsive nature of interest rate channel to shocks among the independent variables over the long run become permanent for Nigeria.

Figure 2 (2) displayed the impulse response function for private sector credits within the model. The result showed that a standard deviation shock emanating from interest rates, exchange rate, inflation expectations and output led to a slightly positive response on private sector credits for the first three quarters. However, these shocks vanished over the medium to long term since the credit channel did not respond to shocks among these variables. That is, the results show that the credit channel is affected contemporaneously by the shocks from past

Table 3. Unit root test.

Augmented Dickey Fuller and Phillip-Perron	ADF		PP		Status
Variable	**T-Stats**	**P value**	**T-Stats**	**P value**	
GDP	-10.8287	(0.0000)***	-10.831	(0.0000)***	I(0)
INT	-10.5762	(0.0000)***	-11.1052	(0.0000)***	I(0)
CCH	5.428	(0.0000)***	-10.7644	(0.0000)***	I(0)
EXC	-9.9974	(0.0000)***	-9.9622	(0.0000)***	I(0)
ASP	-6.5363	(0.0000)***	-6.6147	(0.0000)***	I(0)
IEC	-7.1342	(0.0000)***	-10.8687	(0.0000)***	I(0)

Zivot Andrews and Perron test	ZA		Perron		Status
	T-Stats	**Break Point**	**T-Stats**	**Break Point**	
	(-11.3326)***	2012Q4	(-11.3231)***	2012Q4	I(0)
INT	(-7.8123)***	1993Q1	(-7.8445)***	1992Q1	I(0)
CCH	(-9.2977)***	2011Q3	(-11.4396)***	2012Q4	I(0)
EXC	(-10.3665)***	2002Q4	(-11.8348)***	1999Q1	I(0)
ASP	(-7.3638)***	2008Q2	(-8.0646)***	2008Q4	I(0)
IEC	(-11.2029)***	1996Q1	(-12.3461)***	1996Q1	I(0)

Source: Author's Compilation from Eviews (2017).
The ZA critical value with intercept are -5.34(1%), -4.93(5%) and -4.58(10%). The Perron critical value with intercept are -5.92(1%), -5.23(5%) and -4.92(10%). ***, ** and * denote significance at 1, 5 and 10% levels, respectively.

values of these variables in the short run but vanishes over the medium to long term. Furthermore, shocks originating from private sector credits influenced it positively for the first three quarters, but the response vanished over the medium to long term. Finally, shocks emanating from asset prices influenced the credit channel of monetary policy negatively for the first four quarters. However, these shocks die out over the medium to long term.

Figure 2 (3) shows the impulse response function for exchange rates in Nigeria. From Figure 2 (3), a standard deviation shock arising from interest rates, private sector credits and exchange rate affected exchange rate positively and led to an appreciation in foreign exchange for the first four quarters, while this shock vanished over the medium to long term. However, a standard deviation shock arising from inflation influenced exchange rates positively for the first three quarters and led to an appreciation in foreign exchange, while this shock vanished over the medium to long run. In contrast, a standard deviation shock arising from asset prices and output negatively influenced exchange rates for the first five and three quarters. However, these shocks vanish over the long term in both cases. The implication of this result is that the shocks derived from these variables only affect exchange rate in the short term. However, in the medium to long run, these shocks vanish and the unresponsive nature of exchange rate channel to shocks among the independent variables over the long run becomes permanent for Nigeria.

Figure 2 (4), shows the response of asset prices to a standard deviation shock within the model. A standard deviation shock derived from interest rates would slightly improve asset prices for the first four quarters. However, this shock vanished over the medium to long term. Furthermore, a standard deviation shock derived from private sector credit negatively influenced asset prices in the first quarter, while this shock became positive between the second and fourth quarters. However, asset prices became unresponsive to shocks from private sector credit over the long term. Also, shocks derived from exchange rate, inflation and GDP had a negative influence on asset prices between the first five quarters. However, asset prices became unresponsive to these shocks over the long term. Finally, shocks derived from asset prices influenced asset prices positively from the short to medium term, before dying out over the long term. The implication of this result is that the shocks derived from these variables only affect asset prices in the short to medium term. However, in the long term, the unresponsive nature of asset price channel to shocks among the independent variables becomes permanent for Nigeria.

Figure 2 (5), displays the response of inflation expectations as a result of a standard deviation shock within the model. A standard deviation shock emanating from interest rate, private sector credits, exchange rate, inflation and output affected inflation expectations positively for the first three quarters only. However, these shocks on inflation expectations vanish over the long

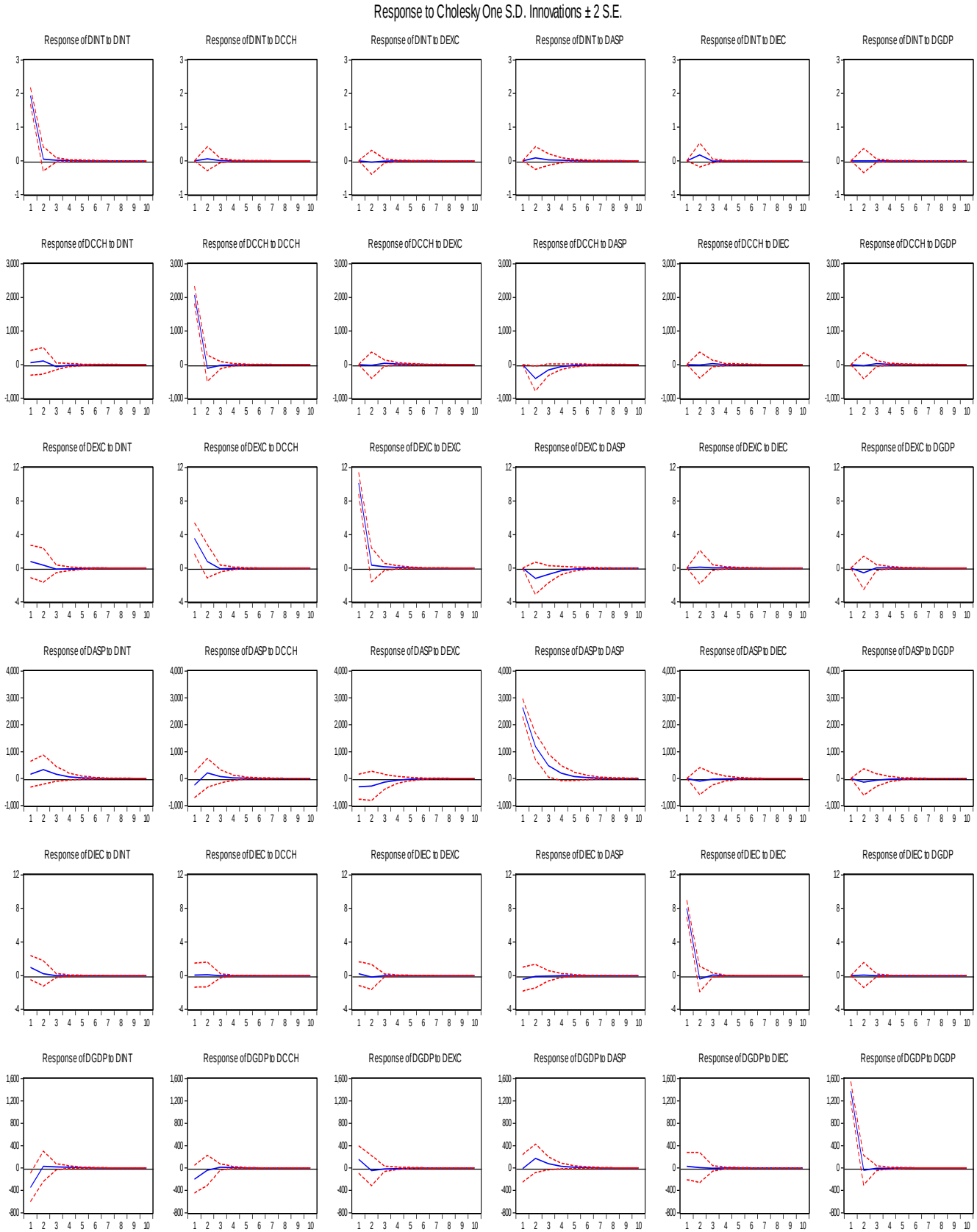

Figure 2. Impulse response function for monetary transmission mechanism in Nigeria.
Source: Author's Compilation from Eviews (2017).

term. This implies that the expectations channel of monetary policy became unresponsive to shocks among the independent variables within the model. Finally, shocks emanating from asset prices slightly influenced inflation expectations negatively between the first two quarters, but this shock had no effect on inflation expectations between the third and tenth quarter. The implication of this result is that the shocks derived from these variables only affect inflation expectations channel of monetary policy in the short term. However, in the long term, the unresponsive nature of inflation expectations channel of monetary policy to shocks among the independent variables becomes permanent for Nigeria.

