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EXTERNAL SHOCKS DYNAMICS AND THE EFFECTIVENESS OF MONETARY POLICY TRANSMISSION CHANNELS IN SSA COUNTRIES

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Abstract

This study examined the extent to which external shocks influence the effective monetary policy transmission mechanisms in the Sub-Saharan African countries in the periods between 1980 and 2024. The Recursive Structural Vector Autoregressive modelling approach was employed to capture the dynamic interactions, interactive effects among key variables and ascertain the most active channels of the monetary policy transmission shocks in the SSA countries. The study revealed the stationarity of the variables at levels and thus established the existence of long run relationships among the variables. The study found that monetary policy transmission effectiveness in SSA is largely influenced by external shocks from financial sector development, macroeconomic performance and the financial institution development index variables, while shocks originating from financial market development index constituted the least active policy transmission channels. This suggests that monetary policy transmission effectiveness is largely influenced by external shocks from financial sector development index and macroeconomic performance variables. Central banks and monetary authorities should thus, adopt an adequate appropriate policy that would leverage the shocks from both financial development and macroeconomic performance in order to reduce the effects of these shocks and boost the monetary policy transmission effectiveness in the SSA countries.

Key words: External shocks dynamics; Financial Development; Monetary Policy; Policy transmission channels; Recursive Structural Vector Autoregression.

JEL Classification: E50, E51, E52, E58

I. Introduction

The efficacy and effective transmission channels via which a monetary policy impulse of the central banks is transmitted to an economy had today been a subject of continuous debates, arguments and relative discourse among scholars, academia and researchers in both developing and developed countries. This is so, because a better understanding and adequate knowledge of the transmission mechanisms of effective monetary policy to real output and inflation objectives are indeed pertinent and sacrosanct for central bankers globally both for effective monetary policy implementations (conducts) and the global monetary objectives (macroeconomic goals) in both developing and developed economies. In other words, and by further implications, the extent to which global monetary policy objectives are achieved in any economy whether developed or developing depends largely on the efficacy and effectiveness of the channels through which the monetary policy impulse is being transmitted to the economy (Nwosa & Saibu, 2012; Sa'ad & Yakubu, 2016). And so, the various transmission channels have their relevance differently, but the question as to which of the channels is the most effective, active and dominant in transmitting the monetary impulse to aggregate output and inflation remains both a subject of debates and unending arguments of concerns among researchers in the literature.

Therefore, while issues on monetary transmission channels and the identification of most dominant channel impulse on the aggregate output and inflation has abound in the literature, possible interactions between external shocks and monetary policy and the extent to which these external shocks dynamics may influence or affect monetary transmission channels in SSA had today suffered much neglects and empirical research attention both among the academia and researcher in the empirical literature. In developing economies like SSA, it is pertinent to analyze the dynamic influences of external shocks on monetary policy impulses for at least two reasons. First, there are scanty evidences regarding the influence of external shocks in Africa, and mixed empirical evidences in the developed economies, and thus, it is worthwhile to update past and current evidences via the use of a wider range of econometric methods. Second, an analysis of the external shocks influence on monetary policy impulses would assist in the clarification of an effective policy transmission mechanism and its impacts on output and inflation in the SSA economies. This is because the monetary policy mix to be adopted and its tools have always been helpful in providing additional stimuli just as the fiscal policy in both developed and developing economies, hence, the need for this study.

Therefore, the extent to which external shocks could influence the effectiveness of monetary policy transmission channels in SSA is today repleted with divergent views, debates, opinions and results in the advanced literature. In most developing economies, empirical works and panel studies on policy transmission are based largely and mostly on VAR, SVAR and DSGE models, but these models had been argued to be limited due to their endogeneity problems and variable omission biasness. This divergence of findings and empirical evidences among the existing body of literature has been hinged on several plausible factors such as the adopted econometric measures, the variable proxy of monetary policy, methodology and period of analysis. For instance, and following the advanced literature, empirical studies in many developing economies had today focused extensively and mostly on the policy rate (MPR) and/or the money supply growth (M2) as the only appropriate proxy measure of monetary policy.

However, to address these issues, this study contributes to the empirics of external shocks and policy transmission mechanisms in developing economies via the use of a new and more robust methodology of the Recursive SVAR technique. In addition, this study thus, uses different measures of monetary policy as independent variables unlike previous that focused mainly on credit, interest rate and exchange rate channels. Hence, while previous and present empirical studies in the developing economies, in particular SSA, have identified most of the active monetary transmission channels in the advanced literature, they however, mostly concentrated on the interest rate and the credit channels (Ogun, 2006; Oyaromade, 2012; Orekoya, 2011; Nkoro & Uko, 2021 among others). This neglect of the other most active key policy transmission channels and transmission mechanisms without any empirical justification and reasons perhaps raises more doubts and theoretical objections, as there could be more than one active policy channel of influence and effect in an economy as often suggested by both the theories and empirical evidences from past and present empirical studies of the developed, emerging and developing economies in the literature (see King, 1994; Nwosa & Saibu, 2012; Nkoro & Uko, 2021).

This study therefore, in addition to the foregoing, employed the panel dataset series on 12 selected sub-Saharan African economies, namely, Ghana, Nigeria, Benin, Angola, Malawi, Kenya, Cameroon, Rwanda, South Africa, Mauritius, Equatorial Guinea and Ethiopia, covering the period between 1980 and 2023. This period and scope were chosen specifically because of two main reasons. Firstly, because it constituted an era where most countries (SSA inclusive) witnessed the wide variations and adverse cyclical fluctuations in policy transmission objectives, implementation and ultimate targets, which partially had been suggested to be explained by both the financial and macroeconomic performance external shocks among the SSA countries. More importantly, is the need to have a wider theoretical view and more empirical knowledge insights on the external shocks - policy transmissions nexus in SSA. Thus, the period is chosen in order to have more proper grasps and a better understanding about the dynamic interactions that may be existing between monetary policy transmission channels and the external shocks in SSA economies, in addition, with how these external shocks may affect the policy transmission channels and impacts in SSA countries, since these policy transmission channels perhaps often vary globally and across different countries and economies, whether developed, emerging or developing (Nkoro & Uko, 2021; Jolayemi & Folorunso, 2021).

Therefore, the objective of this paper is to analyze the dynamic interactions among the external shocks and the monetary policy transmission channels in SSA and developing countries in the period between 1980 and 2023 given that the extent to which external shocks could influence the effectiveness and efficiency performance of monetary policy transmission channels in developing countries constitutes a pertinent and focal strand among academia and scholars in the advanced literature. However, given that some SSA countries are financial development and macroeconomic performance reliant, and that the overdependence on these channels has today exposed most developing economies to several adverse hitting shocks emanating from the global financial institutions and markets, and the extent to how these shocks affect policy transmission mechanisms remains a puzzle to unravel in the literature

(Oyelami & Olomola, 2016; Adejumo & Olomola, 2006). All of these therefore, raises serious issue of concerns, debates and rising public interests about the external shocks – policy transmission nexus which perhaps, confirms the SSA economies to be susceptible to both financial development and macroeconomic performance index channels.

Thus, the study seeks to determine whether a dynamic interaction among the external shocks and effective monetary policy holds in the SSA and developing economies data and the study scope between 1980 and 2024 and how these policy transmission impulses are impaired by the external shocks during the scope and period of the study. Hence, the rest of the paper proceeds as follows: Section two presents some stylized facts on policy transmissions in the SSA economies and the review of the empirical and theoretical existing literature, while the methodological approach and models to the analysis of the paper is discussed in section three. Section four presents, explains and interprets the empirical results of the paper, while the conclusion and policy implications of the study are drawn in section five.

II. Literature Review

The theoretical study of the relationship and dynamic interactions among financial development, macroeconomic performance and monetary policy effectiveness can be traced back to earlier works of Gurley and Shaw (1955; 1967), followed by Taylor (1987), Hendry and Ericsson (1991), Arestis et al., (1992), Mullineux (1994), and Bernanke and Gertler (1995), Beck et al., (2014) and Bean et al., (2002), among many others as identified in the literature. Effiong et al., (2017) for instance, identified two basic theoretical strands and important theories which underline the interconnectedness and links between financial system and the monetary transmission mechanisms via its effectiveness and impact on output and inflation in an economy. These theories include the traditional monetary paradigms of the monetarists, Keynesians and the wicksellian, which further comprises the classical quantity theory of money, Keynesian theory, new - classical and new - Keynesians theories, monetarists paradigm, the wicksellian strands, rational expectations, Mundell – Flemming and the traditional IS – LM models and theories. The second is the modern paradigms which basically include the bank lending and credit perspectives theories of the policy transmission channels. Kashyap and Stein (1997) for instance, identified the modern paradigms as those theories which comprises the credit channel theories i.e. the narrow and broad credit theories, bank lending and liquidity theories, balance sheet channel and theory, the expectation channel, exchange rate channel and the assets prices theories. Also recent is the new consensus macroeconomics model (NCM) which for Arestis (2007) serves as the contemporary theory of monetary policy.

