IRMM
INTERNATIONAL REVIEW OF MANAGEMENT AND MARKETING
EJ EconJournals
ISSN: 2146-4405

International Review of Management and Marketing

ISSN: 2146-4405

available at http: www.econjournals.com

International Review of Management and Marketing, 2018, 8(6), 53-61.

EJ EconJournals

Financial Intermediation and Monetary Policy Effectiveness in Nigeria

Okoro E. U. Okoro[1], Charles O. Manasseh[2]*, Felicia C. Abada[3], Williams A. Nzidee[4], Ambrose C. Okeke[2], Josaphat U. J. Onwumere[1]

[1]Department of Banking and Finance, University of Nigeria Enugu Campus, Nigeria, [2]Department of Economics, Coal City University Enugu, Nigeria, [3]Institute of General Studies, University of Nigeria Nsukka, Nigeria, [4]Department of Economics, Ignatius Ajuru University of Education, Nigeria. *Email: charssille@gmail.com

Received: 20 August 2018 **Accepted:** 25 October 2018 **DOI:** https://doi.org/10.32479/irmm.7273

ABSTRACT

The need to be able to assess properly the extent of the relationship between financial intermediation and monetary policies of the Central Bank of Nigeria (CBN) gave rise to the study on "impact of Financial Intermediation on Monetary Policy Effectiveness in Nigeria." It is evidently clear that financial systems world over are heavily regulated in order to achieve the macroeconomic objectives of the government. Nigeria is not an exception. For this reason, the study estimated the impact of interest rate on bank loans and advances. The study further investigates the impact of cash reserve ratio on demand deposit. The data for study were sourced from CBN statistical bulletin which was estimated using ordinary least square method. The results showed that interest rate have significant impact on bank loan and advances, while cash reserve ratio has positive and significant impact on demand deposit. Consequently, the study recommended that the Central Bank (CBN) and the authorities of the Nigeria Financial system should ensure that the effectiveness of monetary policies is maintained at all times. Also, effort should be made by the apex bank to promote the activities of the commercial banks in intermediary role and should be integrated as a primary role of the commercial banks in Nigeria.

Keywords: Financial Intermediation, Monetary Policy Effectiveness, Cash Reserve Ratio
JEL Classifications: E52, G2

1. INTRODUCTION

Financial intermediary is an institution that acts as a middleman between two parties for the purposes of improving economic activities through the supply of capital from savers to investors. Financial intermediaries, such as commercial bank, investment banks, mutual funds and pension funds provides service that is beneficial to the average consumer, including safety, liquidity, and economies of scale which give cost advantages to enterprises including investment banking and asset management obtain due to their scale of operation. Although in some areas like investment, advancement in technology has threatened to destroy intermediary role of financial system. But this disintermediation has been found to be much less of a threat in areas like finance, including banking and insurance. Efficient intermediation of the financial system promotes the transfer of funds from group with excess capital to the needing funds (Yusifzada and Mammadova, 2015). This development makes a fuss of efficient markets that result to lower cost of conducting businesses in an economy and promote growth. The intermediary role of financial institutions is not restricted to mobilisation of fund only, but cut across many activities, ranging from financial advisory role associated with clients through the purchase stocks, insurance, bonds, real estate and other assets. In most cases, it also makes fund available to investors by standing as a guarantor between the borrowers and the lenders. It is the main drivers of economic growth, which work through the increase in total factor productivity, investments guide to the most productive projects and monitoring them in a cost efficient way (Yusifzada

and Mammadova, 2015). Thus, effective intermediation decreases transaction costs of capital accumulation and encourage savings and investment.

However, through financial intermediary, savers can gather their funds and leverage the opportunity of large investments. This in turn could benefit the entity in which they are investing. Also, intermediation of the financial system reduces risk by spreading funds across a diverse range of investments and loans, which benefit households and countries by enabling them to spend more money. The supply of capital to improve business activities in an economy could be encouraged with effective financial intermediations to satisfy simultaneously the portfolio preferences of borrowers and lenders. This could aid borrowers to expand their holdings of real assets beyond the limits of their own net worth from capital collected in form of loan from the lenders. Also, encourage lenders to hold part or all of their net worth in assets of stable money value with negligible risk of default. However, it is interesting to know that financial depth may be stimulated by financial intermediaries to an extent, but it does not fully reflect the effectiveness of financial intermediaries in leveraging economic agents the opportunities of stimulating economic growth (Alpr et al., Nil). Therefore, this suggests that aspects of financial system such as access, efficiency and stability should be given attention in order to buttress the relationship between finance and economic growth. There is no doubt that efficient financial intermediation has multiplier effect in the economy, but it has been pointed that the viability of the financial system is partly dependent on the type of monetary policy a country adopted, and that's why it is widely agreed that monetary policy is a two edged sword which promote or demote economic activities over a given periods of time through various the monetary policy instruments.

As a process, the monetary authority of the apex bank such as Central Bank of Nigeria (CBN) controls the affairs of the economy by regulating the cost of borrowing in short-term or the monetary base, often targeting reasonable inflation or interest rate that could promote investment and, to ensure price stability and general trust in the currency. This aim at stabilizing the economy through the stimulation of investment in order to achieve and maintain low unemployment and predictable exchange rates with other currencies, and as well promotes the intermediary role of the financial institutions. Though, in many developing countries monetary policy has generally been formed together with fiscal policy like taxation, government spending and associated borrowing which is opposite of what is obtainable in developed countries (Friedman, 1968). Be that at it may, whether monetary and fiscal policies are formed together or not, the most significant aspect of every policy is the target and transparency in the implementation to create good environment for the policy mechanism to transmit and influence macroeconomic indicators. To induce growth in the economy and facilitate intermediation of the financial system, the apex bank (e.g., CBN) use monetary policy tools such as open market operations, bank rate, and moral suasion etc., to control the supply of money, exchange rates, and interest rates. Since, the key objective of monetary policy in Nigeria is to ensure price and monetary stability, which is mainly achieved through the savers who avail investors extra funds for investment at a suitable interest rate, banks and related institutions should be properly supervised to ensure financial sector soundness and to facilitate adequate intermediation for the maintenance efficient system. Against this background, this study seeks to assess the impact of financial intermediation on monetary policy effectiveness in Nigeria by investigating if interest rate has significant influence on bank loans and advances. Also, the study is extended to inquire if cash reserve ratio has significant influence on demand deposit. Furthermore, this paper is divided into five sections. Section two discussed monetary transmission mechanisms; Section three present the review of literature, while section four results presentation and discussion. Section five present Implications of the findings, while section six summaries, conclusion and recommendations.

