Transmission Mechanism of Monetary Policy in Nigeria: Investigating the Role of Interest Rate

Igweze Amechi H.[1], Adetoba Olutope O.[2], Dzaan Kumafan S.[3], Mimiko Daniel O.[4]

[1,2,3,4]Central Bank of Nigeria, Abuja

ABSTRACT: Many studies on transmission mechanism of monetary policy only examine statistical relationship between policy variables and target variables. Most of these models may not be able to explain the pathway through which the monetary policies are transmitted. How monetary policy affects target goals can better be explained by chain and sequence of events known as path analysis. This paper tries to use mediation approach to assess the significance of causal path of monetary policy variables through the interest rate channel. The paper dwelt on the first transmission paths- from MPR to private sector credit through the interest rates. The Sobel test, which is one of the most widely used tests of indirect effect in simple mediation was employed in testing the significance of mediational path of the interest rate transmission mechanism of monetary policy. The results lay credence to effective and significant transmission of effects of monetary policy rates through maximum lending rate, interbank lending rate and treasury bill rate. These variables were found to be partial mediators in the transmission channel of interest rate. Only the prime lending rate was found not to significantly transmit the effect of monetary policy rate to private sector credit. The study concludes that the maximum lending rate path has the highest transmission effect of monetary policy rate. This is followed by the treasury bill interest rate path and the inter-bank call rate path respectively. The prime lending rate's path was not significant at 5% level of significance. It is sacrosanct to also test if the private sector credit (PSC) can effectively transmits the effect from the maximum lending rate, inter-bank call rate and treasury bill interest rate to the target goals-inflation, output and unemployment in subsequent studies. These findings are new in the case of Nigeria as little or no studies have applied mediation approach to the study of transmission mechanism of monetary policy rate in Nigeria.

KEYWORDS: mediation, monetary policy, interest rate, prime lending rate, maximum lending rate.

JEL Classification: E40, E52

1. INTRODUCTION

Monetary policy refers to the policy adopted by a central bankto control either the money supply or interest rate payable on short-term borrowing with goal of controlling inflation and to ensure price stability and stability in the currency (Eduardo & Sturzenegger, 2010). The target goals of monetary policy are stability of gross domestic product, maintaining low unemployment and predictable exchange rates.

The monetary policy transmission mechanism is the process by which prices and general economic conditions are influenced by monetary policy decisions. The monetary policy decisions are expected to influence the interest rates, aggregate demand and money supplyfor improved economic performance. Okaro (2011) argues that the principal channel of monetary policy is through banks' lending to firms, which stimulate economic growth and employment through investment and posits that credit is an important part of the transmission process of Nigerian Monetary Policy. This occurs through interest rate channels, which affect interest rates, costs and level of borrowing and aggregate demand (Mishkin, 2012) as Kuttner & Mosser (2002) posit that interest rate channel is the primary mechanism at work in conventional macroeconomic models.

The mechanisms through which Federal Reserve policy affects the economy; and if the financial innovation affects the monetary transmission mechanism were the pertinent questions examined by the conference of Financial Innovation and Monetary Transmission, sponsored by the Federal Reserve Bank of New York on April 5 and 6, 2001. The overall outcome of the research papers presented was that monetary policy appears to have less of an impact on real activity than it once had(Kuttner & Mosser, 2002).Till date this singular issue bordering on effective transmission mechanism of monetary policy is still a puzzle yetto be solved.

Transmission Mechanism of Monetary Policy in Nigeria: Investigating the Role of Interest Rate

Also, there seem to be no research that have tried to study the path through which the monetary policy is being transmitted to the final target goals -prices, unemployment, output, etc.

To determine the efficacy and efficiency of monetary policies for any target objective, central banks must be able to accurately assess the effect of their policies on the economic activity through the various channels. Also, the significance and relative strength of these transmission channels should be ascertained. Many studies on monetary policy transmission mechanisms have used various versions of regression and time series models to directly regress output and prices on monetary policies variables like interest rates, reserves, etc. These only examine statistical relationship between policy variables and target variables. For instance, the vector auto regression (VAR) widely used in literature does not only seek direct causal effects but also disentangles causes and effects by imposing coefficient and or error covariance restrictions on the parameters of the model(Okaro, 2011).