Numerous studies have sort to test the relationship between the financial development and monetary policy transmission mechanisms in developed economies, while only very few have researched on same topic in the developing and SSA economies. Even at that, these available empirical studies and findings on the nexus between financial development and monetary policy effectiveness have been mixed and inconclusive both in results and empirical findings (Effiong, Esu. & Chuku, 2017; Nkoro & Uko, 2021; Oyaromade, 2006). Thus, three strands of empirical findings and studies emerged in the literature as regards the nexus between financial development and the monetary policy transmission channels. These are the positive (direct) strand, the negative (indirect) strand and the mixed studies strand. Hence, while the positive (direct) and negative (indirect) relationships strands (studies) most times constitute the first and second, the mixed relationships strand constitutes the third. A positive or negative relationship strand would suggest an amplification and/or a dampening impact of financial development on policy effectiveness and transmission, while the mixed strand would suggest both asymmetric and mixed effects, and sometimes no significant effect at all.

These available findings in the developing and emerging countries reveal different results just like their developed counterparts. In other words, various findings and evidences from empirical studies on the association between the financial development and monetary policy transmission channels have been mixed, inconclusive and divergent. In this category of inverse (negative) relationships are those empirical studies carried out by Carranza, Galdon and Gomez (2009), Fernald, Spiegel and Swanson (2014), Ma and Lin (2016), Singh, Razi, Endut and Ramlee (2007), Cecchetti (1999), Beck, Colciago and Pfajfar (2014), and Kashyap and Stein (1997) etc., all of these indicating that empirically the effects of monetary policy operate mainly through the financial system and macroeconomic variable performance as it has been argued by Bernanke and Gertler (1995) and others that the degree of financial development is sacrosanct in explaining the effect of monetary policy transmissions in an economy, since an efficacy and effectiveness in monetary policy is crucially dependent on the financial structures and macroeconomic conditions of a country, whether developed or developing (Oyaromade, 2006; Nkoro & Uko, 2021).

Little wonder the study by Bernanke and Gertler (1995) asserts that the effects of monetary policy transmission follows an increasing effect through a more developed financial system and thus recognized the credit channel as the dominant transmission channel based on the credit modern view theory as its theoretical framework,

and the result finds that more financial frictions in the financial system amplifies the effectiveness of monetary policy transmission in the developed and developing economies. Consequently, Kashyap & Stein (1997) empirically examines the impact of bank's liquidity or balance sheet on the effectiveness of monetary policy in European Monetary Union (EMU) countries using the bank lending channel theoretical approach. The study finds that monetary policy becomes more effective through the influence on loan supply and bank lending especially when banks have less liquidity or less liquid balance sheets to lend, thereby showing a negative relationship between the effectiveness of monetary policy and financial development via decline in banks' liquidity or less liquid balance sheet. Results found that monetary policy actions will be more effective when banks have less liquid balance sheet which thus affect their loan supply and credit lending to borrowers.

However, three years after, Kashyap and Stein (2000) conducted similar studies on the impact of monetary policy on lending behaviour of banks in USA between 1976 and 1993 using the two-step regression approach and the lending channel of the modern credit view theory of monetary transmission. A negative significant nexus was found to exist between monetary transmission and financial development through bank lending channel in USA. In other words, the impact of monetary policy on lending behaviour was found to be stronger and dominant for banks with less liquid balance sheets. Hence, all of these empirical findings in the studies by Kashyap and Stein (1997 & 2000) further supported the Cecchetti's negative significant nexus outcomes and also further validates the credit lending channel theory and hypothesis of the monetary transmission mechanisms of monetary policy in the developed countries.

Also, prior to them is the study of Mullineux (1994) that investigated the impact of financial innovation on monetary policy in United Kingdom and the results also showed a prior validation of credit lending channel as the dominant channel. The paper found a negative link and indirect relationship between the financial development and monetary policy effectiveness as the study observed that a higher level of financial fictions became negatively associated with stronger monetary policy transmission and effective monetary policy actions through the dominant credit channel as argued by the credit channel theorists of the modern credit views. Carranza et al., (2009) in addition to above studies examined the in-depth relationship between development in the financial sector and the monetary policy effectiveness using a sample of more than 60 countries and the use of Non-hierarchical Cluster analysis, Dynamic Panel and VARIMAX estimation techniques; where the overall findings showed that there is no unanimous relationship between financial development and monetary policy effectiveness between the developed and developing countries, but the results revealed specifically a negative relationship and showed that a more advanced financial sector will reduce the effectiveness of monetary policy due to financial innovation for the period between 1985 and 2005.

The studies by Cecchetti (1999), and Djankov et al., (2007) carried out empirical studies in 129 developed countries and the study found that economies with better legal protection for shareholders and debtors have more general association with less potent (weak) monetary transmission thereby showing negative relationship between financial development and monetary policy effectiveness. Aysun et al., (2013) supported the above claims on the relevance of non-financial factors on monetary policy action changes and they contributed to the literature by investigating the effects of legal origin, central bank independence and financial markets development on the effectiveness of monetary policy even though the findings conclude that the overall impact of institutional improvement on the effectiveness of monetary policy is not clear cut and requires further research. Safdar and Khan (2013) also analyzed the financial development and monetary policy link by using the interest rate channel for Pakistan. They employed ordinary least squares technique and quarterly data covering the period 1981 to 2010 and the study found that interest rate channel of monetary policy transmission mechanism dampens output and hence financial innovation has implications for output and monetary policy.

Also, contrary to the foregoing are those empirical studies with mixed relationship findings and results between financial development and monetary policy effectiveness in the developed economies; although they appear to be more prevalent than country-specific studies on the developed and advanced countries just as those of negative and positive relationships cross-country studies that had been earlier reviewed and discussed. Among such studies in this category are the cross-country empirical studies by Elbourne and de Haan (2006), Jannsen, Potjagailo and Wolters (2019), Ho (2022) and Seth and Kalyanaraman (2017). Thus, Elbourne and de Haan (2006) examined to what extent monetary transmission is related to financial structures in 10 EU countries specifically in the Central & Eastern Europe using the Structural VAR (SVAR) technique. The result finds little evidence of links between financial structure and monetary policy effectiveness unlike as reported by Cecchetti (1999) in previous studies conducted in Euro areas.

On sub-Saharan African countries, a number of studies have been undertaken to assess the nexus between financial development and the possible effects of monetary policy effectiveness and transmission. Among them for instance, is the study conducted by Effiong, Esu and Chuku (2017). The study investigated whether financial

development influences or affects the effectiveness of monetary policy transmission in Africa for the period between 1990 and 2015 using a panel of 39 selected countries. The authors applied panel data techniques such as pooled least squares, fixed effects, random effects and generalized method of moments (GMM) as estimation techniques to the panel dataset. The results showed that there is a weak relationship between financial development and monetary policy effectiveness in Africa. The result further showed that there exists no statistical evidence of the link for output growth but there exists a negative link and relationships in the case of inflation on contemporaneous levels.

In addition to the foregoing on the empirical studies conducted in Nigeria is the study by Nkoro and Uko (2021) which investigated the transmission channels of monetary policy shocks on real per capita output in Nigeria for the period between 1981 and 2017 using the Vector Autoregressive framework and technique. The results of the impulse response functions in this study shows that real per capita, exchange rate, private sector credit and inflation all responded heterogeneously to the monetary policy shocks in Nigeria, while in the case of variance decomposition, the study revealed that shocks to monetary policy rate explained the largest variation in real per capita output and this is followed by the private sector credit and exchange rate. The study finds the basic channels of monetary transmission on real per capita output to be interest rate via (MPR), credit via (PSC) and the exchange rate channels in Nigeria. In the case of inflation, the study finds the dominant transmission channel of inflation in Nigeria to be interest rate and credit channels via the monetary policy rate (MPR) and private sector credit (PSC) variable channels.