2. TRANSMISSION MECHANISM OF MONETARY POLICY

Transmission mechanism implies the channel through which decision on monetary policy generally affect the economy and the price level in particular. However, even in the presence of this decision, it is always difficult to predict the actual effect of monetary policy actions on the economy and the price level. Thus, this mechanism characterized with a lot of uncertainty. This uncertainty may be generated by the volatility in exchange and interest rate. These influences the interest rate spreads, non-performing loans, value of collateral, other non-price terms of lending, quantity of money and credit outstanding. Among the above mentioned, the most obvious channel of monetary policy is interest rates. The CBN uses the monetary policy rate (MPR) as an instrument in implementing monetary policy. The MPR is the mid-point around which the Central Bank absorbs and supplies settlement cash to the inter-bank market. Settlement cash is used to fulfil obligations arising from securities and foreign exchange transactions, transactions with government, and other transactions intermediated by banks. The need to settle such transactions is an important reason why banks hold settlement cash. Therefore, the existence of financial intermediaries emphasizes the provision of liquidity, the ability to lower the risks of lending. In both cases, intermediation financial system could enhance efficient allocation of resources because it helps in the reduction of cost of channelling funds between borrowers and lenders.

In terms of liquidity provision, financial intermediaries borrow short and lend to the investors. Hence, without the intermediary of the financial system, investors would be locked into long-term investments that might preclude their desired consumption patterns and would make them vulnerable to unforeseen cash shortfalls. Financial intermediaries can mismatch the maturity of liabilities and assets because; it is rarely the case that all depositors will wish to withdraw their funds at the same time. The transformation of illiquid assets into liquid assets does, however, make financial intermediaries such as banks susceptible to runs. A bank run occurs when depositors simultaneously seek to withdraw their funds because of concerns about whether a bank will be able to meet its obligations (Diamond and Dybvig, 1983). Bank run in most cases may be contagious. Contagious bank runs may disrupt financial intermediation, disrupting real activity, which according

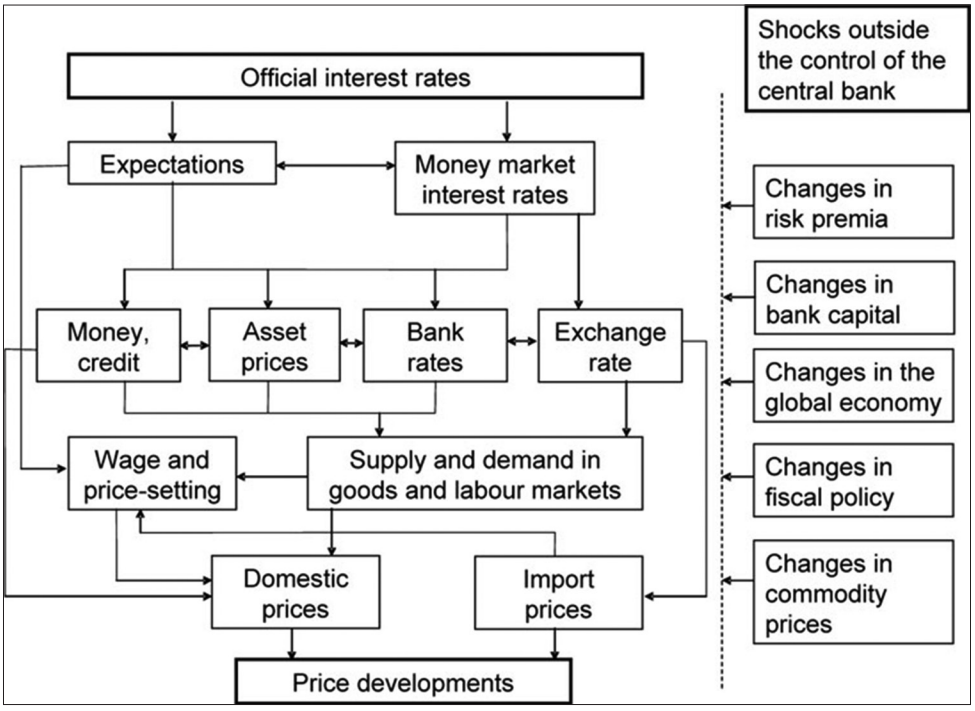
to Bernanke (1983) could cause depression in an economy. Thus, the Figure 1 summarizes the transmission channel of monetary policy and its effect in economic growth.

The Figure 1 shows the channel of transmission of monetary policy and its influence on the economic activities. The CBN perform the function of providing funds to the financial system especially the banking sector and charges interest to every single funds or loan provided to the banking system. But owing to the authority bestowed on the central bank and power of monopoly on issuing money, the apex bank determines the interest rate and at times it affects the official interest rate. In turn, directly or indirectly, the changes in the official interest rate affect the money market interest rate, as well as banks lending and deposit rates (European Central Bank, 2018). Due to dynamic nature of official interest rate, the changes in the expectation of future official interest-rate also affect medium and long-term interest rates. This is because; the longer-term interest rates partly depend on the expectations of the market particularly the future course of short-term rates (European Central Bank, 2018).

