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Monetary Policy and Commercial Bank Lending to the Real Sector in Nigeria: A Time Series Study

Ogolo[1] & Tamunotonye Magnus [1]

[1] Rivers State University, Port Harcourt, Nigeria
Correspondence: Ogolo, Rivers State University, Port Harcourt, Nigeria

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Abstract

This study empirically examined the effects of monetary policy on commercial banks lending to the real sector from 1981 – 2014. The objective was to examine the effectiveness of monetary policy in channeling bank credit to the real sector. Annual time series data were sourced from Central Bank of Nigeria statistical bulletin. Two multiple regression models were specifically estimated with the aid of Software Package for Social Sciences. The study modeled commercial banks credit to agricultural and manufacturing sector as the function of interest rate, monetary policy rate, treasury bill rate, exchange rate, broad money supply and liquidity ratio. The result shows collinearity that corresponds with the Eigen value condition index, and variance constant are less than the required value. The Durbin Watson statistics shows the absence of multiple auto correlation and negative autocorrelation, while the variance inflation factors indicate the absence of auto-correlation. The regression results from model one found that interest rate, monetary policy rate have positive relationship with commercial banks lending to the agricultural sector while Treasury bill rate, exchange rate, broad money supply and liquidity ratio have negative effect on the dependent variable. Model two found that interest rate, Treasury bill rate, exchange rate, broad money supply and liquidity ratio have negative effect on commercial banks lending the manufacturing sector while monetary policy rate have positive relationship with the dependent variable. We recommend that monetary policy should be harmonize with bank lending objectives to enhance commercial banks lending to the real sector of the economy and that management of commercial banks should formulate policies of managing the negative effect of monetary policy variables on its lending.

Keywords: Monetary Policy, Commercial Bank Lending, Real Sector, Nigeria Economy, Time Series Study.

1. Introduction

Commercial banks are immediate financial institutions empowered law to undertake the business of lending and borrowing in the economy. Banking laws such as Bank and Other Financial Institutions Decree Act 1990 as amended (BOFIA) empowered defined the business of banking as an institution that accepts deposit and grant loans. This function bridges the savings-investment gap and restores equilibrium in the financial disequilibrium that exists among the economic agents and enhances the allocation efficiency of the economy (Ezirim, 2005). It also transmits the government monetary policy and facilitates the realization of macroeconomic goal of growth in output, full employment, price stability and external balance.

Monetary policy is a classical instrument of fine-tuning the economy to achieve desired macroeconomic goals. In Nigeria, the Central Bank of Nigeria Decree 1969 empowered Central Bank the monetary policy function. Monetary policy is the deliberate use of monetary instruments (direct and indirect) at the disposal of monetary

authorities such as the Central Bank in order to achieve macroeconomic stability (Toby & Peterside, 2014). The application of monetary policy depends on the desired macroeconomic goals, this monetary policy can be expansionary or contractionary. Contractionary monetary policy aimed at moderating the anticipated inflationary pressures, expected to be triggered by the pre-election spending and the high liquidity injections into the banking system through the purchase of non-performing loans (NPLs) by the Asset Management Corporation of Nigeria (AMCON) while expansionary monetary policy aimed at stimulating the economy.

Bank credit is a financial market activity where banks extend credit to deficit economic units to meet their financing needs (Ezirim, 2005). The monetary transmission mechanism describes how policy induced changes in the nominal money stock or the short-term nominal interest rates impact real variables such as aggregate output and employment (Ireland, 2005). Specific channels of monetary transmission operate through the effects that monetary policy has on interest rates, exchange rates, equity and real estate prices, bank lending and firm balance sheets (Toby & Peterside, 2014). The analysis of the monetary policy transmission proved how monetary policy changes affect the real economy, is one of the most researched areas in macroeconomic literature and a special focus for central bankers. Bank credit constitute the most economic important of bank functions. Bank credit aids in generating employment, maintain a business, take advantage of economies of scale and help to prevent economic disaster (Nwanyanwu, 2011). It helps in reactivating, expanding and modernizing all types of manufacturing enterprises through different structure of credit such as overdraft, short, long-term credit depending on the purpose of the loans.