Sa'ad and Yakubu (2016) found almost similar results with Nkoro and Uko (2021) but with little difference in the transmission channels of inflation in Nigeria. The study for instance investigated the channel of monetary transmission mechanism on inflation pressures in Nigeria using the general unrestricted VAR framework and the study found the interest rate channel as most dominant speed of transmission channel of inflation, followed by the exchange rate and asset prices channels. This latter differs from the former with the inclusion of exchange rate and assets prices which the former do not find to be transmission channel of inflation in Nigeria. Hence, while Sa'ad and Yakubu (2016) found the dominant channels to be interest rate, exchange rate and asset prices, Nkoro and Uko (2021) chose to be differed and found the dominant channels of inflation to be interest rate and credit channels. Orekoya (2011) also differs from the foregoing two studies in Nigeria using the Structural VAR framework and the study found the bank lending of credit channel as the dominant transmission channel of monetary policy shocks to output and inflation, while both the interest rate and exchange rate channels were found to be weak transmission channel of output and inflation during the study period which is between 1970 and 2008.

Nwosa and Saibu (2012) in another way also investigated the transmission channels of monetary policy on sectoral output growth in Nigeria for the period between 1986 and 2009 using the VAR framework and granger causality approach on quarterly data, and the study found both the interest rate and exchange rate channels as the most effective monetary policy channels and measures to stimulate sectoral output growth in Nigeria. This finding from Nwosa and Saibu (2012) differs largely from those of Orekoya (2011) who found credit channel via bank lending as the most effective channel but corroborates the two recent studies by Sa'ad and Yakubu (2016) and Nkoro and Uko (2021) who both found interest rate and exchange rate channels as the dominant and most effective channels on output growth and inflation in Nigeria. Also, the study by Oyaromade (2004) investigated the monetary policy transmission mechanisms and the credit rationing effects in Nigeria using a quarterly data between the period of 1970 and 1999, and based on the technique and framework of VAR, the study found both the interest rate and credit channels as the most effective channels playing a significant role in the transmission of monetary impulse to the real sector in Nigeria.

III. Methodology and Theoretical Framework

The New Keynesian Theory of Fluctuations (NKT) which originated from an expansion of the standard real business cycle framework provided the theoretical framework for this study. This is because it provides a better theoretical stance and approach to investigate the dynamic relationship among financial development, macroeconomic performance and monetary policy effectiveness in SSA. According to Mishkin (1995, 2007, and 2011); the most effective tools for influencing the economic activity, real output and inflation during the conduct of monetary policy actions are the monetary transmission channels which comprises the interest rate (bank lending), exchange rate, asset prices, credits to private sector and broad money supply. The reason is simply because, most central banks adopt the manipulation of either the bank interest rate (monetary policy rate) or broad money supply to influence overall economic activities namely aggregate demand, output gap, aggregate income, investments and prices during an expansionary or contractionary phase of monetary policy conduct in an economy. Therefore, it is on the basis of these empirical facts, that both the interest rate and money supply redistributive implications and the effects of monetary policy transmission via the financial development nexus are considered for this study and based on the new Keynesian theory (NKT). Thus, as specified in the study of Orphanides (2003), Cecchetti (1999) and

Mishkin (2016), the three (3) structural equations of the NKT models had been adopted in this study in deriving the empirical models of policy effectiveness and transmissions as follows:

$$\breve{y}_t = E_t y_{t+1} - \sigma(i_t - E_t \pi_{t+1}) + g_t \quad \ldots\ldots (1).$$

$$\pi_t = \beta E_t(\pi_{t+1}) + k\breve{y}_t + u_t \quad \ldots\ldots (2).$$

$$r_t = i_{t-1} + \delta\pi_t + \beta\hat{y}_t + v_t \quad \ldots\ldots (3).$$

Where E_t = depicts agents', rational expectation given the information set available at time t, y_t = is the real output gap, since aggregate output (Y) relies on the equilibrium condition between consumption (C) and government (G) actions in an economy via its monetary and fiscal policies. In addition, the inverse influence of the interest rate on current output depicts intertemporal substitution of consumption, while the intertemporal elasticity of substitution (σ) represents the interest elasticity of the IS curve. π_t = is inflation, i_t = is monetary policy interest rate (usually short-term interest rate), and sometimes referred to as the monetary policy rule (i.e. the discretionary monetary policy rule) which is the weight attached to the output gap (y_t), y_{t+1} = is the expected future output gap, π_{t+1} = is the expected future inflation rate, and; g_t = is the disturbance or error term, while σ = denotes the intertemporal elasticity of substitution which represents the interest elasticity of the IS curve

Ireland (2005) and Goodfriend (2002 for instance, referred to equation (1) as the expectational or forward looking IS curve, while the equation (2) is the improved New Keynesian Phillip's curve and the equation (3) is the central bank's monetary policy rule.

3.1 Model Specification

In line with the foregoing NKT model framework, we re-specify the dynamic relationship among financial development, monetary policy transmission effectiveness and macroeconomic performance variables in the econometric model form as follows in equations (4a) and (4b):

$$\hat{y}_t = \varphi_0 + \varphi_{1i}E_{i,t}\hat{y}_{t+1} + \varphi_{2i}E_{it}\pi_{i,t+1} + \varphi_{3i}(\hat{r}_{i,t}{}^n + v_t) + \varphi_{4i}e_{it} + \varphi_{5i}M2_{it} + \varphi_{6i}CPI_{it} + \varphi_{7i}FD_{it} + \varphi_{8i}INT_{it} + \varphi_{9i}GDPGR_{it} + \varphi_{10i}FID_{it} + \varphi_{11i}FMD_{it} + \epsilon_{1it} \ldots\ldots (4a).$$

$$\hat{\pi}_t = \rho_0 + \rho_1 E_{it}\hat{y}_{t+1} + \rho_2 E_{it}\pi_{t+1} + \rho_3(\hat{r}_t{}^n + v_t) + \rho_4 e_{it} + \rho_5 M2_{it} + \rho_6 FD_{it} + \rho_7 INT_{it} + \rho_8 GDPGR_{it} + \rho_9 FID_{it} + \rho_{10t}FMD_{it} + \epsilon_{2it} \ldots\ldots (4b).$$

Where Y_{it} = is the output gap at country i in period t. $E_{it}Y_{t+1}$ = is the expected output gap at country i in period (t+1); $E_{it}\pi_{t+1}$ = is the anticipated inflation gap at country i in period (t+1); $E_{it}e_{t+1}$ = is the expected exchange rate at country i in period (t+1); $\hat{\pi}_t$ = is the inflation gap at country i in period t; $M2_{it}$ = is the broad money and money supply at country i in period t, which represents monetary policy in period t; CPI_{it} = is the consumer price index at country i in period t and serves as proxy for inflation; FD_{it} = is the financial development index measure at country i in period t, which comprises two basic channels namely, the financial institution development and the financial market development index at period t; INT_{it} = is the real interest rate/monetary policy rate channel at country i in period t, which represents monetary policy in period t; Where country i comprises the (12) selected countries in the sub-Saharan Africa.

Thus, in order to determine the dynamic relationship among financial development, macroeconomic performance and monetary policy effectiveness in SSA, the Recursive Structural VAR (RSVAR) technique and modeling approach were adopted. In other words, the general VAR model specification of the vector (Z_t) of the endogenous variables included in the reduced-form VAR of this study can be expressed as follows:

$$Z_{it} = (MP_{it}, FD_{it}, MPE_{it}) \quad \ldots\ldots (5).$$

Where MP_{it} = is the macroeconomic performance measure proxied by a log of the discomfort index (DISC) derived from the sum of annual inflation & unemployment rate, and the annual GDP growth rate (GDPGR) variables, based on the 12 selected countries in SSA.

FD_{it} = The financial sector development measures which comprises the financial institution development index (FID) and the financial market development index (FMD); and

MPE_t = denotes the central banks' monetary policy measures proxied by the monetary policy variables like broad money supply (M3) and the policy rate (MPR).