In addition, guide economic agents' expectations of future inflation can also be guided by monetary policy, and thus influence price developments. But that does not mean that economic agents should increase their prices probably because fear of higher inflation or rather reduces their prices due to fear of deflation. The impact of the market expectation triggered by monetary policy action may result to adjustments in asset prices like stock prices, increase/decrease in exchange and interest rate. This can affect savings and investment decisions of the households and firms. Thus, other things being equal, higher interest rates discourage the attractiveness of loans to financing consumption or investment. Also, the changes in asset prices affect consumption and investment through wealth and the value of collateral. For instance, as equity prices rise, households who own shares would be wealthier and may choose to increase their consumption. On the other hand, fall in equity prices may result to a reduction in household's consumption (European Central Bank, 2018). Additionally, changes level of investment and consumption will lead to a change in domestic demand for goods and services compared to domestic supply. Then, if eventually demand exceeds supply, there could be the occurrence of upward price pressure. Thus, the changes in aggregate demand can further translate into strict or loss conditions in labour and intermediate product markets, which in turn can affect price and wage-setting in the market respectively. One of the consequences relate to increase or decrease in interest rate. Thus, higher interest rates may lead to rise in risk of borrowers that may result from their inability to pay back their loans (European Central Bank, 2018).

In addition to the traditional bank lending channel, which focuses on the amount of loans supplied, a risk-taking channel may possibly occur when banks incentives to bear risk is associated to the provision of loans is affected. The risk-taking channel may occur in two ways: The first could be through low interest rates and collateral values. Following the belief that rise in asset values is sustainable, borrowers and banks may likely be willing to accept higher risks. Secondly, as the interest rates falls, riskier assets becomes more attractive, amidst the interest of agents foe a higher yields assets. In view of these two channels, the effects may be related to softening of credit standards that can result to unnecessary increase in supply of loanable funds (European Central Bank, 2018). Therefore, policy rate changes have a way of affecting banks' marginal cost for obtaining external finance differently. Though, this effect depends on the resources and capital own by the bank. However, the situation that could make the channels relevant in an economy is particularly period of financial crisis, especially when bank find it difficult to raise capital

Figure 1: Channel of monetary policy transmission



Source: European Central Bank (2018)

(European Central Bank, 2018). Nigeria experienced this situation during the period the economy was ditched into chronic recession through the second and fourth quarter of 2017. Though there have been claims of economic recovery in recent time.

3. LITERATURE REVIEW

3.1. Theoretical Literature Review

The traditional view of monetary policy transmission has focused on the interest rate channel and the substitutability of different asset classes by investors, including banks, as discussed as pointed by Tobin (1969). Through open market operations, the central bank can influence reserve holdings by banks. A tightening of reservable deposits will result in an increase in the interest rates on accounts not subject to reserve requirements, which in turn translates into higher lending interest rates and thus affects the real economy. The condition for this channel to work is that prices do not adjust immediately to changes in money supply. The traditional view of monetary policy transmission sees financial intermediaries as a pass-through mechanism but not as an actor in itself.

The credit channel of monetary policy focuses on interest rate changes affecting loan supply through credit market frictions with an amplifying effect. It thus builds on a very rich literature on the role of financial frictions and financial intermediaries in the real economy and over the business cycle. Starting with Bernanke and Gertler (1989), this literature has shown that information asymmetries between borrowers and lenders and the resulting agency problems translate in a wedge between the cost of external and internal finance. The size of the external finance premium depends on the quality of the balance sheet of the borrower and varies with the level of interest rates as set by monetary authorities. Amplification comes through a financial accelerator effect. Namely, as the balance sheet quality improves, due to better economic conditions, the external finance premium declines. This allows increases borrowing and investment, which feeds the boom. In this setting a crisis can be generated by a decline in asset values, which deteriorates the conditions of the balance sheet of borrowers, leading to an increase in the external finance premium and hence to lower investment and to reduced economic activity. The credit channel literature distinguishes between two different mechanisms, the firm balance sheet and the bank lending channels. Through their impact on borrowers' profitability, asset value and thus collateral, interest rate changes directly affect borrowers' ability to borrow.

The supply of loanable funds is affected if banks cannot easily replace deposit liabilities with non-deposit funding, i.e., different funding sources are not perfectly substitutable (bank lending channel). Both mechanisms of the credit channel of monetary policy transmission rely on certain frictions in the real world, in addition to limited price flexibility mentioned above. First, reservable and non-reservable liabilities are not perfect substitutes for banks, which imply that a reduction in reservable liabilities translates into a reduction in loan supply by banks. Second, bank and non-bank funding sources are not perfect substitutes for users, i.e., firms and households. More recently, the literature has pointed to an additional credit channel of monetary policy, beyond changing credit supply and that is through the risk profile of banks' credit decisions. Nicolò et al. (2010) discuss three different channels through which low interest rates can increase risk. First, a low yield on safe assets incentivizes financial intermediaries to substitute them for riskier assets. Second, low interest rates can stimulate a search for yield of long-term savings institutions such as pension funds with long-term return commitments, again resulting in investment in riskier assets. A third channel involves procyclical leverage ratios: As asset prices boom, risk-weighted assets drop, resulting in expansion of banks' balance sheets towards riskier assets as they try to maintain a constant leverage ratio. Dell-Ariccia et al. (2010) present a theoretical model that illustrates some of these channels. They show that if a bank's capital structure is fixed, monitoring depends on the degree of bank capitalization; well capitalized banks decrease monitoring, while highly levered banks increase it. With endogenous bank capital, however, a monetary easing always leads to greater leverage and lower monitoring, thus ultimately higher risk-taking. In addition, financial intermediaries might increase credit risk as a consequence of additional availability of liquidity lowering the sensitivity of bankers' payoffs to downside risks and inducing excessive credit volume and asset price bubbles Acharya and Naqvi (2012). While many of these theoretical advances are post Global Financial Crisis and informed by the boom-bust periods of the 2000s, they link to pre-crisis warnings of such mechanisms, most prominently Rajan (2005) and, Borio and Zhu (2012).