Figure 2 (6), displays the response of output to standard deviation shocks within the model. A standard deviation shock originating from interest rate and private sector credits negatively influenced output for the first two quarters and slightly influenced it positively for the next quarter. On the contrary, a standard deviation shock originating from these two variables had no influence on output over the medium to long run. In contrast, shocks emanating from exchange rate were initially positive for the first two quarters, while it became negative in the third quarter. However, shocks emanating from exchange rate vanished over the long term on output. Shocks derived from asset prices positively influenced output for the first four quarters. However, this influence vanished over the long term. Finally, shocks derived from inflation and GDP were positive on output for the first three quarters, however the effect of these shocks vanished over the long term. A major reason for this outcome may be due to the incorporation of structural break within the formulation of the analysis. The implication of this result is that the shocks derived from these variables only affect output in the short run. However, in the medium to long run, the unresponsive nature of output to shocks among the independent variables becomes permanent for Nigeria.

The variance decomposition result in Table 5 showed that innovations originating from the interest rate channel itself caused the greatest shock to its future value. That is, interest rate was the single source of shock on its future value in the first quarter, while it had approximately 99% shock on itself up to the tenth quarter. Exchange rate, private sector credits, asset prices, inflation as well as output account for the minor portion of shocks present on interest rates for Nigeria. The second largest source of innovations that influenced interest rates came from inflation, which accounts for about 0.78% between the second and tenth quarter. The third largest source of interest rate shocks came from asset prices and its value stood at 0.18% in the second quarter and rose marginally to about 0.21% by the tenth quarter. However, private sector credits, exchange rates and output served as the fourth, fifth and sixth source of variation in interest rates, as their values stood at 0.09, 0.06 and 0.0003% by the tenth quarter.

For the credit channel, the variance decomposition results in Table 5 showed that innovations originating from private sector credits caused the greatest shock to its future value. That is, private sector credits had the highest shock on its future value by 99.9% in the first quarter; however, this slightly reduced to about 94.98% between the sixth and tenth quarter. The remaining percentage shocks are explained by other macroeconomic variables within the model. The second largest source of variation influencing private credits was asset prices. It was 3.91% in the second quarter, and slightly rose to 4.5% between the fourth and tenth quarter. Interest rate and exchange rate served as the third and fourth sources of shocks affecting the credit channel within the model. Their values stood at 0.31 and 0.0083% respectively in the second quarter and rose slightly to about 0.40 and 0.05% by the tenth quarter. However, output and inflation served as the fifth and sixth sources of variation influencing the credit channel in the second quarter through the tenth quarter as their values respectively stood at 0.0291 and 0.0044% in the second quarter and slightly increased to 0.05 and 0.02% by the tenth quarter.

For exchange rate channel, the variance decomposition results in Table 5 showed that innovations originating from exchange rate itself caused the greatest shock to its future value; however, this dominance diminished slightly over the long term. That is, exchange rate had the dominant shock on its future value in the first quarter by about 89%, while its value dropped to approximately 86.2% between the fifth to tenth quarter. The second largest source of variation on exchange rates is private sector credits. Its value was as high as approximately 11% between the first and tenth quarter, while the third largest source of variation in exchange rates came from asset prices. A shock on asset prices would have no impact on exchange rates in the first quarter; however, this value slightly rose to 1.75% by the fourth quarter and 1.77% between the fifth to tenth quarter. This is the fourth largest source of variation in exchange rates from interest rate. The shock derived from interest rate influenced exchange rate by 0.54% in the first quarter, while it slightly increased to 0.64% between the fourth to tenth quarter. The fifth and sixth sources of variation in exchange rate came from output and inflation. A shock on output led to 0.27% change in exchange rates from the second quarter to the tenth quarter. Finally, inflation had no impact whatsoever on exchange rates in the first quarter but this changed from the second quarter as it had 0.014% impact on exchange rates. However, this value slightly rose to 0.017% between the third to tenth quarter.

For asset price channel, the results in Table 5 showed that innovations originating from asset prices caused the greatest shock to its future value. This value was as high as about 98% in the first quarter but this reduced to 94.6% between the fourth to tenth quarter. The second largest source of variation in asset prices is exchange

Table 4. Lag length criteria.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-5297.08	NA	5.65e+29	85.53358	85.67005	85.58902
1	-4468.54	1563.540	1.59e+24*	72.75064*	73.70590*	73.13869*
2	-4435.15	59.77726*	1.66e+24	72.79275	74.56680	73.51341
3	-4413.69	36.33935	2.12e+24	73.02731	75.62015	74.08058
4	-4391.87	34.84053	2.72e+24	73.25603	76.66766	74.64192

Source: Author's Compilation from Eviews (2017).
Note: * indicates lag order selected by the criterion; LR, FPE, AIC, SBC and HQ indicate sequential modified LR test statistic, Final Prediction Error, Akaike Information Criterion, Schwarzt Bayesian Information Criterion and Hannan-Quinn respectively.

Table 5. Forecast error variance decomposition results for output.

	Period	INT	LCCH	EXC	LASP	IEC	LGDP
INT	1	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	4	98.8554	0.09301	0.0603	0.2087	0.7823	0.0004
	7	98.8543	0.0931	0.0604	0.2097	0.7823	0.0004
	10	98.8543	0.0931	0.0604	0.2097	0.7823	0.0004
CCH	1	0.0658	99.9342	0.0000	0.0000	0.0000	0.0000
	4	0.3947	94.9966	0.0520	4.4883	0.0212	0.0472
	7	0.3966	94.9775	0.0533	4.5041	0.0212	0.0473
	10	0.3966	94.9774	0.0533	4.5042	0.0212	0.0473
EXC	1	0.5392	10.7770	88.6838	0.0000	0.0000	0.0000
	4	0.6415	11.0091	86.3045	1.7545	0.0171	0.2733
	7	0.6431	11.0074	86.2891	1.7698	0.0171	0.2735
	10	0.6431	11.0074	86.2891	1.7698	0.0171	0.2735
ASP	1	0.3505	0.8023	1.3093	97.5378	0.0000	0.0000
	4	1.7980	1.1917	2.0698	94.6052	0.1072	0.2281
	7	1.8056	1.1925	2.0741	94.5917	0.1072	0.2288
	10	1.8056	1.1925	2.0742	94.5917	0.1072	0.2288
IEC	1	1.4225	0.0048	0.0828	0.2884	98.2015	0.0000
	4	1.5067	0.0306	0.1223	0.2967	98.0383	0.0053
	7	1.5067	0.0306	0.1223	0.2967	98.0382	0.0053
	10	1.5067	0.0306	0.1223	0.2967	98.0382	0.0053
GDP	1	5.7710	1.9039	1.1173	0.0031	0.0487	91.1559
	4	5.7126	1.9623	1.2226	1.7302	0.0508	89.3215
	7	5.7130	1.9623	1.2232	1.7399	0.0508	89.3107
	10	5.7130	1.9623	1.2232	1.7399	0.0508	89.3107

Source: Author's Compilation from Eviews (2017).
Where: GDP represents Real Economic Activity/Output, ASP represents Asset Price Channel, CCH represents Credit Channel, EXC represents Exchange Rate Channel, IEC represents Inflation Expectation's Channel, INT represents Interest Rate Channel.

rate. It accounted for about 1.31% in the variations affecting asset prices in the first quarter, but marginally rose to 2.07% between the fourth to tenth quarter. Interest rate and private sector credits served as the third

and fourth sources of variation in asset prices during the period under observation. Their figures were as low as 0.35 and 0.80% respectively in the first quarter, but these values slightly increased approximately to 1.8 and 1.19% between the fourth and tenth quarter. Lastly, output and inflation served as the fifth and sixth sources of variation in asset prices. These two variables did not influence asset prices in the first quarter but slightly influenced asset prices by approximately 0.23 and 0.11% between the fourth to tenth quarter.