In this RSVAR model, all variables are assumed to be endogenous, affecting each other contemporaneously as well as with lags. The Recursive Structural VAR forecast error variance decomposition (FEVD) and impulse response (IR) analysis of the RSVAR model is therefore duly interpreted to achieve this objective. In vector form, the equation can be specified generally as follows in (6):

$$Z_t = k + \beta_1 Z_{t-i} + \beta_2 Z_{t-i} + \beta_3 Z_{t-i} + \ldots\ldots\ldots + \beta_p Z_{t-p} + \mu_{1t} \quad (6).$$

On the basis of equation (5), we thus re-specify the equations (5) and (6) in a VAR reduced form as follows:

$$\Delta MP_{it} = \propto_0 + \sum_{i=1}^{p} \delta_i \Delta MP_{t-i} + \sum_{i=1}^{q} \beta_i \Delta FD_{t-i} + \sum_{i=1}^{r} \gamma_i \Delta MPE_{t-i} + \mu_{2t} \quad (7).$$

$$\Delta FD_{it} = \propto_0 + \sum_{i=1}^{q} \beta_i \Delta FD_{t-i} + \sum_{i=1}^{p} \delta_i \Delta MP_{t-i} + \sum_{i=1}^{r} \gamma_i \Delta MPE_{t-i} + \mu_{3t} \quad (8).$$

$$\Delta MPE_{it} = \propto_0 + \sum_{i=1}^{r} \gamma_i \Delta MPE_{t-i} + \sum_{i=1}^{p} \delta_i \Delta MP_{t-i} + \sum_{i=1}^{q} \beta_i \Delta FD_{t-i} + \mu_{4t} \quad (9).$$

Where; ΔMPE_{it} = f (M2, INT); ΔFD_{it} = f (FID, FMD) and ΔMP_{it} = f (GDPGR, DISC)

ΔMP_{it} = comprises the macroeconomic performance variables proxied by the real Gross Domestic Product growth rates ($GDPGR_{it}$) and the Discomfort Index ($DISC_t$) as suggested by Okun (1980).

FD_{it} = comprises the financial sector development indicators proxied by Overall financial development index (FD_{it}), financial institution development index (FID_{it}), and the financial market development index (FMD_{it})variables.

ΔMPE_t = comprises the monetary policy variables proxied by the monetary policy rate and/or real interest rate (INT_{it}/or MPR_{it}), and lastly, the money supply variables (M2/M3).

3.2 Estimation Techniques

In terms of estimation methods, the Recursive Structural Vector Autoregressive modelling (RSVAR) was employed in this study. The study's objective was carried out by examining the contribution of each of the components of the financial development and macroeconomic performance variable measures namely; the financial development index (FD), financial intermediary/institution development (FID), financial market development (FMD), gross domestic product growth rate (GDPGR) and the discomfort index (DISC) to monetary policy transmission effectiveness in SSA.

3.3 Data Sources

The study used the annual panel data series covering the period between 1980 and 2024, and from the (12) selected sub-Saharan Africa countries notably, Angola, Benin, Cameroun, Equatorial Guinea, Ethiopia, Ghana, Kenya, Malawi, Mauritius, Nigeria, Rwanda and South Africa where countries and time span were selected subject to data availability and information. The main variables were monetary policy rate (MPR) broad money supply (M3); financial development index (FD), financial institution development index (FID) and financial market development index (FMD) as the key for financial development variable shocks, the discomfort index (DISC) which comprises

of both annual inflation (INF) and unemployment (UNEM) rates and the GDP growth rate (GDPGR) as proxies for the macroeconomic performance shocks. These variables and datasets were sourced from the world's macrotrends and the world bank development indicator data publications.

IV. Empirical Results and Discussions

4.1 Descriptive Statistics and Correlation Matrix

Tables 1 and 2 showed the results of the descriptive statistics and pre-estimation test of the variables used in this study. These are preliminary analysis tests used to support the choice of a model and estimation techniques. The mean and median values lie within the maximum and minimum values, showing a good level of consistency. In terms of the symmetricity of the variables, the result showed that the mean and median values of all the observed variables were not too far from each other, which suggests that the distribution was nearly symmetrical. The symmetric distribution of the dataset implied that if the data was graphed and divided into two at the center, both sides of the graph would be a mirrored image of the other. The foregoing further indicated the existence of low variability and normal distribution for these variables. Specifically, financial development index (FD) exhibited the lowest variability in the series with a standard deviation value of 0.113, followed by real GDP with a standard deviation value. Table 4.1 for instance revealed that the mean logarithmic value of FID constitutes the highest average values (197.74) among all the data sets with FD constituting the lowest mean; therefore, suggesting that monetary policy effectiveness in SSA is based mostly on macroeconomic performance and financial development variables.

The skewness revealed that real GDP, all financial development indicators (FD, FID, FMD), GDPGR and INF were all positively skewed while only real interest rate is negatively skewed. In particular, all the variables observed were close to zero, implying that these variables are symmetrical distributions, except for money supply and the FD that were relatively asymmetrical based on the values of the skewness statistics. In addition, the kurtosis measures the peaked-ness (height) or flatness of the distribution of the series. With a threshold of 3, all the series are platykurtic, indicating that the distributions are flat relative to the normal. Furthermore, the kurtosis of LDISC exceeded three, indicating that the series followed a leptokurtic distribution while all the remaining variable measures are less than three, implying that most of the series are greatly peaked relative to the normal distribution i.e. followed a mesokurtic distribution. Lastly, is the Jarque-Bera statistics based on the p-values, which indicates that the series are normally distributed and accept that all the variables are normally distributed at 5%.

Table 1: Descriptive Statistics of the Variables

	GDP	LFD	INF	INTR	LDISC	FID	GDR	FMD
Mean	5.250	0.162	77.345	7.481	45.406	197.74	2.021	47.950
Median	1.050	0.120	57.392	7.331	16.794	72.149	1.231	37.892
Maximum	5.740	0.590	708.30	45.000	4105.6	1030.31	0.351	142.080
Minimum	3.673	0.030	0.100	-93.513	-51.985	0.029	0.016	11.210
Std. Dev.	1.020	0.113	85.631	12.624	218.61	245.55	1.205	30.225
Skewness	2.878	1.931	3.262	-2.885	14.366	1.059	2.012	0.841
Kurtosis	3.003	2.264	2.453	2.504	4.591	2.882	1.021	2.685
Jarque-Bera	2.055	5.498	6.049	8.894	12.86	96.72	2.012	62.96
Probability	0.041	0.000	0.000	0.000	0.000	0.000	0.021	0.000
Sum	2.710	83.37	39909	3860.4	23429.6	10203	2.214	2.041
Sum Sq. Dev.	5.320	6.588	37765	82069	2461	3105	5.221	4704
Observation	516	516	516	516	516	516	516	516

Source: Author's Computation. **Key Notes: LGDP** = Real GDP; **LFD** = Financial Development Index; **LINF** = CPI/Inflation; L**GDR** = GDP Growth Rate; **INT** = Interest Rate; Financial Institution development and **FMD =** Financial Market Development Index.

4.2 Correlation Coefficients of the Variables

Table 2 displays the results of the degree of association among the employed variables. The result showed a weak relationship among the variables since all the explanatory variables were weakly correlated with the dependent variables. From the table 2, it is apparent that there exists a low correlation among the exogenous and endogenous variables. This correlation index ranges from 0.035 to 0.0312 for INF, 0.032 - 0.0.105 for LGDP and 0.158 – 0.052 for LFD. However, there exists low degree of relationships among the endogenous and exogenous variables; implying that there is no suspicion of high multicollinearity, further implying that including these variables in the same model would likely not produce spurious, bias and inconsistent regressions. Hence, the results suggest that the correlation coefficients between the endogenous and exogenous variables are moderate and can co-exist in the same model.

Table 2: Correlation Coefficients of the Variables

	INF	LFD	LGDP	INT	LDISC	LFID	LFMD	LGDPGR
INF	1							
LFD	0.035	1						
LGDP	0.108	0.158	0.032					
INT	0.048	- 0.060	0.016	1				
LDISC	0.115	- 0.030	0.061	-0.203	1			
LFID	0.120	0.253	0.276	-0.066	0.115	1		
LFMD	0.137	- 0.376	0.167	0.088	0.109	0.154	1	
LGDGPR	0.012	0.052	0.105	0.028	0.101	0.027	0.045	1

Source: Author's Computation.