3.2. Empirical Literature Review

In a study of Kashyap and Stein (1995), the investigation shows that smaller banks loan supply is more affected by monetary policy changes, while Kashyap and Stein (2000) found evidence that the loan portfolios of smaller, more illiquid banks are the most responsive to monetary policy shocks. Other work has used variation in capital asset ratios and publicly traded versus non-traded banks as differential characteristics (Kishan and Opiela, 2000; Holod and Peek, 2007; Peek and Rosengren, 1995) to show differential reactions of banks to monetary policy changes. The literature has also tested the firm balance sheet mechanism of the credit channel. Kashyap et al. (1993) show that monetary policy tightening results in a reduction of bank loans but in an increase in commercial paper issues, indicating that it was lower loan supply rather than lower loan demand following monetary policy tightening that resulted in lower loan volume. Similarly, this literature has used differences across firms to test the firm balance sheet mechanism of the credit channel to show the existence of large variation across firms in the extent to which they suffer from information asymmetries and agency problems, a variation that can be exploited to test the firm balance sheet mechanism.

In a study by Gertler and Gilchrist (1994), the findings show that the investment of an aggregate of small firms is more responsive to changes in monetary policy than in the investment of an aggregate of large firms. Other studies have also tested the risk taking channel of monetary policy (Jimenez et al. 2012). Jimenez et al. (2012) use Spanish credit registry data, rely on the fact that Euro interest rates are exogenous to the country, and exploit cross-bank variation in capitalization and cross firm variation in riskiness. Their results suggest that looser monetary policy leads

less capitalized banks to extend more credit and to riskier firms. Using loan application data, Jimenez et al. (2012) also distinguish between demand and supply side effects and show that the effect of monetary policy on risk-taking through the supply side and variation in loan granting by banks with different capital or liquidity ratios. Bojanic (2009) and Ioannidou et al. (2009) shows that a decrease in the policy rate spurs the granting of riskier loans such as borrowers with worse credit histories, lower internal ratings, and worse ex-post performance. Their findings further stressed that negative performance effect is stronger when the rate subsequently increases.

Buch et al. (2014) use US data for the period 1997 to 2008 to assess the impact of financial Intermediation on monetary policy effectiveness. Using a factor-augmented vector autoregressive model and information from the Federal Reserve's Survey of Terms of Business Lending (STBL), they show that small domestic banks increase their exposure to risk after expansionary monetary policy shocks. Large domestic banks give out more new high risk loans, but the composition of their loan portfolios does not change significantly. Changes in the risk composition of loan portfolios, however, are not compensated by higher risk premium. This seems therefore clear evidence in favour of the risk-taking channel of monetary policy. These results are consistent with findings by Dell-Ariccia et al. (2013) who combine loan-level data from the STBL with call report data on banks and show a similar risk-taking effect of loose monetary policy that is stronger for less capitalized banks. While the traditional credit channel literature has focused on firm credit, household credit has become more and more important across the developed world in recent decades (Thorsten et al., 2012). This implies that there can also be important effects of monetary policy on aggregate demand through households' balance sheets and thus spending patterns. Haltenhof et al. (2014) explore households' balance sheets as additional channel through which the recent financial crisis has impacted employment. Specifically, they distinguish between four different channels, through the supply of commercial and industrial loans to firms and home equity lines of credit to small business owners, through the supply of consumer instalment loans and access to home equity lines for consumption purposes. Exploring differences in the degree of external finance dependence and of asset tangibility across manufacturing industries and in the sensitivity of these industries' output to changes in the supply of consumer credit, they show that during the recent crisis household access to bank loans mattered more for employment than firm access to local bank loans.

While the literature has typically assessed the firm balance sheet and bank lending channels separately, Meisenzahl (2014) offers a horserace between the two. Calibrating the Townsend (1979) and the Holmstrom and Tirole (1997) models of these two agency problems against a comprehensive data set of U.S. small business credit contracts from the FRB's Survey of Small Business Finances, he finds strong support for the firm balance sheet channel but only little support for the bank lending channel. A complementary regression analysis confirms this result, as variation in firm's net worth can explain variation in the amount and cost of external finance, while bank's balance sheet items cannot. His results is consistent with previous work by Ciccarelli et al. (2010) who use US and Eurozone lending surveys and a VAR model and find evidence for transmission through banks, firms and households balance sheets. They also find a stronger effect of the balance sheet mechanism during normal times, while the bank lending channels gain importance during the crisis. Exploring the relative importance of these different mechanisms is important not only for the quantification of expected real effects of monetary policy changes but also the importance of different banking market structures and firm size distributions across economies in the transmission. One important condition for the effectiveness of monetary policy transmission is banks motives for holding reserves beyond the regulatory minimum. If on the one hand, excess reserves simply reflect the lack of investment opportunities, this would make the transmission channel of monetary policy ineffective and call for non-monetary policy levers to increase real investment.