Most of these regression and time series models may not be capable of explaining the pathway through which the monetary policies are transmitted. How monetary policy affects final prices and output can only be explained by chain and sequence of events -path analysis. This paper tries to use mediation approach to assess the causal path of monetary policy variables through the interest rate channels. The main goal of this study is to study the causal path of monetary policy rate to private sector credit through interest rate. It is hoped that the significance of the causal path of monetary policy rate through the prime lending rate, maximum lending rate, inter-bank call rate and treasury bill interest rate as well as the type of mediation that exist through the paths would be ascertained.

2. LITERATURE REVIEW

This study is anchored on the theory of Real Business Cycle (RBC) which posits that almost none of the correlation between money and output comes from monetary base, which can be better controlled by the central bank. The money-output correlation may stem from other components of money supply that are affected by actions of banks, depositors, and borrowers, and more likely to be affected by business cycles. In a period of expansion, interest rates are low and borrowing to invest becomes easy. This increases productivity and output. Consequently, banks are willing to grant loans as expansion allows increase in cash flows and thus, easy pay back of loans becomes possible (Deng, 2009). It is on this premise that Olivero (2006) emphasized on the counter-cyclical margins in banking as an important transmission mechanism in international business cycle. The ability to consider different factors in a general equilibrium approach to the aggregate economic activity has enabled RBC-based models to become widely used in macroeconomic analysis especially in policy analysis and optimal monetary and fiscal monetary policies. This is the thrust of monetary policy analysis.

There have been many different methods employed in monetary policy transmission mechanism in literature, with divergent approaches but usually using interest rates, credit, money supply, exchange rates, asset prices as transmission variables. Majority of these studies employed the vector auto regressive models (Robinson & Robinson, 1997; Ndekwu, 2013; Mishra et al., 2016; Adekunle et al., 2018; etc.).

The Factor Augmented Auto-regressive (FAVAR) model employed by Obafemi & Ifere (2015) is structurally built on dynamic factor model which was first formulated by Bernanke, Boivin &Eliaz (2005). The FAVAR model, which solves a major weakness of the traditional (VAR) by utilizing limited volume of information, is used for identifying shock of monetary policy on macroeconomic variables and forms part of the causative and not path models in literature. Yang et al.(2011) approach used chart and trend line to depict interest rate pass-through, and credit growth also falls short of the pathway analytics of the monetary policy effects.

The research of Opolot & Nampewo (2014) examined the relevance of the bank lending channel of the monetary policy transmission mechanism in Uganda using micro-level data and generalized method of moment (GMM) dynamic panel estimator, which are neither structural nor path analysis models. Bank size, liquidity, and capitalization and the banks' loan supply function were investigated.

Several other studies also dwelt on relationships of monetary policy variables instead of the causal path, which is the main thrust of transmission mechanism, and employed various vector auto regressive models (Adekunle et al.,2018).Ezeaku et al.(2018) assessed the industry effects of monetary policy transmission channels in Nigeria using the Johansen cointegration and the error correction model. Ndekwu (2013) examined the process through which interest rate policy of the Central Bank affects the credit, structure of interest rates, output production and aggregate demand and consequently inflation rate using vector auto-regression model with dynamic logarithmic form and the ordinary least squares (OLS) methods.

Akani & Imegi (2017) also employed the OLS multiple regressions, Cointegration test, Granger Causality Test, Augmented Dickey Fuller Test and Vector Error Correction approaches in examining the effects of monetary policy transmission mechanism on liquidity of Nigerian capital market from 1981-2016.

Nyumuah (2018) employed VAR(P) model on Policy rate, Money Supply, Bank Credit to Private Sector, Exchange rate, Real output, Consumer price index. The study found the money supply channel to be the strongest in the long run and the exchange rate

channel strongest in transmitting monetary impulses in the short run. The interest rate and the bank credit to private sector channels were found to be very weak channels of monetary transmission.

In a similar study, Adekunle et al(2018) used a multi-model approach (Johansen and Autoregressive Distributed Lag (ARDL) techniques) to assess the prevalence of asset prices channel, with emphasis on equity channel, of monetary policy transmission mechanism in Nigeria. These methods have not efficiently assessed the transmission paths of the monetary policy. Their results found exchange rate channel as the most prevalent channel.