4.3 Summary and Decision of Unit Root (Stationarity) Test

The unit root tests are traditionally used to check the order of integration and to confirm the stationarity of the variables. Two main types of panel unit root tests exist in the literature; namely, the individual panel unit root test which comprises the IPS, Fisher - ADF and Fisher - PP tests and the common panel unit root test which comprises the LLC test. The need to ascertain whether mean reversion and non-stationarity is a characteristic of each variable based on Fisher - Augmented Dickey-Fuller (ADF), Fisher - Phillips-Perron (PP), Im, Pesaran, and Shin (IPS) and Levin, Lin and Chu (LLC) panel unit root tests became paramount in this study. This was conducted at intercept specifications of unit roots on the levels of the series. Therefore, comparing the ADF, PP, IPS and LLC test statistics with their critical values, the results found that all the variable series were stationary at levels. The essence of both tests (common and individual unit root tests) is to guide against biased, spurious and inconsistent panel regression results since such biased results could be misleading, inaccurate, inconsistent and unreliable for policy makers (Baltagi, 2005). Having established that all variables are integrated at an order zero I (0) and stationary at level form, the next step is to apply the RSVAR variance decomposition and impulse response function analysis and techniques on the variables of the study.

Table 3a: Results of Fisher – Augmented Dickey Fuller and Fisher – Phillip Perron Unit Root Tests

Variables	Fisher - Augmented Dickey Fuller (ADF)			Fisher - Phillip Perron (PP)			Decision
	Level	First Difference	P-Value	Level	First Difference	P-Value	
LGDP	15.655	None	0.0000***	22.998	None	0.0000***	I(0)
LFD	-11.6232	None	0.0323**	-11.6106	None	0.0336**	I(0)
INF	7.1768	None	0.0000***	-9.470	None	0.0000***	I(0)
INT	65.887	None	0.0000***	135.73	None	0.0000***	I(0)
LDISC	93.065	None	0.0000***	193.86	None	0.0000***	I(0)
LFID	-12.5338	None	0.0000***	-12.8683	None	0.0000***	I(0)
LFMD	-3.9570	None	0.0000***	-8.3315	None	0.0000***	I(0)
LGDPGR	5.7632	None	0.0004***	8.3822	None	0.0000***	I(0)

Source: Author's Computation. All variables are estimated at both trend & intercept. **Note:** ***, ** and * represent 1%, 5% and 10% level of significance respectively.

Table 3b: Results of Levin, Lin & Chu (LLC) and Im, Pesaran & Shin (IPS) Unit Root Tests

Variables	Levin, Lin and Chu (LLC)			Im, Pesaran, and Shin (IPS)			Decision
	Level	First Difference	P-Value	Level	First Difference	P-Value	
LGDP	-9.4739	None	0.0000***	-11.0621	None	0.0000***	I(0)
LFD	-10.525	None	0.0000***	-13.719	None	0.0000**	I(0)
INF	5.2854	None	0.0000***	-5.1707	None	0.0000***	I(0)
INT	-1.8884	None	0.0295**	-4.6753	None	0.0000***	I(0)
LDISC	-6.0196	None	0.0000***	-6.5885	None	0.0000***	I(0)
LFID	-3.8492	None	0.0000***	-0.4605	-13.257	0.0000***	I(0)
LFMD	-0.1703	-11.678	0.0000***	-0.7483	-12.520	0.0000***	I(1)
LGDPGR	7.4543	None	0.0005***	10.7924	None	0.0001	I(0)

Source: Author's Computation. All variables are estimated at both trend & intercept.
Note: ***, ** and * represent 1%, 5% and 10% level of significance respectively.

4.4 Maximum Lag Length Selection Table

Table 4: Lag Length Criteria and Maximum Lag Length Table
Endogenous Variables: *MPR, LDISC, GDPGR, LFD, LFID, LFMD.*

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2039.316	NA	8.130130	16.63672	16.73646	16.67688
1	80.58056	41.09140*	9.380230	-0.508999*	0.598120*	0.121460*
2	167.0087	162.3163	7.580100*	-0.504136	0.992042	0.098305
3	225.2169	106.0051	7.740200	-0.578999	1.615396	0.304582
4	262.9698	66.60475	7.820600	-0.487559	2.405052	0.677161
5	312.9322	85.30173	7.920220	-0.495384	3.095443	0.950475
6	352.6583	65.56414	7.660130	-0.419986	3.869058	1.307012

Source: Author's Compilation using E-views, 2024. **Notes:** * indicates the lag order selected by the criterion respectively.

In using the RSVAR modeling approach of the unrestricted VAR techniques, there is also a need to determine the optimal lag length of the variables using the five (5) different information criteria and measures. The result in Table 4 suggests and indicates the optimal lag length for the stochastic equation to be one (1) i.e. $p^{*}= 1$ is chosen and employed as appropriate lag length in the study.

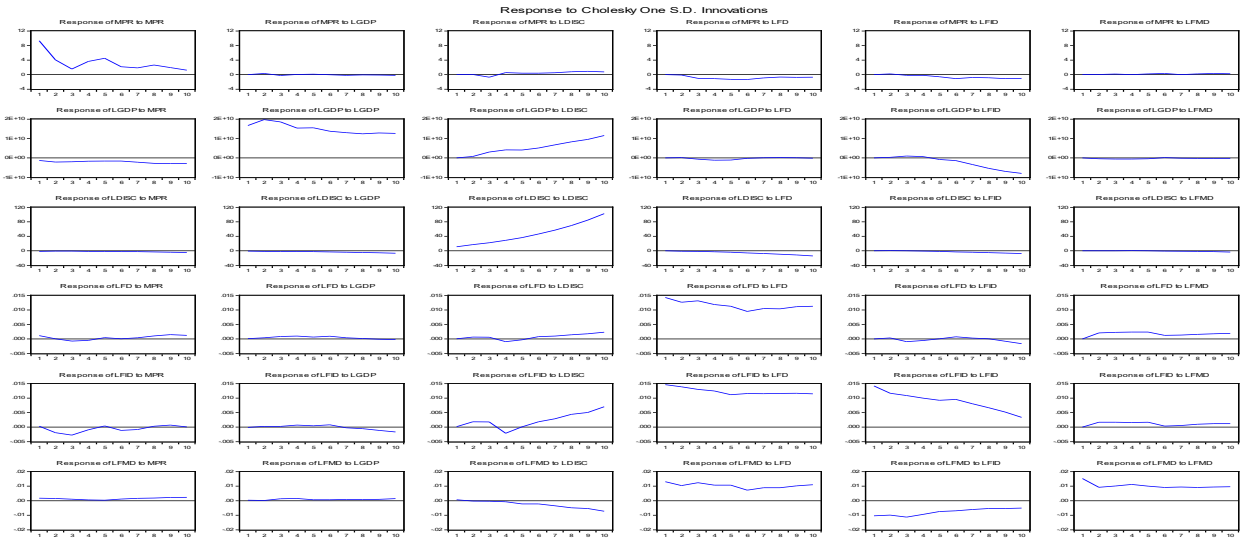
4.5 Recursive Structural Forecast Error Variance Decomposition Function (FEVD) and Results Discussions

The Recursive Structural VAR forecast error variance decomposition functions (R-SVDF) which is a variant type of the general unrestricted VAR forecast error variance decomposition functions (FEVD) was employed in this study. The reason is to measure the percentage change in the dependent variable (regressand) induced by shocks to the explanatory variables and/or regressors in the Recursive SVAR model. In other words, the RSVD function estimates would help us to measure the relative contribution of the impact or effect made by each of the regressors i.e. the financial sector development and macroeconomic performance variables which comprises the overall financial development index (LFD), financial institution development (LFID), financial market development (LFMD), GDP growth rate (GDPGR), and the discomfort index (LDISC) towards the regressand the monetary policy rate (MPR) as a measure of monetary policy and its effectiveness in SSA and developing economies. Therefore, given that the unrestricted general VAR and Structural VAR models are recursively sensitive, the popular Cholesky ordering and Structural decomposition ordering were both applied in the estimation of the recursive structural variance decomposition (RSVD) function analysis in this study. These recursive structural variance decomposition (RSVD) functions estimates and results are presented and well shown in Table 5 in this study.