Chang et al. (2014) found evidence for a precautionary motive for reserve accumulation due to weak bank balance sheets, uncertainty about access to short-term liquidity on the market and the perceived lack of lending opportunities to low-risk borrowers. They also show that the Capital Purchase Program of the Troubled Asset Relief Program that was used by the Fed to purchase preferred stock and warrants in financial institutions did have a positive impact on lending, as institutions benefiting from this program accumulated fewer excess reserves than comparable financial institutions. In response to the financial crisis that began in the summer of 2007 and the increasing liquidity problems, central banks around the world have increasingly resorted to non-standard policy measures, including unlimited discount windows and longer-maturity asset purchases. Carpenter et al. (2014) show that liquidity risk, as measured by the intra-day funding volatility is negatively associated with lower loan supply. They found that most non-standard measures were successful in reducing bank liquidity risk and in doing so have significantly contributed to safeguard the transmission of monetary policy to the respective economies, with the effect being stronger in the US than in Europe. This might be explained by the fact that bank recapitalization proceeded much more swiftly in the U.S. than in Europe Financial innovation might have also played an important role in the transmission of monetary policy, as argued by many observers (Smets, 2013). Securitization might have increased risk-taking incentives provided by low interest rates further, as might have the increasing use of different derivatives.

Norden et al. (2014) explore different hypotheses on the effect of credit derivatives on banks' behaviour. They found that banks passed on risk management benefits of credit derivatives to corporate borrowers in the U.S. They also find that the magnitude of this effect remained the same during the Global Financial Crisis and that banks with larger holdings of credit derivatives cut their lending by less than other banks and faced lower non-performing assets. This clearly points to positive effects of this specific form of financial innovation and speaks to the current debate on regulating financial innovation. How has the effectiveness of monetary policy transmission changed over the Great Moderation and the Global Financial Crisis, including with the introduction of

non-conventional monetary policy tools? This has been the focus of an increasing number of studies in recent years.

Ciccarelli et al. (2013), using detailed data on lending conditions and standards, they analyse along several key dimensions of heterogeneity how financial fragility has affected the transmission mechanism of the single Eurozone monetary policy. The analysis shows that the monetary transmission mechanism is time‑varying and influenced by the financial fragility of the sovereigns, banks, firms and households. The impact of monetary policy on aggregate output is stronger during the financial crisis, especially in countries facing increased sovereign financial distress. This amplification mechanism, moreover, operates through the credit channel, both the bank lending and the non‑financial borrower balance‑sheet channels. Their results suggest that the bank‑lending channel has been to a large extent neutralized by the ECB non‑standard monetary policy interventions, but the policy framework until the end of 2011 was insufficient to overcome credit availability problems stemming from deteriorated firm net worth and risk conditions, especially for small firms in countries under stress. Gertrud and Lenno (2014) studied the effect of a monetary policy shock in the euro area on the main Estonian economic and financial variables between 2000 and 2012. Using a standard structural vector autoregression model, the study found strong and persistent effects on Estonian GDP, private consumption, corporate investment, and imports. A monetary policy shock was found to have strong and sluggish effects on the housing loan and consumer credit interest rates. The estimated reaction of Estonian GDP and the GDP deflator-based inflation rate is about four times stronger than the reaction of euro area-wide aggregates. The strength of the impact depends on the inclusion of the data from the years of the recent financial and economic crisis.

4. RESULTS PRESENTATION AND DISCUSSION

It is conventional to carryout stationarity test to ascertain the behaviour of time series variables by examining whether they are influenced by time. Where this occurs, they are normally subjected to "de-trending" that is, removing the influence of time from time series data. The point at which they are free from time influence is examined using Augmented Dickey-fuller test. This exercise is carried out as shown in Table 1.

4.1. Summary of Stationarity Test

It is evident from Table 1 that all the variables are not stationary at level, until after first difference, meaning that they integrated at order one. However, ADF test confirms that we can reject the null hypothesis of non-stationarity in the series after first difference. The uniform level at which the series of the variable sets become stationary implies that we can conduct a Johansen test of long run relationship between the series when they are combined at a parallel level. In the main time, it is informative to note that since the variables are confirmed to be non-stationary, they are prone to generating unreliable results. This is particularly true as (Granger and Newbold (1974) have argued that a regression result involving two (or more) non-stationary time series variables could produce spurious or nonsensical results. That is, such result could show significant relationship between the variables where indeed such relationship exist as a result of chance. To ensure that a stable and reasonable relationship exists between our selected variables, Johansen test of co integration is carried out in Table 2.

To consider the hypothesis that the variables are not co-integrated ($r = 0$) against the alternative of one or more co-integrating vectors ($r > 0$), we have to look at the value of λTRACE. Column 3 of the first part of Table 2 indicates the value of λTRACE equal to each number of the co-integrating vector: λTRACE (0) = 161.31, λTRACE (1) = 78.61. Since the value of λTRACE (1) exceeds the critical value (15.495) at the 0.05 significance level, we can reject the null hypothesis of one co-integrating vectors ($r = 1$) and accept the alternative hypothesis.

Table 3 presents regression results on the dependency of Loan and advances on interest rate. As the model appears, 4.1440.05 is the average value of loan and advances in the absence of interest rate. However, loan and advances reduces by −2032.463 billion as a result of a one percentage increase in interest rate. The $R^2 = 0.503925$ indicate that the model significantly ($F = 18.28482$) explains 50% of the variation in loan and advances. However, interest rate accounted for about 48% variance (Adjusted $R^2 = 0.476365$) in loan and advances. The Durbin-Watson value of 2.223408 indicates absence of autocorrelation in the error term of the model.

A Breusch-Godfrey serial correlation LM test was conducted to investigated whether the successive values of the error term are serially dependent on each other up to lag two. The result on Table 4 indicates that the error term is serially independent up to lag two ($F = 1.787764$, $P > 0.05$).

A test of whether the error term is normally distributed as expected was conducted using the Jarque-Bera (JB) statistic (Figure 2). The underlying null hypothesis is that the series of the error term are normally distributed with zero mean and constant variance. The result indicates absence of non-normality of the error term at 5% level of significance ($JB = 1.092406$, $P > 0.05$).

A pairwise granger causality test was conducted to examine the extent to which the past values of the independent variable assists in predicting present value of the dependent variable. The result indicates that Interest rate significantly granger causes loan and advances at 5% level ($F = 6.60017$, $P > 0.05$). The reverse is the case for a reverse causality running from loan and advances and Interest rate, but at 10% level (Table 5).