Obafemi & Ifere (2015) investigated effectiveness, dominance and the exact channel through which monetary policy impacts the Nigerian economy using a FAVAR model estimated with 53 variables spanning the quarterly period of 1970:01 to 2013:04. The results show that that credit channels and interest rates are the dominant and strongest channels of transmission of monetary shocks in Nigeria, followed by Exchange rate and money channels.

Majority, if not all, of these monetary policy transmission mechanisms studies used approaches that examined statistical relationships between policy variables and target variables. These regression and time series models may not be capable of explaining the pathway through which the monetary policies are transmitted and how monetary policy, especially the interest rates, affect final prices and output. Hence the need for path analysis approaches that analyses the path through which these policy effects are transmitted.

Mediation Analysis is a path model that analyzes causal sequence of relationship between a dependent and independent variable through a third hypothetical variable known as the mediator. A mediation model is a path model that seeks to identify and explain the mechanism or process that underlies a relationship between two or more variables through a third explanatory variable, known as a mediator variable (Fairchild & MacKinnon, 2009).Hence, statistical mediation refers to a causal path in which the effect of one or more independent variables is transmitted to one or more dependent variables through third variable known as mediator. Thus, the effect of a variable X is transmitted to another variable Y through a mediator variable M. Consequently, mediation is a causal path such as X → M → Y (MacKinnon, 2000).Fairchild & MacKinnon (2009)posit that a mediator variable is useful in understanding the mechanism through which a cause produces an effect.

3. RESEARCH METHOD

This study employs the mediation procedure used in Nwankwo & Igweze (2016).The procedure originates from Baron and Kenny(1986) approach to mediation analysis. The Sobel test, which is one of the most widely used testsof indirect effect in simple mediation was employed in testing the significance of mediational path of the interest rate transmission mechanism of monetary policy. The data series used is a monthly data from January 2007 to January 2020 covering 14years and 158 data points. This is considered large enough to capture the trends and relationships over time. The data was sourced from the Central bank of Nigeria money market data base.

This paper studied the monetary policy rate (MPR) path:

$$\text{MPR} \rightarrow \text{ Interest Rates} \rightarrow \text{ Privat Sector Credit}$$

The interest rates used were prime lending rate (PLR), maximum lending rate (MLR), inter-bank rate (IBR) and treasury bill rate (TBR).

From the logic of Baron & Kenny (1986), the first step in meditational analysis is to establish that a relationship exists between the independent and the deapendent variable using a regression linear model: as in equation (1). This is known as path c.

$$E(\text{PSC}) = c_0 + c * \text{MPR} \quad (1)$$

Next is to fit a regression model with the suspected mediator variable predicting the dependent variable as in equation (2). This is known as path b.

$$E(M) = a_0 + a * \text{PSC}, \quad (M = \text{PLR}, \text{MLR}, \text{IBR} \& \text{TBR}) \ (2)$$

Thirdly, fit a regression model with the independent and each of mediator variable predicting the dependent variable as in equation (3)

$$E(\text{PSC}) = c_0 + c_1 * \text{MPR} + b * M, \quad (M = \text{PLR}, \text{MLR}, \text{IBR} \& \text{TBR}) \ (3)$$

The effect size is then computed as product of coefficient of PSC in equation (2) and each of coefficients of M in equation (3) or difference between the coefficient of MPR in equation (1) and coefficient of MPR in equation (3)

$$\widehat{B}_{(\text{indirect})} = ab \ (4a)$$

$$\widehat{B}_{(\text{indirect})} = c - c_1 \ (4b)$$

These two methods in (4a) and (4b) have been found to give the same result (Nwankwo & Igweze, 2016). The significance of the mediational effect also known as indirect effect is then tested using the Sobel test, which is a ratio of the indirect effect size and the standard error of the indirect effect

---

Transmission Mechanism of Monetary Policy in Nigeria: Investigating the Role of Interest Rate

The hypothesis is given as:

$$H_0: \widehat{B}_{(indirect)} = 0 \text{ versus}$$
$$H_1: \widehat{B}_{(indirect)} \neq 0$$