For inflation expectations, the variance decomposition results in Table 5 showed that innovations originating from inflation itself contributed to the largest shock on its future values. This value was as high as approximately 98% over the long run. The second and third largest source of variation on the future values of inflation expectations are interest rates and asset prices. Interest rates accounted for about 1.42% in the first quarter on inflation and these values slightly increased to 1.51% between the fourth to tenth quarter. On the contrary, asset prices accounted for about 0.29% in the variations on inflation expectations in the first quarter, but these figures slightly increased to about 0.30% in the variations on inflation between the fourth to tenth quarter. The fourth and fifth largest source of variation in the future values of inflation expectations are exchange rate and private sector credit. Exchange rate accounted for about 0.08% in the first quarter and these values slightly increased to 0.12% between the fourth to tenth quarter, while private sector credit accounted for 0.0048% in the variations in inflation expectations. However, these values slightly increased to about 0.03% between the fourth to tenth quarter. The final variable to cause a shock on the future values of inflation is output. It had no impact on inflation expectations in the first quarter but this slightly increased to 0.0053% between the fourth to tenth quarter.

The variance decomposition results in Table 5 showed that innovations originating from GDP caused the greatest shock on its future value. That is, GDP explained about 91% of its future values in the first quarter. However, these values slightly reduced to 89% between the fourth and tenth quarter. The second largest source of variation on output is interest rate. It accounted for about 6% shocks on the future values of output over the long term. Private sector credit and asset prices accounted for the third and fourth largest sources of variation in output during the period under investigation. Private sector credit caused about 1.90% shock on output in the first period, while the value slightly increased to 1.96% between the fourth to tenth quarter. As earlier mentioned, asset prices accounted for the fourth largest source of variation in output during the period. It increased from 0.0031% in the first quarter to 1.74% between the fifth to tenth quarter. The fifth and sixth sources of variations in the future values of output were exchange rate and inflation. Their values were 1.12 and 0.049% respectively in the first quarter, while their values slightly increased by approximately 1.22 and 0.05% respectively between the fourth to tenth quarter.

DISCUSSION

From the above analysis, the impulse response results showed that a standard deviation shock originating from the observed macroeconomic variables only had a short-term impact on each monetary policy channel. In the long term, this impact vanishes, implying that standard deviation shocks affect monetary transmission mechanism and output only in the short term as earlier indicated in the body of the work. A plausible reason for this may also be due to the incorporation of structural break within the estimated model. The variance decomposition results demonstrated that innovations originating from a variable itself caused the greatest shock on its future values, while other macroeconomic variables constitute the minor innovations influencing each monetary policy channel. This outcome is plausible since the stakeholders within the monetary policy formulation and implementation process set different targets for each macroeconomic indicator. Take for instance, while the policy rate serves as the anchor on other interest rate variables, exchange rate policies have been used to manage the country's exchange rate system, while the fear of a default have affected banks' ability to create more loans, hence giving loans only to its trust worthy customers. The performance on the nation's bourse – the all-share index – has also been affected by speculations within capital market activities, while expectations on future outcomes have affected prices within the economy.

In order to establish the dominant channel of monetary policy on output, the forecast error variance of each monetary policy channel on output and prices was quantitatively weighed. Observing from Table 5, it can be deduced that the interest rate channel was more prominent than any other channel of monetary policy on output. This was followed by the credit channel, which was closely followed by the asset price channel. The fourth and fifth dominant channels of monetary policy on output were exchange rate channel and inflation expectation's channel. By implication, it can be suggested that with the consideration of structural breaks, interest rate channel is the dominant monetary policy channel on output for Nigeria. This result is in line with previous studies that also found interest rate channel to be the dominant channel of monetary policy on output both in developed countries (Romer and Romer, 1990; Vymyatnina, 2005), developing countries (Loayza and Schmidt-Hebbel, 2002; Lättemäe, 2003; Tuano-Amado et al., 2009; Maturu and Ndirangu, 2013; Gitonga, 2014; Hai and Trang, 2015) and Nigeria (Nwosa and Saibu, 2012; Bernhard, 2013; Obafemi and Ifere, 2015; Apanisile,

2016).

Finally, while monetary policy transmission seemed to function as expected in Nigeria, there is little evidence that it is able to exert powerful influence on output over the period. This is because this influence was found to be very weak since they only comprised a combined 9 to 11% on the future values of output. This outcome was in line with previous works by Kuttner and Mosser (2002) in the US and Montiel (2013) for Uganda. Consequently, an increase in money supply reduces interest rates, which reduces the cost of borrowing for firms and consumers. This leads to increased consumption as well as investment. By implication, increased consumption and investment raises aggregate demand, output and finally the aggregate price level.

CONCLUSION AND POLICY RECOMMENDATION

This study examined monetary transmission mechanism in Nigeria using an SVAR framework. Data on aggregate variables such as private sector credit, the policy rate, exchange rate, all-share index and consumer price index were used as proxies for the credit channel, interest rate channel, exchange rate channel, asset price channel and expectations channel respectively. The study found a significant standard deviation real effect on each monetary policy channel in the short term, while it also found that innovations arising from a channel itself caused the greatest shock on its future values. Furthermore, the study demonstrated that each monetary policy channel had a weak influence on output, with interest rate channel being the dominant channel of monetary policy on output. A major observation from this outcome was that it was in line with the theoretical expectation on monetary policy transmission mechanism since it affirms that the interest rate channel (the traditional channel) was superior in improving real economic activity in Nigeria and therefore, this channel must continue to be targeted as the major policy anchor through which monetary policy impulses are transmitted into the economy.

As a result, improving monetary policy efficiency on output will require further regulatory reforms and the strengthening of monetary policy implementation. Moreover, the monetary authorities can adopt some short-term measures to mitigate shocks and strengthen both interest rate and exchange rate channels, while the credit channel can be strengthened by tightening creditworthiness standards, strengthening accounting standards, tightening bankruptcy laws and improving corporate governance structure. These can also be done by improving bank credit assessment capabilities and strengthening the judicial system to improve the ability of banks to enforce collaterals (Nwosa and Saibu, 2012). Finally, to ensure monetary policy effectiveness through the asset price and inflation expectation channels, the monetary authorities should maintain a strong and financially sound capital market, while they maintain a low and stable inflation rate in order to improve these channels. For future considerations, monetary transmission mechanism may be examined at the micro level for Nigeria.

CONFLICT OF INTERESTS

The authors declared that they have no conflicts of interest.

REFERENCES

Aleem A (2010). Transmission Mechanism of Monetary Policy in India. Journal of Asian Economics 21(1): 186-197.

Apanisile OT (2016). Dynamic Stochastic General Equilibrium Approach to Monetary Policy Analysis and Channels of Transmission in Nigeria. An unpublished PhD. Thesis Submitted to The Department of Economics, Obafemi Awolowo University, Ile-Ife,Nigeria.

Apergis N, Miller S, Alevizopoulou E (2012). The Bank Lending Channel and Monetary Policy Rules: Further Extensions. 2nd Annual International Conference on Accounting and Finance, Procedia Economics and Finance 2: 63- 72.

Aslanidi O (2007). The Optimal Monetary Policy and the Channels of Monetary Transmission Mechanism in Cis-7 Countries: The Case of Georgia. Centre for Economic Research and Graduate Education 171: 1 – 43.

Bature BN (2014). An Assessment of Monetary Policy Transmission Mechanisms in Nigeria. IOSR Journal of Humanities and Social Science (IOSR-JHSS) 19(3):54-59.

Bernhard OI (2013). Monetary Transmission Mechanism in Nigeria: A Causality Test. Mediterranean Journal of Social Sciences MCSER 4(13).