To consider the hypothesis that the variables are not co-integrated ($r = 0$) against the alternative of one or more co-integrating vectors ($r > 0$), we have to look at the value of λTRACE. Column 3 of

Table 1: Summary of stationarity test

Variables	ADF	Order of Integration
LOAN	−5.090997	I (1)
DDEP	−5.779202	I (1)
INT	−5.808661	I (1)
CRR	−4.640732	I (1)

Figure 2: Normality test

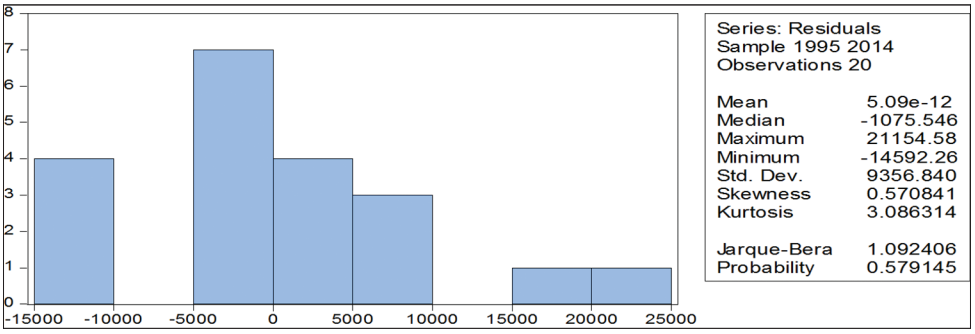


Table 2: Results of cointegration test for model of loans and advances, and interest rate

Hypothesized	Eigen value	Trace stat	5% critical value	P**
r0	0.921854	123.6067	69.81889	0.0000
r1	0.841204	75.17041	47.85613	0.0000
Hypothesized	**Eigen value**	**Max-Eigen stat**	**5% critical value**	**P****
r0	0.921854	48.43428	33.87687	0.0005
r 1	0.841204	34.96260	27.58434	0.0047

Table 3: Regression result for LOAN and INT

Variable's	Coefficient	Std. Error	t-Statistics	P
INT	−2032.463	475.3104	−4.276076	0.0005
C	41440.05	8228.184	5.036355	0.0001
R^2	0.503925			
Adjusted R^2	0.476365			
F-statistics	18.28482			
Durbin-Watson	2.223408			

Table 4: Serial correlation test

Breusch-Godfrey serial correlation LM test			
F-statistics	1.787764	P F (2,16)	0.1450
Obs *R^2	2.426603	Prob. Chi-square (2)	0.1402

Table 5: Pairwise granger causality tests

Null hypothesis	Obs	F-statistics	P
INT does not granger cause loan	18	6.60017	0.00105
LOAN does not granger cause INT		3.75523	0.0516

the first part of Table 6 indicates the value of λTRACE equal to each number of the co-integrating vector: λTRACE (0) = 26.54736, λTRACE (1) = 5.3457963. Since the value of λTRACE (1) exceeds the critical value (3.841466) at the 0.05 significance level, we can reject the null hypothesis of one co-integrating vectors (r = 1) and accept the alternative of more than one co-integrating vector.

The extent to which demand deposit depends on cash reserve ratio was investigated using ordinary least square estimation technique. As the estimated model shows in Table 7, the average value of demand deposit in the absence of cash reserve ratio is −2112.285 billion naira. Meanwhile, demand deposit increases by 1057.477 billion naira due to a one percentage increase in cash reserve ratio. The model significantly explains 40% of the variation in demand deposit (F = 12.09282, P < 0.01), while about 37% variance in demand deposit is accounted for by changes in the cash reserve ratio. In addition, the Durbin-Watson statistic vale of 1.940326 indicates absence of autocorrelation in the error term.

The Breusch-Godfrey serial correlation LM test was conducted to determine whether the error term series are not serially dependent on each other. Analysis of this test at lag two indicates absence of serial dependence of the error term at 5% level (F = 2.592443, P > 0.005 (Table 8).

Normality test was equally conducted to determine whether the error term satisfy the classical assumptions of normality of the error term. Using the JB criterion, (JB = 1.612584, P > 0.05), it is statistically evident that the error term satisfies the normality assumption (Figure 3).

A pairwise granger causality test was conducted to examine the extent to which the past values of the independent variable assists in predicting present value of the dependent variable (Table 9). The result indicates that cash reserve ratio granger causes demand deposit at 5% level (F = 4.31685, P < 0.05). The reverse is not the case for a reverse causality running from demand deposit to cash reserve ratio, even at 10%.

4.2. Test of Hypotheses

The hypotheses stated earlier in this study are hereby restated to guide the process of decision making as follows:

i. H_0: Interest rate does not have a significant influence on Bank Loans and Advances.
ii. H_0: Cash Reserved Ratio does not significantly influence Demand Deposit.

The first null hypothesis is examined using student t-test. Judging by the *t*-statistic value estimated for the coefficient of interest rate at Table 4.3 and its associated probability value (t = −4.276076, P < 0.01), we reject the null hypothesis, and conclude that interest rate does have significant influence on bank loans and advances.