The Sobel (1982) test statistic for testing significance of indirect effect of the single mediator is:

$$Z_{(Sobel)} = \frac{\widehat{B}_{(indirect)}}{S_{(sobel)}}$$

Where: $\widehat{B}_{(indirect)}$ is as defined indirect effect (4a and 4b)

$$S_{(Sobel)} = \sqrt{b^2 S_a^2 + a^2 S_b^2 - S_a^2 S_b^2} \text{ (11b)}$$

The Sobel test follows a standard normal distribution, with parameters as the indirect effect and standard error of the indirect effect.

a is the unstandardized coefficient of independent variable (MPR) in equation (2),

b is the unstandardized coefficient of M in equation (3),

S_a is the standard error of the coefficient of MPR for the mediator in equation(2),

S_b is the standard error of the coefficient of mediator variables in equation (3).

Decision: If p-value is less than α=0.05, reject H_0 and conclude significance of indirect effect.

In ascertaining the type of mediation that exist, whether full or partial, the significance of coefficient of MPR in equation (3) and MPR in equation (1) is compared. It is partial mediation if the coefficient of MPR in equation (3) is reduced and remain significant. A full mediation occurs when the coefficient of MPR in equation (3) is drastically reduce and becomes insignificant. In this case it is believed that the effect of MPR in equation (1) has been fully transmitted to the mediator variable M in equation (3), thereby becoming insignificant. The excel Real Statistics Macro function was used in running the various mediation analysis.

4. RESULTS AND DISCUSSION OF FINDINGS

In this paper, monetary policy rate (MPR) is used as the independent variable while maximum lending rate, prime lending rate and inter-bank call rate were mediator variables used individually in the model. Credit to private sector was used as the dependent variable. The data series used is monthly data from January 2007 to January 2020 covering158 data points. The mediation procedure tests the path through which the monetary policy rate is being transmitted to the various bank rates and treasury bill rate, and subsequently to the credit to private sector of the Nigerian economy.
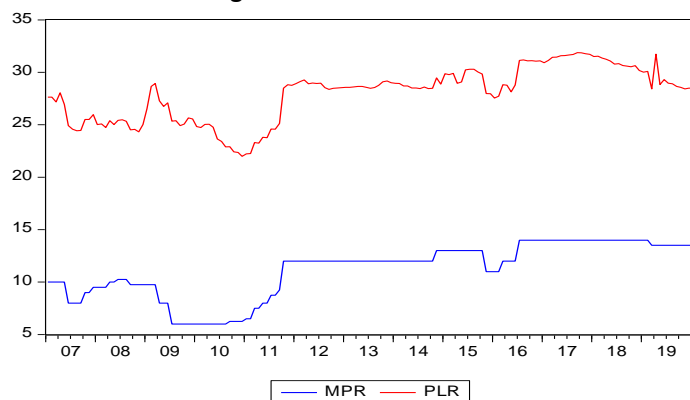