The objective of stimulating bank credit to the real sector by the monetary authority is to achieve sectoral growth. The real sector is recognized by the monetary policy of the economy. The importance cannot be over emphasized in the economic growth of the country. Its output is measure quantitatively as the contribution of the sector to Total Gross Domestic Product (GDP). The sector is important for variety of reasons, it produces and distributes tangible goods required to satisfy aggregate demand and aggregate supply in the economy (Adegbite, 2010). Second performance of the sector can be used to measure the effectiveness of monetary and macroeconomic policies (Adediran & Obasan, 2010). Third a vibrant industrial sector is capable of generating income, create employment absorb idle resources and increase capacity utilization which is prerequisite for economic growth (Mike, 2010) the manufacturing sector act as a catalyst that accelerates the pace of structural transformation and diversification of the economy, this enabling the country to utilize its factor endowments and to depend less on the foreign supply of finished goods or raw materials (Adediran and Obasam, 2010), the sector also creates investment capital at faster rate than other sector of the economy while promoting wider and more effective linkages among different sectors and facilitate the formation capital (Tobby and Thompson, 2013).

Theoretically, two leading hypotheses have been formulated in relationship to banking sector and the growth of an economy. The supply leading development to economic growth, this implies that bank credit will increase the productive capacity of the economy while the demand leading hypothesis persist a passive to economic growth (Olokyo, 2011), (Ogen, 2007) (Okwo et al, 2012). Adediran and Obasam (2010) opined that a well functioning and efficient financial sector with sophisticated banking institutions and regulatory system will foster economic growth and development through efficient credit allocation to the various sectors of the economy.

The objectives of banking sector reforms over the years has been to achieve an effective and efficient banking industry that will function to realize the macroeconomic goals, for instance the deregulation of the financial sector in 1986 was designed to reduce cost of obtaining fund (Oputu, 2010).The consolidation and realization reform in 2004 was motivated to reposition the Nigerian banking industry to be an active player and not a spectator in the global financial market (Toby, 2006). These are monetary policy operational framework; hence the effect of monetary policy variables on bank lending to the real sector of the economy needs to be examined

in relationship with the various monetary policy reforms in the past decades.

The belief and assumption that an efficient and well structured financial system can facilitate the realization of monetary and macroeconomic goals dates back to the classical theories of monetary policy and Schumpeter in 1912 which noted that services provided by the financial intermediaries are the essential driven for innovation and growth (Akani et al, 2016). Bank credit to the real sector is required if the monetary and the macroeconomic goals are to be achieved. The effects of monetary policy on the supply of bank loans depend on the characteristics of the banking sector. The size of banks, market concentration, capitalization and liquidity are among the commonly mentioned factors (Konstantins, 2008). This no doubt necessitated the various monetary policy reforms through the banking sector.

However, Nigerian banks have gone through various phases of reforms through the monetary policy instruments and the monetary authorities. Phase 1 bordered on definition of banking business and prescription of minimum capital requirements, phase II regulates the banking activities with the enactment of CBN Act 1958, phase III is the deregulation of the banking industry, the IV phase is the re-introduction of regulations as a result of bank failure that affected the economy, the V phase is the democratic regime with the liberalization of the financial sector while the VI phase in the banking sector consolidation and recapitalization (Akani et al., 2016). The effect of these reforms on bank lending to the real sector remains a matter of fact and a knowledge gap. An examination of Central Bank of Nigerian Publication (CBN, 2015) shows that the quantity of commercial banks credit to the real sector of the economy continues to decrease over the periods, for instance, in 2010 percentage of commercial banks lending in agriculture sector is 1.67% to total sectoral credit while that of manufacturing sector is 12.8%, in 2013 it was 3.98% and 2.6% in 2014. The low commercial banks lending to the real sector of the economy contributed to the low performance of the economy at large.

The effect of monetary policy on commercial banks performance has long been a research interest and documented in literature. The relationship between monetary policy and bank lending to the real sector of the economy is lacking in literature. Similar studies such as Ajayi and Atanda (2012), Ubi et al., (2012) examined the relationship between monetary policy and commercial banks lending behaviour, the study of (Konstantins, 2008), (Shuzhang et al., 2010) examined commercial banks and the transmission channel of monetary policy in Turkey. This study therefore intends to examine the effect of monetary policy on commercial banks to the real sector in Nigeria.

2. Literature Review

2.1Monetary Policy in Nigeria

A monetary policy shift tends, generally, to transmit a change for the future in the expected behavior of macroeconomic variables (Toby & Peterside, 2014). The Central Bank of Nigeria (CBN) is mandated by the CBN act of 1958 to promote and maintain monetary stability and a sound financial system in Nigeria. Just like other central banks, the CBN has the "end" of achieving price stability and sustainable economic growth through the "means" of monetary policy. Embedded in this twin objectives are (1) the attainment of full employment, (2) maintaining stability in the long-term interest rates and (3) pursuing optimal exchange rate targets. To achieve these multiplex objectives, the CBN operates through a system of targets. These are; the operational targets, the intermediate targets and the ultimate target (Ibeabuchi, 2007). The Central Bank uses its operational target over which it has deterministic control to influence the intermediate target (broad money) which eventually affects the ultimate targets (inflation and output). In setting its targets, the CBN considers an information set that is feed into by contemporaneous and lagged values of real Gross Domestic Product (GDP), real investment prices, real wages, labour productivity, fiscal operations and balance of payments performance, among others. Depending on the relative importance attached to the various information elements, the CBN sets its target parameters for its

quantity-based nominal anchor and its price-based anchors. The bank generally implements its monetary policy programmes using the market-based and rule-based techniques.