Figure 3: Normality test

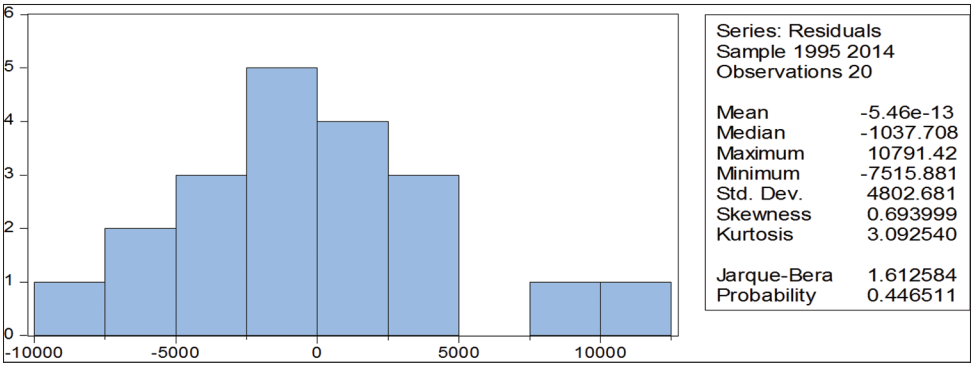


Table 6: Results of cointegration test for the model of loan and advances and interest rate

Hypothesized	Eigen value	Trace statistics	5% critical value	P**
r 0	0.691997	26.54739	15.49471	0.0007
r 1	0.257111	5.349763	3.841466	0.0207
Hypothesized	**Eigen value**	**Max-Eigen stat**	**5% critical value**	**P****
r 0	0.691997	21.19762	14.26460	0.0034
r 1	0.257111	5.349763	3.841466	0.0207

Table 7: Regression of demand deposit on cash reserve ratio

Variable's	Coefficient	SE	t-statistics	P
CRR	1027.477	304.0935	3.477473	0.0027
C	−2112.285	1965.747	−1.074546	0.2968
R^2	0.401851			
Adjusted R^2	0.368620			
F-statistics	12.09282			
Durbin-Watson	1.940326			

Table 8: Breusch-Godfrey serial correlation LM test

F-statistics	2.592443	Prob. F (2,16)	0.1059
Obs *R^2	4.894891	Prob. Chi-square (2)	0.0865

Table 9: Granger causality test

Null hypothesis	Obs	F-statistics	P
CRR does not granger cause DDER	18	4.31685	0.0365
DDER does not granger cause CRR		1.20369	0.3314

The second null hypothesis was verified using the *t*-statistic criterion. That which was estimated for the coefficient of cash reserve ratio in Table 4.7 formed the basis for the test. Testing on the basis of the magnitude of *t*-statistic value alongside its estimated probability value ($t = 3.477473$, $P < 0.01$), we reject the null hypothesis which state that cash reserve ratio does not significantly influence demand deposit. Consequently, we accept the underlying alternative hypothesis which holds that cash reserve ratio does have significant influence on demand deposit.

4.3. Implications of the Findings

The simple implication of the regression outcome states that prudence needs to be applied in ensuring that there is a certain level of balance between liquidity and cash reserve ratio. Since liquidity is regarded as one of the key indicators of financial stability, concern should be given to it because whatever affects financial stability might pose unfavourable consequences to the economy as whole. Nothing must be done deliberately to hinder financial stability. Loan and advances are two inevitable means through which funds are utilized for enhancing economic growth. Even though these are the major means through which banks make most of their profits, they are ready not to lend out when interest rates are high going by our findings, and if this were the case, economic activities can be hampered, posing negative consequences to the economy.

5. CONCLUSION AND RECOMMENDATIONS

From the general analysis, it is quite clear that interest rate to a reasonable extent, explains the changes that takes place in banks loan and advances, while cash reserve ratio affects the liquidity position of banks. Both the interest rate, loan and advances, cash reserve ratio and liquidity have a significant influence, which means, when the independent variables, in this case, interest rate and cash reserve ratio are altered, it could have an effect on banks loans and liquidity positions. In our analysis, if by any ways interest rate is increased it will lead to a decrease in loan and advances, while an increase in Demand Deposit will lead to an increase in cash reserve ratio.

By way of conclusion, it can be said that the two dependent variables studied and analysed are vital for every economy seeking growth potentials. For this reason, no action must be deliberately carried out to hinder the effectiveness of the two factors. Based on the findings in this study, the following suggestions are recommended.

Commercial banks should focus on how to mobilize more deposits, as this will enhance their lending services. Bank supervisors and regulators should be mindful of the adverse consequences of government policies for the sound functioning of commercial bank. Moreover, there should be closer consultation and cooperation between commercial banks and the regulatory authorities so that the effect of

regulatory measure on commercial banks will be taken into account at the stage of policy formulation. In addition, the atmosphere under which banks' regulation and supervision are undertaken must also be made friendlier by the regulators where both parties see that steps and measures being taken are in their best interest. Such an atmosphere would go a long way in creating a better condition for the lending operation and liquidity positions of commercial banks in Nigeria.

Nigerian commercial banks should ensure good planning which encompasses budgeting, reviews and incentives. They should formulate critical, realistic and comprehensive strategic and financial plans. This will help to mitigate the adverse effect of macro-economic factors such as government and CBN directives and monetary tools to control their operations. In a volatile environment such as ours, risks are high, thus in response to this, commercial banks should develop credit procedures, policies and analytical capabilities. It is essential for commercial banks to build system and skills in liquidity management, assets and liability management and foreign exchange management.

REFERENCES

Acharya, V.V., Naqvi, H. (2012), The Seeds of a Crisis: A Theory of Bank Liquidity and Risk Taking Over the Business Cycle. CEPR Discussion Papers No. 8851. C.E.P.R. Discussion Papers.

Alper, K., Kılınç, M., Yörükoğlu, M. (Nil), Monetary policy transmission and shifts in financial intermediation. Central Bank of the Republic of Turkey. BIS Papers No. 83.

Bernanke, B., Gertler, M. (1989), Agency costs, net worth, and business fluctuations. American Economic Review, 79(1), 14-31.

Bernanke, B.S. (1983), Non-monetary effects of the financial crisis in the propagation of the great depression. The American Economic Review, 73(3), 257-276.

Bojanic, A.N. (2009), The impact of tin on the economic growth of Bolivia. Coyuntura Económica, 39, 171-183.