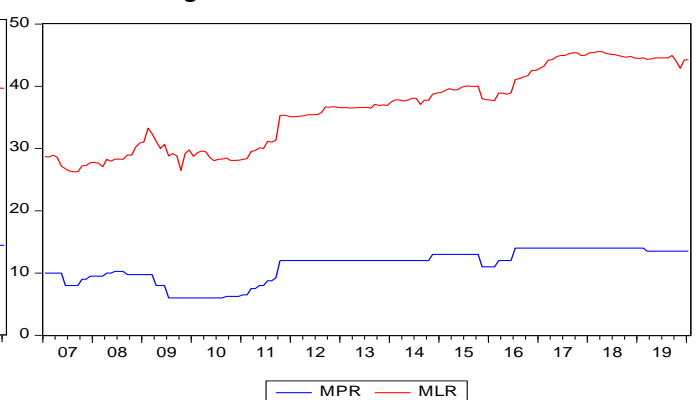Figure 1: Plot of MPR and PLR

Figure 2: Plot of MPR and PLR
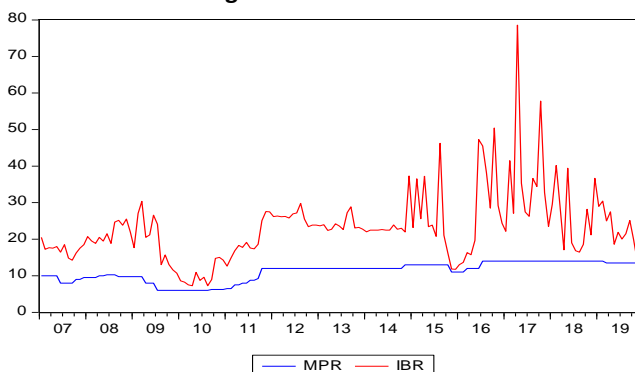

Figure 3: Plot of MPR and IBR
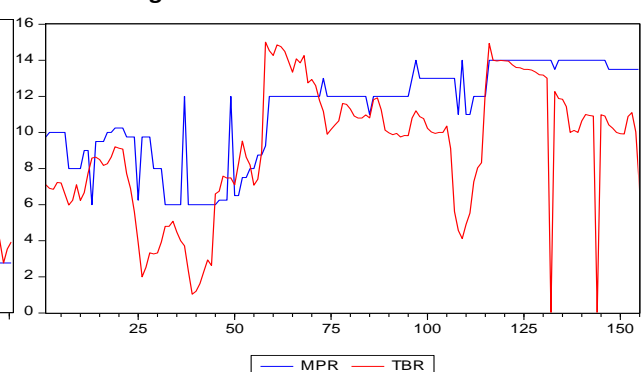

Figure 4: Plot of MPR and TBR
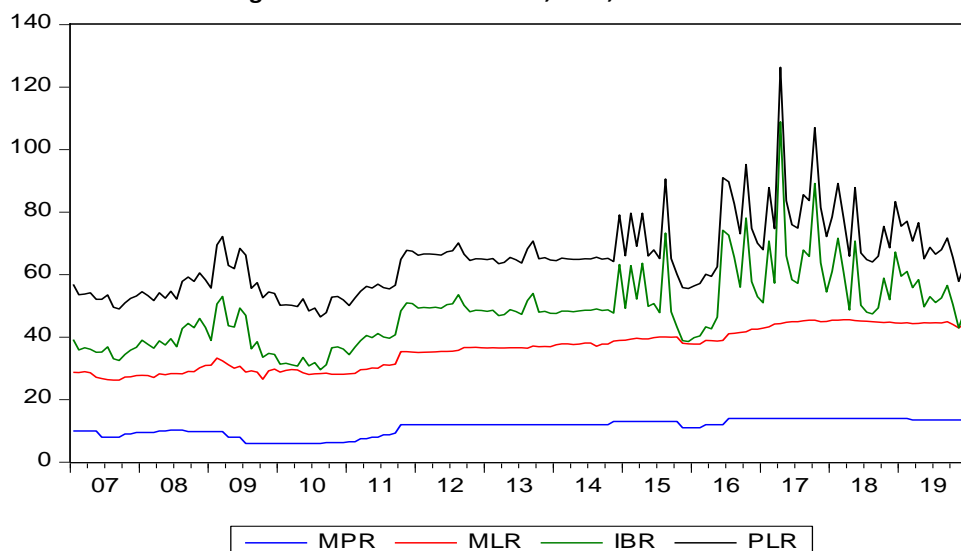
Figure 5: Plot of MPR on PLR, MLR, IBR and TBR

The plot of MPR on PLR, MLR, IBR and TB Rare presented in figure 5. The series are from January 2007 to January 2020. The series of MPR and PLR tend to convergence in recent periods. There is possibility of series crossing in the future, signaling an inverse relationship of MPR and maximum lending rate. The plot of MPR and MLR reveals a divergent series, indicating that as MPR increases, the MLR diverges away from the MPR over time. The plot of MPR and Inter-bank rate (IBR) reveals a random series in recent times while that of MPR and Treasury bill interest rates shows no clear trend or relationship.

4.1 Causal Path Analysis of Prime Lending Rate to Prices

Table 1a shows that the transmission path from monetary policy rate to prime lending rate (PLR) was found to be significant at 5% level of significance, as the p-value of the path, MPR→PLR is less than 0.05. This means that the effect of MPR could effectively transmit to prime lending rate (PLR). However, the transmission path PLR→PSC in equation (2) of table 1a was found not to be significant at 5% level of significant. This suggests that prime lending rate does not have the capability of transmitting the effect of MPR to private sector credit. Hence PLR is not a mediator variable.