Central Bank of Nigeria (2011). "Understanding Monetary Policies Series, No 3 – The Central Bank of Nigeria Monetary Policy Framework. Central Bank of Nigeria, Nigeria.

Cevik S, Teksoz K (2012). Lost in Transmission? The Effectiveness of Monetary Policy Transmission Channels in the GCC Countries International Monetary Fund WP/12/191.

Christiano LJ, Eichenbaum M, Evans C (1999). Moneyary Policy Shocks: WhatHave We Learned and to What End? Handbook of Macroeconomics, eds. Michael Woodword, and John Taylor.

Chuba MA (2015). Transmission Mechanism from Exchange Rate to Consumer Prices in Nigeria. European Journal of Business and Social Sciences 4(3):110-126.

Dabla-Norris E, Floerkemeier H (2006). Transmission Mechanism of Monetary Policy in Armenia: Evidence from VAR Analysis. International Monetary Fund Working Paper *WP*/06/248.

Davoodi HR, Dixit S, Pinter G (2013). Monetary Transmission Mechanism in the East African Community: An Empirical Investigation. IMF Working Paper WP/13/39: 1-59.

Engler P, Giucci R (2015). The Transmission Mechanism in Moldova. Reasons for its Weakness and Recommendations for its Strengthening. Policy Paper Series 01:1-16.

Eviews 10 User Guide I and II (2017). Online: https://www.eviews.com

Fu Q, Liu X (2015). Monetary Policy and Dynamic Adjustment of Corporate Investment: A Policy Transmission Channel Perspective. China Journal of Accounting Research 8:91-109.

Gitonga MV (2014). Analysis of Interest Rate Channel of Monetary Transmission Mechanism in Kenya. Asian Society of Business and Commerce Research, International Journal of Business and Commerce 4(04): 38-67.

Hai BV, Trang TTM (2015). The Transmission Mechanism of Monetary Policy in Vietnam: A VAR Approach. Working Paper Series

IHEIDWP 15:1-35.
Hassan A (2015). Transmission Mechanism of Monetary Policy in Nigeria: Evidence from VAR Approach. An unpublished M.Sc. Thesis Submitted to Eastern Mediterranean University, Gazimağusa, North Cyprus.
Jeon BN, Wu J (2014). The Role of Foreign Banks in Monetary Policy Transmission: Evidence from Asia During the Crisis of 2008 to 2009. Pacific Basin Finance Journal 29(1):96-120.
Kelikume I (2014). Interest Rate Channel of Monetary Transmission Mechanism: Evidence from Nigeria. The International Journal of Business and Finance Research 8(4):97-108.
Kuttner KN, Mosser PC (2002). The Monetary Transmission Mechanism: Some Answers and Further Questions. Federal Reserve Bank New York Economic Policy Review, pp.15-26.
Kyari G, Chenbap R (2015). Inflationary Process Responsiveness to Monetary Policy Transmission Mechanism in Nigeria. ISERD, pp. 5-8.
Lättemäe R (2003). Monetary Transmission Mechanism in Estonia. Kroon and Economy No 1:58-67.
Loayza N, Schmidt-Hebbel K (2002). Monetary Policy Functions and Transmission Mechanism: An Overview. World Bank Working Papers *pp.* 1-20.
Lucky AL, Uzah CK (2017). Monetary Policy Transmission Mechanisms and Domestic Real Investment in Nigeria: A Time Series Study 1981-2015. International Journal of Economics and Financial Management 2(2):29-59.
Maturu B, Ndirangu L (2013). Monetary Policy Transmission Mechanism in Kenya: A Bayesian Vector Auto-regression (BVAR) Approach. Central Bank of Kenya (CBK) Technical Retreat, Naivasha pp. 1-55.
Mies V, Tapia M (2003). Monetary Policy and Transmission Mechanisms in Chile: has the Effect of Monetary Policy Changed in Time? Why? Central Bank of Chile, pp. 1- 38.
Mishkin FS (1995). Symposium on the Monetary Transmission Mechanism. Journal of Economic Perspectives 9(4):3-10.
Mishkin FS (2004). Economics of Money Banking and Financial Markets. 7th edition. Addison Wesley Series in Economics. USA.
Mishra P, Montiel P (2012). How Effective Is Monetary Transmission in Low-Income Countries? A Survey of the Empirical Evidence. International Journal of Business and Commerce 4:38-67.
Mishra P, Montiel PJ, Spilimbergo A (2012). Monetary Transmission in Low-Income Countries: Effectiveness and Policy Implications. IMF Economic Review 60(2): 270-302, Published by: Palgrave Macmillan Journals on behalf of the International Monetary Fund.
Montiel P (2013). The Monetary Transmission Mechanism in Uganda. International Growth Centre Working Paper, pp. 1-39.
Montiel PJ (2015). Monetary Transmission in Low-Income Countries: An Overview. Employment Working Paper 181: 1- 34.
Nwosa PI, Saibu MO (2012). The Monetary Transmission Mechanism in Nigeria: A Sectoral Output Analysis. International Journal of Economics and Finance 4(1):204-212.
Obafemi NF, Ifere EO (2015). Monetary Policy Transmission Mechanism in Nigeria: A Comparative Analysis. Research in World Economy 6(4):93-103.
Ogun TP, Akinlo AE (2010). The Effectiveness of Bank Credit Channel of Monetary Policy Transmission: The Nigerian Experience. African Economic and Business Review 8(2):15-29.
Okaro CS (2011). Transmission Mechanism of Monetary Policy in Nigeria. Journal of Economic and Finance, African Banking and Finance Review 1(2):1-19.
Olowofeso OE, Bada AS, Bassey KJ, Dzaan KS (2014). The Balance Sheet Channel of Monetary Policy Transmission: Evidence from Nigeria. CBN Journal of Applied Statistics 5(2):95-116.
Olteanu D (2015). Monetary Policy Effectiveness in Stimulating the CEES Credit Recovery. Journal for Financial Studies 19(3):8-24.
Perron P (2006). Dealing with Structural Breaks. Palgrave handbook of econometrics 1: 278-352. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/versions?
Romer CD, Romer DH (1990). "New Evidence on the Monetary Transmission Mechanism. Brookings Papers on Economic Activity 1:149-213.
Sims CA (1992). Interpreting the Macroeconomic Time Series Facts: The Effects of Monetary Policy. European Economic Review 36:975-1000.
Sinclair P (2004). The Transmission Mechanism of Monetary Policy in Transition and Developing Countries. Bank of England, pp.1-18.
Tuaño-Amador MC, Glindro ET, Claveria RA (2009). Some Perspectives on the Monetary Policy Transmission Mechanisms in the Philippines. Bangko Sentral Review 09, Working Paper Series 959:18-40.
Vymyatnina Y (2005). Monetary Policy transmission and Bank of Russia Monetary Policy. Working paper 02:1-24.
Williams C, Robinson W (2016). Evaluating the Transmission Mechanism of Monetary Policy in Jamaica: A Factor-Augmented Vector Autoregressive (FAVAR) Approach with Time Varying Coefficients. Bank of Jamaica Working Paper. pp.1-22.
Zivot E, Andrew DWK (1992). Further Evidence on the Great Crash, the Oil- Price Shock and the Unit Root Hypothesis. Journal of Business and Economic Statistics 10(3):251-270.

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A systematic and non-systematic approach to monetary policy shocks and monetary transmission process in Nigeria

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The study explores the impacts of systematic and nonsystematic monetary policy shocks and how they affect the monetary transmission process in Nigeria from 1986 to 2020 using quarterly data. The objective of the study was to improve the understanding of the systematic and non-systematic monetary shocks and how they affect the monetary transmission process in Nigeria. Data on variables such as monetary policy rate, all-share index, exchange rate, private sector credits, and inflation rate were used to investigate the impact of these shocks on monetary transmission channels. The study adopted methods such as unit root, historical decomposition as well as a non-linear Autoregressive Distributed Lag (NARDL) framework to carry out this investigation. The results showed that both the systematic and nonsystematic shocks influenced interest rate and expectations channels, while the negative systematic shocks influenced the credit channel. However, these shocks had no significant influence on exchange rate and asset price channels. The study was concluded by recommending that these channels should be well managed to avoid negative systematic and nonsystematic shocks to improve the monetary transmission process and foster a sound financial system in Nigeria.