Borio, C., Zhu, H. (2012), Capital regulation, risk-taking and monetary policy: A missing link in the transmission mechanism? Journal of Financial Stability, 8(4), 236-251.

Buch, C.M., Eickmeier, S., Prieto, E. (2014), In search for yield? Survey-based evidence on bank risk taking. Journal of Economic Dynamics and Control, 43, 12-30.

Carpenter, S.B., Demiralp, S., Eisenschmidt, J. (2014), The effectiveness of nonstandard monetary policy in addressing liquidity risk during the financial crisis: The experiences of the federal reserve and the European central bank. Journal of Economic Dynamics and Control, 43, 107-129.

Chang, S.H., Contessi, S., Francis, J. (2014), Understanding the accumulation of bank and thrift reserves during the U.S. financial crisis. Journal of Economic Dynamics and Control, 43, 78-106.

Ciccarelli, M., Maddaloni, A., Peydró, J.L. (2013), Heterogeneous transmission mechanism: Monetary policy and financial fragility in the Eurozone. Economic Policy, 28(75), 459-512.

Ciccarelli, M., Peydró, J.L., Maddaloni, A. (2010), Trusting the Bankers: A New Look at the Credit Channel of Monetary Policy. Working Paper Series 1228, European Central Bank.

Diamond, D.W., Dybvig, P.H. (1983), Bank runs, deposit insurance, and liquidity. Journal of Political Economy, 91(3), 401-419.

Dell-Ariccia, G., Laeven, L., Marquez, R. (2010), Monetary Policy, Leverage, and Bank Risk-Taking. IMF Working Papers No. 10/276. International Monetary Fund.

Dell-Ariccia, G., Laeven, L., Suarez, G. (2013), Bank Leverage and Monetary Policy, Risk-Taking Channel: Evidence from the United States. IMF Working Papers No. 13/143. International Monetary Fund.

Friedman, M (1968), The role of monetary policy. Presidential address at the eightieth annual meeting of the American economic association. American Economic Review, 58(1), 1-17.

Gertler, M., Gilchrist, S. (1994), Monetary policy, business cycles, and the behaviour of small manufacturing firms. The Quarterly Journal of Economics, 109(2), 309-340.

Gertrud, E., Lenno, U. (2014), Euro area monetary policy transmission in Estonia. Baltic Journal of Economics, 14(1-2), 55-77.

Granger, C.W.J., Newbold, P. (1974), Spurious regressions in econometrics. Journal of Econometrics, 2(2), 111-120.

Haltenhof, S., Lee, S.J., Stebunovs, V. (2014), The credit crunch and fall in employment during the great recession. Journal of Economic Dynamics and Control, 43, 31-57.

Holmstrom, B., Tirole, J. (1997), Financial intermediation, loanable funds, and the real sector. The Quarterly Journal of Economics, 112(3), 663-691.

Holod, D., Peek, J. (2007), Asymmetric information and liquidity constraints: A new test. Journal of Banking and Finance, 31(8), 2425-2451.

Ioannidou, V., Ongena, S., Peydro, J. (2009), Monetary Policy, Risk-Taking, and Pricing: Evidence from a Quasi-Natural Experiment. Discussion Paper 2009-31 S. Tilburg University, Center for Economic Research.

Jimenez, G., Ongena, S., Peydro, J., Saurina, J. (2012), Credit supply versus demand: Bank and firm balance-sheet channels in good and crisis times. SSRN Electronic Journal, DOI: 10.2139/ssrn.1980139.

Kashyap, A.K., Stein, J.C. (1995), The impact of monetary policy on bank balance sheets. Carnegie-Rochester Conference Series on Public Policy, 42(1), 151-195.

Kashyap, A.K., Stein, J.C. (2000), What do a million observations on banks say about the transmission of monetary policy? American Economic Review, 90(3), 407-428.

Kashyap, A.K., Stein, J.C., Wilcox, D.W. (1993), Monetary policy and credit conditions: Evidence from the composition of external finance. American Economic Review, 83(1), 78-98.

Kishan, R.P., Opiela, T.P., (2000), Bank size, bank capital, and the bank lending channel. Journal of Money Credit and Banking, 32(1), 121-141.

Meisenzahl, R. (2014), Verifying the state of financing constraints: Evidence from U.S business credit contracts. Journal of Economic Dynamics and Control, 43, 58-77.

Nicolò, G.D., Dell-Ariccia, G., Laeven, L., Valencia, F. (2010), Monetary Policy and Bank Risk-Taking. IMF Staff Position Notes 2010/09. International Monetary Fund.

Norden, L., Buston, C.S., Wagner, W. (2014), Financial innovation and bank behaviour: Evidence from credit markets. Journal of Economic Dynamics and Control, 43, 130-145.

Peek, J., Rosengren, E. (1995), The capital crunch: Neither a borrower nor a lender be. Journal of Money Credit and Banking, 27(3), 625-638.

Rajan, R.G. (2005), Has Financial Development Made the World Riskier? Proceedings Economic Policy Symposium, 313-369.

Smets, F. (2013), Financial stability and monetary policy: How closely interlinked? Sveriges Riks bank Economic Review, 3, 121-160.

Thorsten, B., Büyükkarabacak, B., Rioja, F.K., Valev, N.T. (2012), Who gets the credit? And does it matter? Household vs. firm lending across countries. The B E Journal of Macroeconomics, 12(1), 1-46.

Tobin, J. (1969), A general equilibrium approach to monetary theory. Journal of Money Credit and Banking, 1(1), 15-29.

Townsend, R.M. (1979), Optimal contracts and competitive markets with costly state verification. Journal of Economic Theory, 21(2), 265-293.

Yusifzada, L., Mammadova, A. (2015), Financial Intermediation and Economic Growth William Davidson Institute. Working Paper Number No. 1091.