Table 1a: Mediation results of MPR, PLR and Credit to Private Sector (PSC)

		coeff	std err	t-stat	p-value	corr
	MPR → PLR	-0.10242	0.032016	-3.19902	0.00167	-0.24812
Eqn. (2)	PLR → PSC	-690820	480722.6	-1.43704	0.152708	-0.1143
Eqn, (1)	MPR → PSC	2010418	118274.1	16.99796	2.48E-37	0.805843
Eqn. (3)	MPR	2066909	121112.2	17.06606	1.65E-37	
	PLR	551564.9	293403.1	1.879888	0.061988	

Level of significance is 5%, equation (3) is the partial effect model

Source: Authors' computation

Table1b: Indirect effect and test of significance of PLR.

	coeff	std err	t-stat	p-value
MPR→PLR	-0.24812	0.07756	-3.19902	
PLR→PSC	-0.1143	0.079539	-1.43704	
MPR→M→Y	0.02836	0.020737	1.367636	0.173406

Source: Authors' computation

The result of indirect effect and related test of significance also supported the fact that the prime lending rate is not a medium for transmitting the interest rate policy of the central bank.

4.2 Causal Path Analysis of Maximum Lending Rate

The path analysis of the transmission mechanism of monetary policy rate is presented in table 2a. The transmission path from monetary policy rate to maximum lending rate (MLR) rate was found to be significant at 5% level of significance, as the p-value of the path, MPR→MLR is less than 0.05. This means that the MLR has the ability of receiving the effect of MPR. The transmission path: MLR→PSC in equation (2) was also found to be significant at 5% level of significant. The coefficients of MLR and MLR in partial effect model, equation (3) were also found to be significant at 5% level of significant respectively.

Table 2a: Mediation results of MPR, MLR and Private Sector Credit (PSC)

		coeff	std err	t-stat	p-value	Corr
	MPR → MLR	1.169468	0.084603	13.82301	6.96E-29	0.741977
Eqn. (2)	MLR → PSC	1518627	35730.94	42.50174	1.12E-87	0.95943
Eqn. (1)	MPR → PSC	2010418	118274.1	16.99796	2.48E-37	0.805843
Eqn. (3)	MPR	521575.6	73122.04	7.132946	3.46E-11	
	MLR	1273094	46392.8	27.44163	1.38E-61	

Level of significance is 5%, equation (3) is the partial effect model

Source: Authors' computation

Table 2b presents the result for indirect effect of MLR on the relationship between MPR and PSC. The result of the indirect effect MPR→MLR→PSC of approximately 0.7119 and a p-value of 5.31E-27shows that maximum lending rate is a confirmed mediator in the transmission channel of MPR to PSC. This confirms a significant transmission mechanism of MPR to PSC through MLR.

Table2b: Indirect effect and test of significance of MLR.

	coeff	std err	t-stat	p-value
MPR→MLR	0.741977	0.053677	13.82301	
MLR→PSC	0.95943	0.022574	42.50174	
MPR→MLR→SC	0.711875	0.054141	13.14854	5.31E-27

Source: Authors' computation

4.3 Causal Path Analysis of Inter-bank Call Rate (IBR)

The path analysis of the transmission mechanism of monetary policy rate through inter-bank call rate (IBR) is presented in table 3a. The transmission path from monetary policy rate to IBR was found to be significant at 5% level of significance, as the p-value of the path, MPR →IBR is less than 0.05. This means that the IBR has the ability of receiving the effect of MPR. The transmission path: IBR→PSC in equation (2) was also found to be significant at 5% level of significant.

Table 3a: Mediation results of MPR, IBR and Private Sector Credit (PSC)

		Coeff	std err	t-stat	p-value	Corr
	MPR → IBR	1.165968	0.233568	4.991991	1.58E-06	0.371134
Eqn. (2)	IBR → PSC	184925.9	61831.57	2.990801	0.003235	0.232872
Eqn. (1)	MPR → PSC	2010418	118274.1	16.99796	2.48E-37	0.805843
Eqn. (3)	MPR	2081508	126851.6	16.40901	8.54E-36	
	IBR	-60970.7	40377.53	-1.51002	0.133062	

Level of significance is 5%, equation (3) is the partial effect model

Source: Authors' computation

Table 3b presents the result for indirect effect of MLR on the relationship between MPR and MLR. The result of the indirect effect (MPR→IBR→PSC) of 0.0864 and a p-value of approximately 0.010, shows that Inter-bank call rate is a significant mediator of the transmission channel of interest rate. This confirms a significant transmission mechanism of MPR to private sector credit through IBR.