4.5.1 Forecast Error Impulse Response of Monetary Policy Rate (MPR) Channel of Monetary Policy in SSA

The result from Figures 1 and 2 showed that a standard deviation shock originating from monetary policy rate channel positively influenced itself throughout the period of study (impulse 1,1). This means that the policy rate channel of monetary policy positively influenced itself in SSA during the period of study. In particular, with regards to the response of MPR channel of monetary policy to itself, it further means that a one-unit shock in MPR led to initial much decline in itself, though still above its equilibrium line but reached its minimum in the third period (short run). It further rose slightly, got to one of its peaks at the sixth period (middle run), and thereafter begins to rise and decline (fluctuating at intervals) in the rest of the period. Also, as regards its response (MPR) to a standard deviation shock from the other components and measures channels of financial development index and macroeconomic performance in SSA i.e. with regards to the response of MPR to (GDPGR, LDISC, LFD, LFID, and LFMD), the GDP growth rate channel of macroeconomic performance (GDPGR) responded mixed (i.e. it affected MPR both positively and negatively) to a standard deviation shock from the monetary policy rate (MPR) channel of monetary policy (impulse 1,2), thus, positive between the first and third periods (short run) and in the fifth and sixth period (middle run) but became negative in the fourth period and between the seventh and tenth periods (long run), although the shock effects were negligible and slight in all the observed periods in the study.

Figure 1: Recursive Structural Impulse Response of Financial Sector Development, Macroeconomic Performance and Monetary Policy Effectiveness in SSA



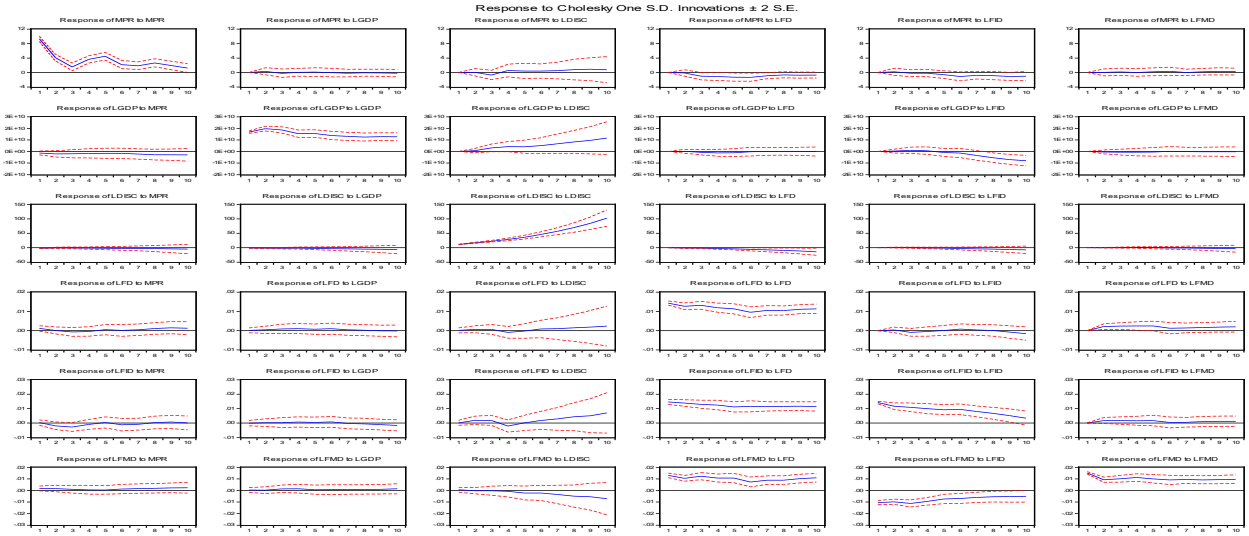
Source: Author's Compilation from E-views, 2024.

Note: Financial Development Components – LFD, LFID, LFMD, Macroeconomic Performance Components – LDISC, GDPGR, Monetary Policy – MPR.

In the case of a standard deviation shock to the discomfort index measure of macroeconomic performance which comprises of the unemployment and inflation rate channels (impulse 1,3), the monetary policy rate (MPR) channel of monetary policy responded negatively between the first and fourth periods (short run), it thereafter cuts and fell below the equilibrium level and began to rise slightly in the rest periods (long run). This means that the response of MPR to LDISC is very significant in the long run, implying that a one-unit shock in LDISC (discomfort index) led to an initial decline below its equilibrium line in the (first and fourth period) short run and a marginal positive jump above its equilibrium line in the rest periods (long run). This therefore means that increased macroeconomic performance proxied by discomfort index (i.e. increased inflation and unemployment) could contribute to monetary policy effectiveness significantly in both the short and long run. This could be attributed to the fact that the discomfort index channel of macroeconomic performance could result to increased policy efficiency and effectiveness in the long run, this is evident in the result as a one-unit shock in LDISC led to initial negative effect on policy rate (MPR) in the short run and a positive effect in the long run, precisely negative between period 1 and 4, and positive in the rest periods since it rises steadily and positively in the rest periods even up till the tenth period (i.e. in the long run).

A standard deviation shock from the overall financial sector development (LFD) channel (impulse 1,4) negatively influenced the MPR channel in all the periods observed, though the effect was more pronounced in the medium and long run, but faded away in the earlier periods (short run). However, the effect of a standard deviation shock to the financial institution development (i.e. the institution based) channel (impulse 1,5) had a positive but negligible effect on the MPR in the short run between first and fourth period, and then later cuts the equilibrium line and thereafter declined in the rest observed periods in SSA. Also, with regards to the response of monetary policy (MPR) to financial market development (LFMD) i.e. the market-based channel, it shows that the former (MPR) remains perpetually around its equilibrium as it is positive and fluctuates slightly about its equilibrium line. Finally, it implies that a standard deviation shock from LFMD positively affected the monetary policy in between the medium run and long run observed, indicating that the effect remained slight and negligible in the short run and less pronounced in the long run (impulse 1,6). This implies that the growing level of LFMD in SSA has affected the effectiveness of monetary policy (MPR) in the SSA economy.

Figure 2: Recursive Structural Impulse Response of Financial Development, Macroeconomic Performance and the Monetary Policy in SSA



Source: Author's Compilation from E-views, 2024. **Note:** Financial Development Components – LFD, LFID, LFMD, Macroeconomic Performance Components – LDISC, GDPGR, Monetary Policy – MPR.

4.5.2 Establishing the most dominant and active transmission channels of Financial Development and Macroeconomic Performance Variables on Monetary Policy Effectiveness in SSA Countries

In order to establish and ascertain the most effective or dominant variable channel or measure of financial development and macroeconomic performance on monetary policy effectiveness in SSA, the general unrestricted Vector Autoregressive (VAR) variance decomposition function (VDF) analysis of the monetary policy rate (MPR) from the Recursive Structural Vector Autoregression Model (RSVAR) technique is adopted in this study. The foregoing task therefore, constitutes one of the specific research objectives and questions that this study seeks to achieve in the SSA and developing countries. These according to the past methodological literature are usually done or better carried out by examining and investigating the relative contribution of each of the two main basic components and channels of financial sector development namely the financial institution development index (LFID) channel which proxies the bank-based financial system and the financial market development index (LFMD) channel which also proxies the market-based financial system (Ma & Lin, 2016).

In addition to the foregoing and as a contribution to knowledge is the measures of the relative contributions from the two basic components of macroeconomic performance namely the discomfort index (LDISC) which measures both the economic condition, macroeconomic well-being and economic welfare, and the Gross Domestic Product Growth rate (GDPGR) measure or channel to monetary policy rate and its effectiveness in the SSA during the period of study (Okun, 1980). Hence, by implication, the index measure or channel with the highest contribution to the variations in the monetary policy rate of the monetary policy becomes the dominant (largest and most effective)

channel or measure of financial development and macroeconomic performance nexus to the monetary policy effectiveness in SSA, while a measure or channel with the lowest or least contribution remains the least effective or the smallest channel or measure of financial development and macroeconomic performance nexus to monetary policy effectiveness in SSA. To achieve this objective task, the recursive structural variance decomposition function (RSVDF) analysis of the monetary policy rate channel (MPR) of monetary policy effectiveness is therefore carried out below respectively.