Key words: Monetary policy, monetary transmission mechanism, systematic monetary shocks, nonsystematic monetary shocks, non-linear ardl, historical decomposition.

INTRODUCTION

The principal objective of this paper is to improve the understanding of the systematic and nonsystematic changes in monetary policy actions and how it affects monetary policy transmission in the Nigerian economy. The argument starts from the findings of previous studies on systematic and nonsystematic monetary policy. The first arguments are that monetary policy shocks explain very little volatility in output over the long term (for example Rosoiu, 2015; Arias et al., 2017). The second argument stems from the view that monetary policy shocks are endogenous, that is, determined by macroeconomic conditions within the economy (Bernanke et al., 1997; Giannone et al., 2002). Also, formulations of monetary policies and their reactions have been determined within a Structural Vector Autoregressive (SVAR) framework and some studies (McCallum, 1999; Primiceri, 2004; Gertler and Karadi, 2015; Arias et al., 2017) have shown that the nonsystematic portion of

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Table 1. Distinction between systematic and nonsystematic shocks.

		Policy maker	
		Systematic	**Nonsystematic**
Public	Anticipated	Known policy reaction function	Credible announcement of atypical policy reaction function
	Unanticipated	Surprise change to policy reaction function	Random shock to policy reaction function

Source: Adopted from Hoover and Jorda (2001).

monetary policy was also as important as the systematic monetary policies.

Furthermore, some studies such as Cochrane (1996), Bernanke et al. (1997), Clarida et al. (1998), McCallum (1999), and Giannone et al. (2002) have focused largely on the systematic changes to monetary policy and how they affect monetary policy decisions. They argue that nonsystematic changes to monetary policy do not matter. However, other prominent studies such as Lucas (1976), Hoover and Jorda (2001), and Primiceri (2004) were of the view that nonsystematic monetary policy is more effective in dealing with monetary policy shocks. One thing the above studies have in common is using SVAR models to determine monetary policy shocks and how they affect an economy. In principle, policy shocks can be identified within a VAR framework (Giannone et al., 2002); however, measurement problems and uncertainty make SVAR models difficult to interpret according to Christiano et al. (1999). Besides, the VAR literature has largely focused on nonsystematic shocks.

More recently, studies such as Gertler and Karadi (2015), Ramey (2016), Miranda-Agrippino and Ricco (2017), Andrade and Ferroni (2021), and Zhang (2021) have revisited the methodological issues surrounding monetary policy shocks. Ramey (2016) believed monetary policy shocks should have a zero mean and no evidence of serial correlation.

Gertler and Karadi (2015) used the changes in three-months-ahead federal funds futures contracts to highlight monetary policy shocks. Miranda-Agrippino and Ricco (2017) use asset price behavior to disentangle standard monetary policy surprises from information surprises. Andrade and Ferroni (2021) look at the impacts of macroeconomic conditions and news on future monetary policy shocks on the yield curve. Zhang revisited the effects of unconventional monetary policies using a longer-term euro futures measure on monetary policy decisions.

From the foregoing, the study looks at policy rules (reflecting systematic reaction) and policy shocks (reflecting nonsystematic reactions) and how they affect the monetary transmission mechanism within the Nigerian economy. The study deviates from others by focusing on the systematic and nonsystematic nature of monetary policy shocks using a different approach and investigates how this affects the monetary policy transmission process. The reason for accounting for systematic shocks in monetary policy transmission is that the structure of the Nigerian economy makes it more vulnerable to shocks since Nigeria is an import-dependent economy. Another explanation is that the size and frequency of shocks affecting the Nigerian economy can be better managed if we account for nonsystematic shocks.

Policy shocks are the random, nonsystematic component of the monetary authorities' actions. That is, the portion that is not related to the state of the economy (exogenous), while the systematic or predictable changes are endogenously determined (McCallum, 1999). Table 1 explains this distinction between the two kinds of monetary policy actions. It also shows that both the systematic and nonsystematic changes in the economy can be anticipated or not, depending on the policymakers and the public (Hoover and Jorda, 2001:119). Therefore, the study will investigate the impacts of systematic and nonsystematic monetary policy shocks and how they affect the monetary transmission process in Nigeria. The rest of the paper is organized as follows: section two discussed empirical issues, while section three discussed the methodology. Section four analyses and interprets the data while the final section concludes the paper with some policy recommendations.

Empirical issues in the Literature

This part of the study provides pieces of evidence from past works of literature regarding the interpretation of monetary policy shocks and how they affect monetary policy decisions within the economy. The literature on monetary policy shocks begins with an empirical examination of Lucas' (1972) critique whose study was of the view that the unsystematic component of monetary policy actions/reactions was important in conducting monetary policy formulations within an economy. Rosoiu (2015), on the impact of monetary policy transmission on key macroeconomic variables such as output, unemployment rate, and inflation within a VAR framework, found out that the impact of monetary policy shocks on output and prices dissipates over the long term. This confirms the notion that monetary policy rates cannot be used to influence the real economy over the long term. This view was also reinforced by Arias et al. (2017) whose study examined the effects of monetary policy

shocks within the SVAR framework. The study found monetary policy shocks to be contractionary during the period of great moderation, while it also found that increased policy rates led to a reduction in aggregate output.

Herrera and Pesavento (2007) empirically investigated the relationship between oil price shocks, systematic monetary policy, and the great moderation in the US. The result found that systematic monetary policy initially influenced economic activity in the 70s, but this changed as it did not influence the economy of the US after the great moderation. They concluded that the role of monetary policy in mitigating oil price shocks was smaller and that oil price shocks had a more significant influence on output compared to monetary policy. Similarly, Bernanke et al. (1997) also examined the systematic monetary policy and its relationship with oil price shocks. The study found out that monetary policy tightening tends to bring about oil price shocks and not the changes in oil price itself. The study was similar to Zeshan et al. (2019), whose study also examined the relationship between oil price shocks and monetary policy. However, their study found that a monetary policy tightening due to oil price shocks leads to output loss in Pakistan.

Giannone et al. (2002) were one of the early authors to track both the systematic and nonsystematic changes in monetary policy within the same econometric model. Their study revealed that macroeconomic variables within the economy are prone to be collinear and they recommend targeting a specific policy anchor conditional on different systematic and nonsystematic shocks rather than targeting multiple anchors unconditionally. Similarly, Mandler (2010) examined the systematic and unsystematic monetary policy shocks and how they affect the economy of the US. Their results show that the nonsystematic monetary policy shocks differ across different regimes. During high inflationary periods, their result corroborates previous studies; however, during low inflationary periods, the output does not respond to monetary policy shocks.

McCallum (1999) examined the monetary transmission mechanism and the importance of systematic monetary policy. The paper argues that to ascertain the monetary transmission mechanism process, more emphasis needs to be put on the systematic monetary policy. Similarly, Hoover and Jorda (2001) measured systematic monetary policy using a VAR framework. The study found the systematic portion of monetary policy to be very important in formulating monetary policies within an economy. However, Feldkircher and Huber (2018) examined unconventional monetary policies and their transmission into the economy due to shocks reducing interest rate spread. The study found out that reduced interest rate spread boosts lending in the US, while declined interest spreads boost lending via the credit channel.

Finally, the study also found the effect of a contractionary monetary policy to have a distinct pattern on the US economy.

Primiceri (2004) examined the systematic and nonsystematic monetary policy in the economy of the US. The study found that both the systematic and nonsystematic monetary policy changed throughout the study. While nonsystematic monetary policy became less important, especially towards the end of the sample period, systematic monetary policy became much more important during that period, especially against inflation and unemployment. In addition, the study found little evidence of a causal link between systematic monetary policy and high inflationary and unemployment episodes. Lastly, Lenza et al. (2010) examined the lags from monetary policy actions to inflation in UK and US and their study found that it takes over a year for inflation to respond to monetary policy actions within the economies of the UK and the US.