Table 3b: Indirect effect and test of significance of IBR

	coeff	std err	t-stat	p-value
MPR =>IBR	0.371134	0.074346	4.991991	
MPR =>PSC	0.232872	0.077863	2.990801	
MPR=>IBR=>PSC	0.086427	0.033186	2.604326	0.010101

Source: Authors' computation

4.4 Causal Path Analysis of Treasury Rate (TIR)

The path analysis of the transmission mechanism of monetary policy rate through treasury bill interest rate (TIR) is presented in table 4a. The transmission path from monetary policy rate to TIR was found to be significant at 5% level of significance, as the p-value of the path, MPR→TIR is less than 0.05. This means that the TIR is capable of receiving the effect of MPR. The transmission path: TIR →PSC in equation (2) was also found to be significant at 5%. The mediation results for MPR, TIR and private sector credit (PSC) presented in table 4a reveal that the paths: MPR→TIR; TIR→ PSC and MPR → PSC are all significant as their respective p-values are less than 0.05. This suggest that the TIR is a possible mediator, capable of transmitting the effect of MPR to private sector credit

Table 4a: Mediation results of MPR, TIR and Private Sector Credit (PSC)

	coeff	std err	t-stat	p-value	Corr
MPR →TIR	0.90251	0.083306	10.83367	9.6E-21	0.655241
M →PSC	754834.3	131825.3	5.726019	5.13E-08	0.416741
MPR →PSC	2010418	118274.1	16.99796	2.48E-37	0.805843
MPR	2329191	152133.3	15.3102	6.91E-33	
TIR	-353207	110452	-3.19783	0.001677	

Source: Authors' computation

Table 4b: Indirect effect and test of significance of TIR

	coeff	std err	t-stat	p-value
MPR→TIR	0.655241	0.060482	10.83367	
M →PSC	0.416741	0.07278	5.726019	
MPR→TIR→PSC	0.273066	0.05376	5.079354	1.08E-06

Source: Authors' computation

Table 4b presents the result for indirect effect of TIR on the relationship between MPR and MLR. The result of the indirect effect MPR→TIR→PSC of 0.273 and a p-value of approximately 1.08E-06, that TIR is a mediator of the transmission channel of interest rate. This confirms a significant transmission mechanism of MPR to private sector credit through TBR.

On interest rate channel mechanism, private sector credit was found to effectively transmit the effect of monetary policy rate (MPR) to the prices through maximum lending rate, inter-bank call rate and treasury bill interest rate.

The summary result of the credit mechanism of monetary policy rate is presented in table 5

Table 5: summary result of path analysis of interest rates

Channel	Effect	T-Stat	p-value.
MLR→PLR→PSC	0.02836	1.367636	0.173406
MLR→MLR→PSC	0.711875	13.14854	5.31E-27*
MLR→IBR→PSC	0.086427	2.604326	0.010101*
MPR→TIR→PSC	0.273066	5.079354	1.08E-06*

∗ significant at 5% level of significance.

Source: Authors' computation

A comparison of the results for each path in table 5 reveals that the maximum lending rate path has the highest indirect effect (0.711875) on the monetary policy rate with the least p-value of 5.31E-27. This is followed by the treasury bill interest rate path

with indirect effect size of 0.273066 and corresponding p-value of 1.08E-06. The IBR path has the least significance with effect size of 0.086e4 and p-value of 0.01. The prime lending rate path was not significant at 5% level of significance.

5. CONCLUSION AND RECOMMENDATIONS

The findings of this study lay credence to effective and significant transmission of monetary policy rate through maximum lending rate, interbank lending rate and treasury bill interest rate. Only the prime lending rate was found not to significantly transmit the effect of monetary policy rate to private sector credit. It is sacrosanct to also test if private sector credit (PSC) could effectively transmit the effect from the maximum lending rate and inter-bank call rate to the target prices-inflation in subsequent studies. Although the prime lending rate is the best interest rate that major banks extend to their borrowers with the best credit, it was found not to significantly transmit the MPR through the private sector credit.