4.5.3 Recursive Structural Variance Decomposition of Monetary Policy Effectiveness Channels in SSA

Table 5: Recursive Structural Variance Decomposition of Monetary Policy Effectiveness Channel

Period	S.E.	MPR	LDISC	GDPGR	LFD	LFID	LFMD
1	9.291880	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	10.14903	99.84521	0.003333	0.101209	0.018109	0.031589	0.000547
3	10.34564	98.26571	0.462557	0.146307	1.034345	0.061171	0.029909
4	11.03058	97.22543	0.641539	0.130623	1.894729	0.081366	0.026311
5	12.00794	96.11735	0.659133	0.117765	2.741338	0.320014	0.044403
6	12.33599	94.21316	0.726592	0.113233	3.748862	1.086293	0.111857
7	12.54246	93.30722	0.877331	0.130867	4.141552	1.434685	0.108348
8	12.89093	92.54768	1.209197	0.126518	4.181134	1.812527	0.122941
9	13.13802	91.28791	1.627707	0.127692	4.347859	2.432456	0.176379
10	13.27663	90.21790	1.900199	0.145488	4.547941	2.983632	0.204841

Source: Author's Compilation from E-views, 2024. **Note:** Financial Development Components – LFD, Macroeconomic Performance Components – LDISC, GDPGR, Monetary Policy – MPR, EXR, INT.

Table 5 above revealed that all the three financial development indicators namely; the financial sector development index (LFD), financial institution development (LFID) and financial market development (LFMD) channels of financial sector development failed to account and do not account for any variations or changes in the monetary policy effectiveness in the first period. In other words, all the three variable measures of financial development namely financial sector development index, financial institution development and financial market development (LFD, LFID and LFMD) did not account for any of the variations in the monetary policy rate channel of monetary policy effectiveness in the first period during the study. Conversely, in the second, third, fourth and fifth periods, the three basic channels or measures namely, the overall financial sector development (LFD), financial institution development (LFID) and the financial market development (LFMD) channels all contributed to an average of 1.42% (LFD), 0.12%, and 0.03% of the variations or changes in the monetary policy effectiveness respectively in the short run and periods under study.

Furthermore, the contributions of the financial sector development (LFD), financial institution development (LFID) and the financial market development (LFMD) channels to the variations in monetary policy effectiveness also significantly increased and rose from 3.74% (LFD), 1.09% (LFID) and 0.11% (LFMD) in the sixth period (middle run) to about 4.54% (LFD), 2.98% (LFID) and 0.20% (LFMD) respectively in the tenth period (long run) in SSA. The implication of this finding is that the overall financial sector development (LFD) channel or component of the total financial development had the highest contribution to the variations and changes in monetary policy effectiveness in SSA during the short and long run period of study. This is however, followed by the financial institution development index (LFID) measure or channel and the financial market development index measure, component or channel in that order.

Therefore, in comparing the recursive structural variance decomposition function (RSVDF) results using the two basic components of financial development measures namely, the financial intermediary/institution development (LFID) and the financial market development (LFMD) channels, we find that the bank-based financial system i.e. the financial intermediary/institution development variable (LFID) contributes the largest and more significantly to the variations and changes in the effectiveness of monetary policy in SSA than that of the market-based financial system i.e. the financial market development variable (LFMD). This result indicates and suggests that the effectiveness of monetary policy may depend more on the development of the financial intermediary or institution supervised and headed by the central banks in the money markets than those of the developments of the financial market or stock market that are supervised and controlled by the securities and exchange commissions or board (SEC) in the capital markets. In other words, the RSVDF results suggests that a bank-based financial system

contributes more and significantly to the variations and changes in the monetary policy and monetary policy effectiveness in SSA than the market-based financial system during the period of the study.

This foregoing result further justifies the well-known facts and previous assertions that a vibrant financial system and development are both crucial and necessary for the conduct of monetary policy objectives, instruments and targes since an effective monetary policy and its targets are essentially a financial process with the financial system, development and structure as the interface and links for both effective and efficient monetary policy (Levine, 2005; Loutskina & Strahan, 2009; Ma & Lin, 2016). This result and finding therefore corroborates the previous findings by Mullineux (1994), Bernanke and Gertler (1995) and recently by Ma and Lin (2016) that an effective monetary policy and monetary policy generally works largely through its influence on the financial system, financial structure, conditions and development over time. It also confirms and affirms the findings of Ma and Lin (2016) that a bank based financial system contributes largely and more significantly to the effectiveness of monetary policy in 41 developing and advanced economies than the market - based system while comparing the basic two components of financial sector developments in both the developed and developing countries.

In addition, the contributions of the two basic macroeconomic performance indicators and measures namely, the discomfort index (LDISC) which comprises the annual inflation and unemployment rates and the GDP growth rate (GDPGR) to the variations and changes in monetary policy effectiveness also did not account for any variation in the monetary policy effectiveness in the first period just like the two basic components of financial sector development measures during the period of study, while in the second, third, fourth and fifth periods, the two basic channels and indicators of macroeconomic performance namely the discomfort index (LDISC) and the GDP growth rate (GDPGR) channels both contributed an average of 0.44% (LDISC) and 0.12% (GDPGR) to the variations and changes in the monetary policy effectiveness respectively in SSA during the period of study. This trend and variation changes continued as the contribution of the discomfort index (LDISC) measure rose significantly and largely from 0.73% in the sixth period (middle run) to 1.90% in the tenth period (long run), while the contribution of the GDP growth rate (GDPGR) channel to the variations and changes in monetary policy and its effectiveness also rose slightly between these periods, such that it rose and increased from 0.11% in the sixth period (middle run) to 0.15% in the tenth period (long run).

The implication of the foregoing result is that the unemployment and inflation rates channels and measures of macroeconomic performance proxied by the discomfort index (LDISC) as suggested by Okun (1980) had the highest contribution to the variations and changes in monetary policy effectiveness in SSA during the period of study, followed by the GDP growth rate (GDPGR) channels. Put simply, in comparing the results of the two foregoing basic components and channels of macroeconomic performance namely the discomfort index and GDP growth rate (i.e. DISC and GDPGR) on the effectiveness of monetary policy in SSA economies, the results however, suggests that the discomfort index (LDISC) measure and component of the macroeconomic performance contributes more largely and significantly to the variations and changes in the monetary policy effectiveness in SSA than the GDP growth rate (GDPGR) measure, component and channel both in the short and long run during the period of the study.

Thus, the most effective (dominant) measure and channel of macroeconomic performance and financial development to monetary policy effectiveness in SSA are the discomfort index (LDISC) and the financial intermediary/institution development (LFID) channels. This perhaps may be as a result of the recent decade rise in financial deepening over stock market subscriptions in Africa, the increase in bank accessibility and efficiency due to a rise in the numbers of banks and non-bank financial institutions, increased fund mobilization and channelization due to recent financial and bank reforms, the dynamics of fiscal and monetary policy, dynamics of the labour market, inflation and unemployment problems, dollarization, fiscal dominance and indiscipline issues prevalent in African economies and the fact that African and SSA countries lag behind their counterparts across the rest of the globe in terms of financial market development in the capital market (Mishra & Montiel, 2013). This is because many of these listed and highlighted problems in Africa have strong tendencies to both undermine and affect the effectiveness and efficiency of monetary objectives and targets of output and inflation in SSA (Effiong, Esu & Chuku, 2017).

Furthermore, the least dominant or lowest effective component/channel of financial sector development to monetary policy effectiveness in SSA is the financial market development (LFMD) channel, while that of the macroeconomic performance component is the GDP growth rate (GDPGR) channel. The possible explanation for these channels (i.e. LFMD and GDPGR) emerging as the least most effective or lowest channel may be linked to the abysmal low levels of subscription in the financial bonds, credits and government securities in the African financial market in comparison to their counterparts in developed economies which is mainly due to the influence of public expectations and the fall in public trust, low competitiveness in the African financial markets, less-developed financial markets, and the lack of well-functioning and competitive financial markets in terms of development in the stock, bond and security markets, unlike what is obtainable in the financial institution markets. Also, and of key

notice and interest, is the continuous fall in real investment growth and financial market instruments such as the financial bonds, debentures, financial assets and liabilities, the financial securities among others (Christensen, 2011 & Montiel, 2013).

Consequently, others however, include the continuous rise in the real interest rate for borrowing (INT), the monetary policy rate (MPR), decreases in bond rates, high level of corruption and embezzlement and lastly, the abysmal low and weak institutions in terms of quality and regulatory environment, limited degree of international financial integration with the global financial markets and the frequent foreign exchange market interventions. This is because by implication, the lack of a well-developed financial system would perhaps weakens the various financial development and macroeconomic performance transmission channels through the financial intermediary development (LFID), financial market development (LFMD), overall financial sector development (LFD), GDP growth rate, output growth, inflation and unemployment rates; all of which have today contributed adversely to the fall in the growth rate of GDP, real national output (real GDP), national productivity and the GDP per capita in the SSA countries.