Marcelino (2006) examined the effects of non-systematic fiscal policy in the largest four countries in the Euro area. Their study also explored the impacts of fiscal and monetary shocks and the effectiveness of fiscal and monetary policies in the fiscal policy coordination debate for the effectiveness of fiscal shocks in stabilizing these economies within the Euro Area. The study found that the non-systematic fiscal policy affects these countries differently. Finally, fiscal shocks impact interest rates directly or through the output gap and inflation. However, monetary policy tends to have a lesser impact on fiscal policy, output and inflation.

Apanisile (2017) examined the asymmetric effects of monetary policy shocks on output in Nigeria. The study represented monetary policy shocks using broad money supply and decomposed broad money into positive and negative using the non-linear ARDL framework. The study found out that both the positive and negative shocks have a positive impact on economic output in Nigeria; however, the negative shocks proved insignificant. This result corroborates a work by Goshit et al. (2020) on the asymmetric effects of monetary policy shocks on output in Nigeria.

Ajisafe et al. (2022) also examined the effects of anticipated and unanticipated monetary policy on output in Nigeria and found a long-run relationship between anticipated and unanticipated monetary policy in Nigeria. However, the anticipated impacts were insignificant while unanticipated have a significantly positive relationship with output. The study recommended that the study aligns with the rational expectation theory that only the unanticipated monetary shocks affect the real economy. The results aligned with other authors like Thanh et al. (2019).

METHODOLOGY

The study adopted two methods to fulfill the objectives of the study. The study first applied the historical decomposition method as

Table 2. Descriptive characteristics of the variables.

	ASI	CPS	EXR	INF	INT	NSYS	SYS
Mean	16571.0	7495.9	102.6	18.9	14.1	0.0	13.5
Median	11554.3	947.6	117.5	11.4	13.7	-0.3	13.3
Maximum	60953.0	49304.1	306.9	73.1	26.7	9.9	16.4
Minimum	138.5	14.8	1.0	2.1	6.0	-4.8	11.0
Std. Dev.	15295.8	12804.0	85.8	17.6	3.8	2.6	1.6
Skewness	0.7	2.1	0.7	1.6	0.5	1.2	0.3
Kurtosis	2.6	6.6	3.0	4.2	4.4	5.5	1.9
Jarque-Bera	11.4	169.0	10.5	63.3	17.7	67.2	8.4
Probability	0.0033	0.0000	0.0054	0.0000	0.0001	0.0000	0.0151
Sum	2187373.0	989458.2	13544.6	2495.4	1860.2	-3.8	1776.7
Sum Sq. Dev.	30600000000.0	21500000000.0	963649.8	40611.8	1877.1	876.1	338.5
Observations	132.0	132.0	132.0	132.0	132.0	132.0	132.0

Source: Author's Compilation Eviews (2022). Where: ASP represents Asset Price Channel, CCH represents Credit Channel, EXC represents Exchange Rate Channel, IEC represents Inflation Expectation's Channel, INT represents Interest Rate Channel, SYS represents Systematic Monetary Policy Shocks and NSYS represents Nonsystematic Monetary Policy Shocks.

designed by Kilian and Park (2009) to decompose monetary policy shocks into systematic and nonsystematic shocks. The Historical Decomposition (HD) methodology is a method of decomposing series into the various constituent shocks. The second applied the Non-Linear Auto-Regressive Distributed Lag (NARDL) model proposed by Shin et al. (2014) to establish the systematic and nonsystematic influence of monetary policy shocks on each channel of monetary policy. NARDL is very useful given the way it models the stochastic relationship between variables of a different order of integration. It also provides better efficient short-run and long-run coefficient estimates (Shin et al. 2014). Based on the linear-ARDL model as proposed by Pesaran and Shin (1999), the NARDL framework models the dependent variable as a function of its lagged variables and lagged variables of independent variables. Thus, the NARDL model is specified for examining the systematic and nonsystematic monetary policy shock on each monetary policy channel as follows:

$$\Delta k_t = \beta + \varphi_1 k_{t-1} + \lambda_1^{+}\delta_{t-1}^{+} + \lambda_1^{-}\delta_{t-1}^{-} + \lambda_2^{+}\eta_{t-1}^{+} + \lambda_2^{-}\eta_{t-1}^{-} + \sum_{j=0}^{q}\left(\theta_{1,j}^{+}\Delta\delta_{t-j}^{+} + \theta_{1,j}^{-}\Delta\delta_{t-j}^{-}\right) + \sum_{j=0}^{q}\left(\theta_{2,j}^{+}\Delta\eta_{t-j}^{+} + \theta_{2,j}^{-}\Delta\eta_{t-j}^{-}\right) + \sum_{j=1}^{\rho-1}\partial_{1,j}\Delta k_{t-j} + \varepsilon_t \quad (1)$$

Where Δ is the difference operator; β the drift component, ε is the white noise, λ, φ are the long-run multiplier, and k_t represents the five (5) different channels of monetary policy (interest rate, exchange rate, credit, asset price and expectation's channel). Furthermore, δ_t and η_t are used to capture the systematic and nonsystematic monetary policy shock. Thus, the variable δ_t and η_t estimates the effects of those systematic and non-systematic shocks on each transmission channel of monetary policy.

Analysis and presentation of results

This paper applied quarterly data series from 1986 to 2020 on the monetary policy rate, all share index, inflation rate, private sector credit, and exchange rate. The data were generated from the Central Bank of Nigeria (CBN) Statistical Bulletin (2021). The descriptive statistic results in Table 2 had a good level of consistency with the mean and median values being within their minimum and maximum values, and the values of interest rates, exchange rate, and both systematic and nonsystematic monetary policy changes being relatively close, which indicates lower levels of variability. The skewness statistics showed that the variables were all positively skewed, while the kurtosis statistic showed that credit channel, inflation, interest rate, and nonsystematic monetary policy exceeded three, meaning that the series follows a leptokurtic distribution. However, all share index and the systematic monetary policy followed a platykurtic distribution, while the exchange rate followed a mesokurtic distribution.

The unit root test results in Table 3 showed that all the variables are in the first difference order, even though the interest rate was stationary at 5% for Augmented Dickey-Fuller test and 10% for the Phillips-Perron test in line with ADF and PP statistics (Dickey and Fuller, 1979; 1981, Phillips and Perron, 1988). However, this was resolved as both tests were stationary in their first difference form at 5 and 1% respectively.

Table 3. Unit root test – augmented Dickey Fuller and Phillip-Perron.

Variable	Test	Levels		First difference		Status
		T-Stats	p Value	T-Stats	p Value	
ASP	ADF	-1.978	(0.2964)	-6.695	(0.0000)***	I(1)
	PP	-1.616	(0.4715)	-6.773	(0.0000)***	I(1)
CPS	ADF	2.641	(1.0000)	-4.374	(0.0005)***	I(1)
	PP	-1.619	(0.4698)	-10.976	(0.0000)***	I(1)
EXR	ADF	0.860	(0.9947)	-10.146	(0.0000)***	I(1)
	PP	0.809	(0.9939)	-10.111	(0.0000)***	I(1)
INF	ADF	-2.634	(0.0887)*	-7.275	(0.0000)***	I(1)
	PP	-2.866	(0.0521)*	-11.035	(0.0000)***	I(1)
INT	ADF	-2.884	(0.0499)**	-10.745	(0.0000)***	I(1)
	PP	-2.807	(0.0600)*	-11.285	(0.0000)***	I(1)

The ADF and PP critical value with intercept are -3.48(1%), -2.88(5%) and -2.58(10%); ***, ** and * denote significance at 1, 5 and 10% levels, respectively.
Source: Author's Compilation Eviews (2022).

Table 4. Lag length criteria.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-5517.709	NA	1.23e+30	86.805	86.4416	86.3623
1	-4688.972	1566.831	5.12e+24*	73.9214*	74.8573*	74.3017*
2	-4658.517	5467235*	5.60e+24	74.0081	75.7460	74.7142
3	-4641.669	28.6939	7.62e+24	74.3073	76.8474	75.3394
4	-4625.37	26.2314	1.06e+25	74.6152	77.9574	75.9731

* indicates lag order selected by the criterion; LR, FPE, AIC, SBC and HQ indicate sequential modified LR test statistic, Final Prediction Error, Akaike Information Criterion, Schwarzt Bayesian Information Criterion and Hannan-Quinn respectively.
Source: Author's Compilation Eviews (2022).