To the best of our knowledge, no previous studies have applied mediation approach to the study of monetary policy transmission mechanism in Nigeria. Thus, the findings herein are new. We therefore recommend that the Central Bank of Nigeria should seek creative ways to channel its monetary policy implementation through maximum lending rate, inter-bank rates and treasury bill interest rates, as they are the paths through which the monetary policy rate is transmitted most effectively.

6. REFERENCES

1) Adekunle, P.A., Yaaba, B. N., Stephen, S.A., Ogbuehi F., Idris A. and Zivoshiya, P.B. (2018). Monetary Policy Transmission in Nigeria: How Important is Asset Prices Channel? Microeconomics and Macroeconomics Vol., 6(3): 55-66

2) Akani, H.W. and Imegi, J.C. (2017). Monetary Policy Transmission Mechanism and Liquidity of Capital Market: A Time Series Study from Nigeria: 1981-2016. IOSR Journal of Economics and Finance (IOSR-JEF), Vol. 8 (5)(IV):01-24

3) Baron, R.M. and Kenny, D.A. (1986). The Moderator Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic and Statistical Considerations. Journal of Personality and Social Psychology, 51, 1173-1182

4) Deng, D. (2009). Real Business Cycle Theory – A Systematic Review. Munich Personal Re PEc Archive (MPRA), Paper No. 17932

5) Eduardo, L.Y. and Sturzenegger, F. (2010). Monetary and Exchange Rate Policies. Handbooks in Economics. Handbook of Development Economics. 5. pp. 4215–4281.

6) Ezeaku, H.C., Ibe, I.G., Ugwuanyi, U.B., Modebe, N.J. and Agbaeze, E.K. (2018). Monetary Policy Transmission and Industrial Sector Growth: Empirical Evidence from Nigeria. SAGE Open April-June: 1 –12.

7) Fairchild, A.J. and MacKinnon, D.P. (2009). A General Model for Testing Mediation and Moderation Effects. Prevention Science, 10, 87-99.

8) Kuttner, K.N.& Mosser, P.C (2002). The Monetary Transmission Mechanism: Some Answers and Further Questions. FRBNY Economic Policy Review.

9) MacKinnon, D.P. (2000). Contrasts in Multiple Mediator Models. In J. Rose, L. Chassin, C. C. Presson, & S. J. Sherman (Eds.), Multivariate Applications in Substance use Research: New Methods for New Questions (pp. 141-160). Mahwah, NJ: Erlbaum.

10) Mishkin, F. (2012). The Economics of Money, Banking, and Financial Markets. Prentice Hall. ISBN 9781408200728.

11) Mishra, P., Montie, P. and Sengupta, R. (2016). A Modern Macroeconomic Perspective. (Eds.) Chetan Ghate and Ken Kletzer. Springer Verlag: India.

12) Ndekwu, E.C. (2013). An Analysis of the Monetary Policy Transmission Mechanism and The Real Economy in Nigeria. Central Bank of Nigeria, Occassional Paper No. 43.

13) Nwankwo, C.H and Igweze, A.H. (2016). Comparison of Tests of Indirect Effect in Single Mediation Analysis. American Journal of Theoretical and Applied Statistics. Vol. 5 (2):64-69.

14) Nyumuah, F.S. (2018). An Empirical Analysis of the Monetary Transmission Mechanism of Developing Economies: Evidence from Ghana. International Journal of Economics and Finance; Vol. 10 (4):72-83.

15) Obafemi, F.N. and Ifere, E.O. (2015). Monetary Policy Transmission Mechanism in Nigeria: A FAVAR Approach. International Journal of Economics and Finance; Vol. 7(8):229-239.

16) Okaro, C. S. (2011). Transmission Mechanism of Monetary Policy in Nigeria. African Banking & Finance Review, Vol. 1 (2):68-85.

17) Opolot, J. and Nampewo, D. (2014). Bank Lending Channel of the Monetary Policy Transmission Mechanism in Uganda: Evidence from Disaggregated Bank-level Data. Journal of Applied Finance & Banking, vol. 4(1): 47-60.

18) Robinson, W. and Robinson, J.W. (1997). The Transmission Mechanism of Monetary Policy in the Jamaican Economy. Working Paper, Bank of Jamaica.