This therefore leaves the bank-system channel of financial system development and the discomfort index channel of macroeconomic performance as the only viable channels for effective financial development transmission of monetary policy effectiveness which invariably can be equally impaired by the institution environment, low degree of competition, low degree of financial depth, accessibility, stability and efficiency since a weakening of the bank-based and market-based financial systems and the macroeconomic performance of the economic well-being and general welfare conditions may perhaps lead to a weakening of the overall financial development and macroeconomic performance transmissions of monetary policy and its effectiveness in developing and SSA countries (Christensen, 2011; Effiong, Esu & Chuku, 2017). Thus, we can conclude that all the two main macroeconomic performance channels and the three basic components of financial development to monetary policy are both effective and significant in SSA and developing countries, but the discomfort index (LDISC), overall financial sector development index (LFD) and bank-based financial system (LFID) channels of macroeconomic performance and financial sector development remains the dominant transmission and measures channel in SSA and developing countries. Conclusively, the findings of this study support the views of Saxegaard (2006), Ma and Lin (2016), Effiong, Esu and Chuku (2017), Montiel (2013) and Christensen (2011) both in the developed and developing countries.

V. Conclusion

In summary and conclusion, this study determines and ascertains the external shocks with largest and lowest effect on monetary policy effectiveness in SSA using the Recursive structural vector autoregression modeling technique. Hence and based on the findings and results, while the financial institution development index (FID) and discomfort index channels (DISC) remain the largest and most active component channels and drivers of policy transmission effectiveness in SSA, the GDP growth rate (GDPGR) and financial market development (FMD) component channels on the other hand remain the least dominant and least active channels and component drivers of policy transmission and effectiveness in the SSA and developing countries. The reason for this outcome is because the latter (FMD and GDPGR channels) transmit the lowest (least or smallest) impact of shocks to the monetary policy effectiveness and transmissions in SSA and developing countries. This perhaps may be due to the slow and weaken growth, the underdevelopment and poor performances of the financial market developments and the markets less competitiveness in the SSA as compare to those of the developed countries.

Hence, it is right to conclude that the financial institution development index (FID) channel remains and appears to be the most active or dominant transmission channel as it transmits highest impact of shocks to monetary policy effectiveness in SSA, followed by the discomfort index (DISC) channel, while the least active or least dominant channel remains the GDP growth rate and the financial market development component measures and channels in SSA. The study thus recommends that there should be a policy coordination, synergy and cohesion among the monetary policy of the central banks, the nation's financial sector development plans and the macroeconomic performance indicators in the SSA economies such that the developing nations' macroeconomic policies (SSA inclusive) will be able to manage the aggregate shocks and the adverse effects that are emanating from both the internal and external shocks in developing and SSA economies.

VI. REFERENCES

1. Aysun, U., Brady, R. and Honig, A. (2013). Financial Frictions and the Strength of Monetary Transmission. Journal of International Money and Finance. 32, 1097 – 1119. https://doi.org/10.1016/j.jimonfin.2012.09.003.
2. Bernanke, B. & Gertler, M. (1995). Inside the black box: The Credit Channel of Monetary Policy Transmission. *Journal of Economic Perspectives. 9*(4), 27–48. https://doi.org/10.3386/w5146.
3. Carranza, L., Galdon-Sanchez, J. & Gomez-Biscarri, J. (2010). Understanding the relationship between Financial Development and Monetary Policy. *Review of International Economics, 18*(5), 849 – 864. https:// doi.org/10.1111/j.1467-9396.2010. 00926.x
4. Cecchetti, S.G., Flores-Lagunes, A. and Krause, S. (2006). Has Monetary Policy Become More Efficient? A Cross-Country Analysis. *The Economic Journal. 116*, 408-433.
5. Christensen, B. V. (2016). Have monetary transmission mechanisms in Africa changed? *BIS Working Paper* No. 56, Bank of International Settlement.
6. Effiong, E., Esu, G., & Chuku, C. (2017). Financial Development and Monetary Policy Effectiveness in Africa. MPRA Paper No. 79732. https://mpra.ub.unim uenchen.de/79732/Paper No 79732.
7. Gertler, M. & Gilchrist, S. (1995). The Role of Credit Market Imperfection in the Monetary Transmission: Arguments and Evidence. *Scandinarian Journal of Economic,* 95(1), 43 – 64. http://dx.doi.org/10.2307/3440134.
8. Gurley, J. & Shaw, E. (1955). Financial Aspects of Economic Development. *American Economic Review. 45*, 515 – 538.
9. Gurley, J. & Shaw, E. (1967). Financial Structure and Economic Development. *Economic Development and Cultural Change. 15,* 257 – 268. https://doi.org/10.1086/450226.
10. Ireland, N. (2005). The Monetary Transmission Mechanism. *FRB of Boston Working Paper* No. 6. JEL Classification: E52.
11. Jannsen, N., Potjagailo, G. & Wolters, M. (2019). Monetary Policy during Financial Crises: Is the Transmission Mechanism Impaired? *International Journal of Central Banking. 15*(4), 81-126.
12. Karim, Z.A., Zaidi, M.A.S., & Karim, B.A. (2013). Monetary policy shocks, financial constraints and firm-level equity return: Panel evidence. *Journal Pengurusan, 39*, 51–63. https://doi.org/10.17576/pengurusan-2013-39-05
13. Kashyap, A. & Stein, J. (1995). The Impact of Monetary Policy on Bank Balance Sheets. *Carnegie-Rochester Conference Series on Public Policy* 42, 151-195.
14. Kashyap, A. & Stein, J. (2000). What do a million Observations on Banks say about the Transmission of Monetary Policy? *American Economic Review. 90,* 407 – 428.
15. Loutskina, E. & Strahan, P. (2009). Securitization and the declining impact of Bank Finance on Loan Supply: Evidence from Mortgage Originations. *Journal of Finance. 64*, 861 – 889.
16. Mahmood -ur- Rahman, (2018). Financial Development and Monetary Policy Efficiency: Unraveling the Empirical Contradiction and Discovering the True Relation. *Economics Bulletin, 38*(1), 281-296.
17. Mishkin, F. (1995). "Symposium on the Monetary Transmission Mechanism," *Journal of Economic perspectives*, *9*(4), 3-10.
18. Mishkin, F. (1996). The Channels of Monetary Transmission: Lessons for Monetary Policy, *National Bureau of Economic Research*, No. 5464.
19. Mishra, P., Montiel, P.J., & Spilimbergo, A. (2012). Monetary transmission in low-income countries: Effectiveness and Policy Implications. *IMF Economic Review, 60*(2), 270–302. https://doi.org/10.1057/imfer.2012.7
20. Mullineux, A. (1994). Financial Innovation and Monetary Policy in the United Kingdom. *Review of Policy (2)*1, 29 – 44.
21. Nkoro, E. & Uko, A. (2021). Monetary Policy Transmission Mechanism and Economic Development: Evidence from Nigeria. *International Journal of Economics, Commerce and Management.* 9(5), 259 – 289.
22. Nwosa, P. & Saibu, O. (2012). The Monetary Transmission Mechanisms in Nigeria: A Sectoral Output Analysis. *International Journal of Economics and Finance.* 4(1), 204 – 212.
23. Orekoya, S. (2011). Monetary Policy Transmission Mechanisms in Nigeria. PhD Thesis, Economics Department, University of Ibadan, Ibadan.
24. Oyaromade, R. (2004). Credit Rationing and the Transmission Mechanism of Monetary Policy in Nigeria. PhD Thesis, Economics Department, University of Ibadan, Ibadan.
25. Oyaromade, R. (2002). Monetary Policy Transmission Mechanism in Nigeria: A VECM Approach. *The Nigerian Journal of Economic and Social Studies, 44(2),* 187-206.
26. Oyaromade, R. (2006). Monetary Transmission Mechanism, Credit Availability Doctrine and Credit Rationing Hypothesis: A Literature Survey. *Applied Macroeconomics and Economic Development,* University of Ibadan Press, 217-250.
27. Sa'ad, S. & Yakubu, A. (2016). A Comparative Study of the Channels of Monetary Transmission Mechanism and Inflation Targeting in Nigeria. *Abuja Journal of Business and Management.* 2(5), 143-151.
28. Thi, Lam & Ho (2022). Financial Development: Is it an Advantage or Obstacle for Monetary Policy? *Journal of Advances in Management Research. 19*(3), 349-366. DOI: 10.1108/JAMR-03-2021-0103.