Table 5. Bound test result.

	Int Rate	Credit	Exc Rate	Asset Price	Expectations
K	4	1	1	2	4
N	4	4	4	4	4
F-Statistic	5.33	1.83	0.97	3.03	2.42
Lower (1%)	3.74	3.74	3.74	3.74	3.74
Upper (1%)	5.06	5.06	5.06	5.06	5.06
Lower (5%)	2.86	2.86	2.86	2.86	2.86
Upper (5%)	4.01	4.01	4.01	4.01	4.01
Decision	Co-integration	No	No	Inconclusive	No

K - is the lag length, n - is the number of variables in the equation.
Source: Author's Compilation from Eviews (2022).

The study chose a lag length of one based on the Akaike and Schwarz criteria in Table 4. Finally, the bound test result in Table 5 showed that the credit, exchange rate, and expectations channel had no long-run relationship, while that of the asset price channel was inconclusive. However, the interest rate channel exhibited a long-run

Table 6. Short run ARDL result.

Variable		INT	CPS	EXR	ASP	EXP
ΔDEP_{t-1}	Coeff	0.89			0.53	
	Tstats	19.19***			7.00***	
ΔDEP_{t-2}	Coeff	-0.02				
	Tstats	-1.91*				
ΔDEP_{t-3}	Coeff	-0.02				
	Tstats	-1.83*				
$\Delta SMPS^{+}$	Coeff	0.08	-944.25	-2.22	-282.31	839.16
	Tstats	0.68	-1.09	-0.85	-0.33	1.02
$\Delta SMPS^{+}_{-1}$	Coeff					3816.81
	Tstats					1.57
$\Delta SMPS^{+}_{-2}$	Coeff					-5526.22
	Tstats					-3.06***
$\Delta SMPS^{+}_{-3}$	Coeff					2077.05
	Tstats					3.73***
$\Delta SMPS^{-}$	Coeff	-0.06	4211.15	5.48	-243.49	1903.96
	Tstats	-0.51	1.76*	0.82	-0.15	2.88***
$\Delta SMPS^{-}_{t-1}$	Coeff					-2013.41
	Tstats					-3.71***
$\Delta NMPS^{+}$	Coeff	0.99	253.86	0.67	-56.05	0.76
	Tstats	68.53***	1.63	1.48	-0.52	2.02**
$\Delta NMPS^{+}_{t-1}$	Coeff	-0.93				
	Tstats	-18.68***				
$\Delta NMPS^{-}$	Coeff	1.02	-154.61	-0.04	-105.22	-0.67
	Tstats	74.10***	-0.98	-0.09	-0.93	-1.85*
$\Delta NMPS^{-}_{t-1}$	Coeff	-0.89				
	Tstats	-18.64***				
ECT	Coeff	-0.04	-0.11	-0.05	-0.11	-0.28
	Tstats	-4.72***	-2.93***	-1.56	-3.80***	-5.47***

***, ** and * denote significance at 1%, 5% and 10% levels respectively. $SMPS^{+}$ – Positive Systematic Monetary Policy Shock, $SMPS^{-}$ – Negative Systematic Monetary Policy Shock $NMPS^{+}$ – Positive Nonsystematic Monetary Policy Shock, $NMPS^{-}$ – Negative Nonsystematic Monetary Policy Shock.
Source: Author's Compilation from Eviews (2022).

relationship.

Table 6 analyzes the asymmetric influence of the systematic and non-systematic monetary policy shock on each transmission channel of monetary policy. From the Non-Linear ARDL results in Table 6, it was revealed that interest rates in the previous three quarters significantly affect interest rate in the current period. Furthermore, positive and negative changes in systematic monetary policy shock do not impact interest rates in the current period. However, positive and negative nonsystematic monetary policy shocks in the current period influence interest rates positively in the current period, while in the previous period negative and positive nonsystematic monetary policy shocks influence interest rates negatively. The implication of this for Nigeria is that a change in the policy rate incited by current period nonsystematic shocks, irrespective of the direction of change (either positively or negatively), will improve the

Table 7. Long run ARDL result.

Variable		INT	CPS	EXR	ASP	EXP
$SMPS^+$	Coeff	1.91	-8521.92	-48.33	-2631.91	-4.93
	Tstats	0.69	-1.15	-0.85	-0.33	-0.50
$SMPS^-$	Coeff	-1.33	38006.06	119.05	-2270.02	63.67
	Tstats	-0.51	1.94	0.79	-0.15	2.63
$NMPS^+$	Coeff	1.65	2291.15	14.64	-522.54	2.70
	Tstats	7.41***	1.72	1.22	-0.51	2.08
$NMPS^-$	Coeff	1.84	-1395.35	-0.90	-980.97	-2.40
S-C	Tstats	6.90***	-1.03	-0.09	-0.93	-2.01
	pvalue	0.5656	0.8081	0.7202	0.4394	0.1522
ARCH	pvalue	0.3252	0.9997	0.9987	0.0772	0.1260

Source: Author's Compilation from Eviews, 2022. ***, ** and * denote significance at 1%, 5% and 10% levels respectively. $SMPS^+$ – Positive Systematic Monetary Policy Shock, $SMPS^-$ – Negative Systematic Monetary Policy Shock $NMPS^+$ – Positive Nonsystematic Monetary Policy Shock, $NMPS^-$ – Negative Nonsystematic monetary policy shock.

interest rate channel of monetary policy in the current period, while a change in the policy rate incited by the previous period nonsystematic shocks, irrespective of the direction of change (positive or negative), will negatively affect the interest rate channel of monetary policy in the short run.

The error correction term on the interest rate, credit, asset price, and expectations channel had a negative credit channel, the nonsystematic monetary policy shock (both positive and negative) and the positive systematic shock did not influence the credit channel; while the negative systematic monetary policy shock has a positive influence on the credit channel of monetary policy. This result implies that a change in the policy rate incited by negative systematic monetary policy shocks will positively influence the credit channel of monetary policy in the short run. Finally, 11% of these short-run errors are corrected in the long run at a 5% significance level. For the asset price channel, the systematic and nonsystematic monetary policy shocks do not influence asset prices; however, the first lag of asset prices influenced asset prices positively in the current period. However, these short-run errors are adjusting towards equilibrium at 11%.

For the exchange rate channel, the systematic and nonsystematic monetary policy shock does not influence the exchange rate in the current period. Finally, for the inflation expectations channel of monetary policy, the previous two and three-quarters of systematic monetary policy shocks influence inflation expectations in the current period.

Furthermore, negative systematic monetary policy shock in the current and previous quarter's influence coefficient and was statistically significant at 5%, implying that there is a movement from the short run to the long run; while that of the exchange rate channel was negative and statistically insignificant. This implies there might be no movement from the short run to the long run since only one of the two conditions was met. Therefore, 4% of the short-run errors recorded on the interest rate channel of monetary policy are corrected in the long run. For the inflation expectations in the short run. For the nonsystematic monetary policy shock, positive nonsystematic monetary policy shock influences inflation expectations positively, while negative nonsystematic monetary policy shocks influence inflation expectations negatively. This result implies that a change in the policy rate incited by systematic and nonsystematic monetary policy shocks will influence the inflation expectations channel of monetary policy in the short run. The error correction term shows that 28% of these errors are adjusting towards equilibrium in the long run.

In the long run, the interest rate channel was found to be the only channel to be cointegrated based on the bound test result. Therefore, the long-run result in Table 7 will only be interpreted for the interest rate channel. From Table 7, the results showed that negative and positive systematic monetary policy shocks do not influence the interest rate channel of monetary policy; however, negative and positive nonsystematic monetary policy shocks influence the interest rate channel of monetary policy positively in the long run. That is, a percentage increase in positive nonsystematic shocks will improve interest rates by 1.65%, while a percentage increase in negative nonsystematic shocks will improve interest rates by 1.84%. This result implies that a change

in the policy rate incited by negative and positive nonsystematic monetary policy shocks will influence the interest rate channel positively in the long run for Nigeria. For the diagnostics in Table 7, the results showed that there is no evidence of serial correlation among the variables and that the model is homoscedastic, that is, the models have equal variance.

DISCUSSION

From the analysis, the short-run nonlinear ARDL results showed that the positive and negative nonsystematic changes in monetary policy influence the interest rate channel of monetary policy. The nonsystematic monetary policy affects the interest rate channel because they are more or less atypical or random shocks to the policy reaction function, while systematic shocks do not significantly influence the interest rate channel in the short run in Nigeria. For the credit channel, negative systematic monetary policy shocks affect this channel. This result is plausible because, during periods of economic shocks, banks are averse to lowering interest rates due to the uncertainty around future economic outcomes. They, therefore, increase their rates to balance the effect of the systematic shocks that may affect their performance.

On the other hand, the exchange rate and asset price channels do not react to systematic and nonsystematic monetary policy shocks in the short run in Nigeria. This result is plausible since it can be argued that monetary policy shocks directly impact bank lending rates (interest rate channel) and their ability to give out credit (credit channel).

However, the expectations channel of monetary policy reacts to systematic and nonsystematic monetary policy shocks in Nigeria. This result is plausible since the reaction of the policymakers to systematic and nonsystematic monetary policy shocks will determine the publics' expectations of inflation.

The bound test results however showed that the movement, in the long run, was only sustainable in the interest rate channel. The results of the interest rate channel in the long run echoes what was observed in the short run. The long-run results show that the positive and negative nonsystematic changes in monetary policy influence the interest rate channel of monetary policy. This is because the nonsystematic monetary policy shocks are more or less atypical or random shocks to the policy reaction function and these shocks are directly transmitted from the policy rate down to the other interest rates vis-à-vis the interest rate channel.

CONCLUSION AND POLICY RECOMMENDATION

This paper examines how monetary policy channels react to a shock arising from monetary policy. The results showed that systematic and nonsystematic monetary policy shocks had more influence on interest rate and expectations channel, while negative systematic shocks had an influence on the credit channel. However, the results showed that systematic and nonsystematic monetary policy shocks had no influence on asset price and exchange rate channels of monetary policy for the period under investigation. Since the study demonstrated that the systematic and nonsystematic monetary policy changes affected interest rate, credit, and expectations channel of monetary policy, therefore, these channels should be well managed to avoid negative systematic and nonsystematic shocks to improve the monetary transmission process and foster a sound financial system in Nigeria. By implication, policymakers should focus more on nonsystematic shocks and attend to these situations to diminish the degree of their impact on the monetary transmission process.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

REFERENCES

Ajisafe RA, Adesina KE, Okunade SO (2022). Effects of Anticipated and Unanticipated Monetary Policy on Output in Nigeria. African Journal of Economic Policy 10(2):40-55.

Andrade P, Ferroni F (2021). Delphic and Odyssean Monetary Policy Shocks: Evidence from the Euro Area. Journal of Monetary Economics 117:816-832.

Apanisile OO (2017). Asymmetry Effects of Monetary Policy Shocks on Output in Nigeria: A Non-Linear Autoregressive Distributed Lag (NARDL) Approach. A Paper presented at: Economic Society of South Africa Biennial Conference Paper. Essa_3452.

Arias J, Caldara D, Rubio-Ramirez JF (2017). The Systematic Component of Monetary Policy in SVARs: An Agnostic Identification Procedure. Federal Reserve Bank of Atlanta Working Paper Series No. 15a:1-28.

Bernanke BS, Gertler M, Watson M (1997). Systematic Monetary Policy and the Effects of Oil Price Shocks. Brookings Papers on Economic Activity 1:91-157.

Central Bank of Nigeria (CBN) Statistical Bulletin (2021). Statistical Bulletin. Available at: https://www.cbn.gov.ng/documents/QuarterlyStatbulletin.asp

Christiano LJ, Eichenbaum M, Evans C (1999). Monetary Policy Shocks: What Have We Learned and to What End? Handbook of Macroeconomics, eds. Michael Woodword, and John Taylor.

Cochrane JH (1996). A Cross-Sectional Test of an Investment-Based Asset Pricing Model. Journal of Political Economy 104(3):572-621.

Dickey DA, Fuller WA (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. Journal of the American Statistical Association 74:427-431.

Dickey D, Fuller W (1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. Econometrica 49:1057-1075.

Feldkircher M, Huber F (2018). Unconventional U.S. Monetary Policy: New Tools, Same Channels? Journal of Risk and Financial Management 11(71):1-31.

Gertler M, Karadi P (2015). Monetary policy surprises, credit costs, and economic activity. American Economic Journal: Macroeconomics 7(1):44-76.

Giannone D, Reichlin L, Sala L (2002). Tracking Greenspan: Systematic and Unsystematic Monetary Policy Revisited. Available at: https://cepr.org/active/publications/discussion_papers/dp.php?dpno=

3550.
Goshit GG, Iormber PT, Jelilov G, Celik B (2020). Asymmetric Effects of Monetary Policy Shocks on Output in Nigeria: Evidence from Non-linear ARDL and Hatemi-J Causality Tests. Journal of Public Affairs pp. 1-11.
Herrera AM, Pesavento E (2007). Oil Price Shocks, Systematic Monetary Policy and the Great Moderation. Michigan State University. Available at: https://gattonweb.uky.edu/faculty/herrera/documents/HPsys.pdf
Hoover KD, Jorda O (2001). Measuring Systematic Monetary Policy. Federal Reserve Bank of St. Louis 2:113-138.
Kilian L, Park C (2009). The Impact of Oil Price Shocks on the US Stock Market.International Economic Review 50:1267-1287.
Lenza M, Pill H, Reichlin L (2010). Monetary Policy in Exceptional Times. European Central Bank Working Paper Series No. 1253:1-40.
Lucas RE (1972). Expectations and the Neutrality of Money. Journal of Economic Theory 4(1):103-124.
Lucas RE (1976). Econometric Policy Evaluation: A Critique. Carnegie-Rochester Conference Series on Public Policy 1:19-46.
Mandler M (2010). Monetary Policy Shocks, Systematic Monetary Policy, and Inflation Regimes. Results from Threshold Vector Autoregressions pp. 1-41. Available at: https://www.iwh-halle.de/fileadmin/user_upload/events/workshops/former/20100603/ddh/pdf/Mandler.pdf
Marcelino M (2006). Some Stylized Facts on Non-Systematic Fiscal Policy in the Euro Area. Journal of Macroeconomics 28:461-479.
McCallum BT (1999). Analysis of the Monetary Transmission Mechanism: Methodological Issues NBER Working Paper 7395.
Miranda-Agrippino S, Ricco G (2017). The transmission of monetary policy shocks. Bank of England Working Paper No. 657.
Pesaran MH, Shin Y (1999). An Autoregressive Distributed Lag Modelling Approach to Co Integration Analysis. Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium, Strom, S. (ed.) Cambridge University Press.
Phillips PCB, Perron P (1988). Testing for a Unit Root in Time Series Regression, Biometrika 75:335-346.
Primiceri GE (2004). Time-Varying Structural Vector Autoregressions and Monetary Policy. Princeton University. Available at: https://faculty.wcas.northwestern.edu/gep575/tvsvar_final_july_04.pdf
Ramey VA (2016). Macroeconomic shocks and their propagation. Handbook of Macroeconomics 2:71-162.
Rosoiu A (2015). Monetary Policy and Time-Varying Parameter Vector Autoregression. Procedia Economics and Finance 32:496-502.
Thanh SD, Canh NP, Maiti M (2019). Asymmetric Effects of Unanticipated Monetary Shocks on Stock Prices: Emerging Market Evidence. Journal of Economic Analysis and Policy 65:40-55.
Zeshan M, Malik WS, Nasir M (2019). Oil price shocks, systematic monetary policy and economic activity. The Pakistan Development Review 58(1):65-81.
Zhang X (2021). A New Measure of Monetary Policy Shocks. Staff Working Papers 21-29, Bank of Canada.

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