When implementing monetary policy using the rule-based technique, the CBN uses direct instruments like selective credit controls, direct regulation of interest rates and moral suasion. While indirect instruments like the Open Market Operation (OMO), discount rate and the reserve requirements are used when implementing monetary policy programmes using the market-based approach. Since its inception, the CBN has implemented monetary policy using various combinations of these two techniques with more or less emphasis on the one. Depending on the emphasis that is placed on either of the techniques, the evolution of monetary policy in Nigeria can be classified into two phases: (1) the era of direct controls (1959- 1986) and (2) the era of market-based controls (1986-date). The era of direct controls was a remarkable period in monetary policy management in Nigeria, because it coincided with several structural changes in the economy; including the shift in the economic base from agriculture to petroleum, the execution of the civil war, the oil boom and crash of the 1970s and early 1980s respectively and the introduction of the Structural Adjustment Programme (SAP).

During this period CBNs monetary policies focused on fixing and controlling interest rates and exchange rates, selective sectoral credit allocation, manipulation of the discount rate and involving in moral suasion. Reviewing this period, Omotor (2007) observe that monetary policy was ineffective particularly because the CBN lacked instrument autonomy and goal determination, being heavily influenced by the political considerations conveyed through the Ministry of Finance.

Progressively, the implementation of the SAP programme which commenced in 1986 ushered in a new era of monetary policy implementation with market-friendly techniques in Nigeria. The capacity of the CBN to carry out monetary policy using market friendly techniques was letter reinforced by the amendments made to the CBN Act in 1991 which specifically granted the CBN full instrument and goal autonomy. Using this technique, the CBN indirectly influences economic parameters through its Open Market Operations (OMO). These operations are conducted wholly on Nigerian Treasury Bills (TBs) and Repurchase Agreements (REPOs), and are being complimented with the use of reserve requirements, the Cash Reserve Ratio (CRR) and the Liquidity Ratio (LR). These set of instruments are used to influence the quantity-based nominal anchor (monetary aggregates) used for monetary programming. On the other hand, the Minimum Rediscount Rate (MRR) is being used as the price-based nominal anchor to influence the direction of the cost of funds in the economy. Changes in this rate give indication about the monetary disposition of the Bank, whether it is pursuing a concessionary or expansionary monetary policy. This rate has generally been kept within the range of 26 and 8 percent since 1986. As a companion to the use of the MRR, the CBN latter introduced the Monetary Policy Rate (MPR) in 2006 which establishes an interest rate corridor of plus or minus two percentage points of the prevailing MPR. Since 2007, this rate has been held within the band of 10.25 and 6 percent.

2.2 Monetary Policy and Credit Channel

Monetary policy models describe an economy in which there is an excess supply; hence, aggregate output is demand-determined in the short to medium run. The agents in this macro model include the (a) households, (b) domestic firms, (c) the government; (d) the rest of the world provides capital, goods and services demanded by the domestic economy and a market for domestic production and (e) the central bank. In the model, the central bank has the task of anchoring the nominal side of the economy. The central bank adopts an inflation targeting framework (IT) and is a flexible inflation targeted and sets a short-term interest rate to achieve an inflation target, and, consequently provides nominal stability. There are lags and delays between a change in interest rate and inflation. Given these lags and price and wage rigidities, the use of a simple interest rate rule is required to anchor inflation in the long run. Meanwhile, asset markets are imperfect. The nominal exchange rate is allowed

to transitorily deviate from purchasing power parity (PPP) so that movements occur in the real exchange rate. In addition, the nominal short-term interest rates play the leading role as the instrument of monetary policy. The transmission mechanism starts with the domestic interest rate policy. The overnight reverse repurchase rate (RRP) is prescribed as the nominal interest rate which follows a behavioral equation required to anchor inflation in the long run (Clarida, Gali and Gertler, 2000). The overnight RRP adjusts to inflationary pressure measured by the difference between the inflation forecast and the inflation target announced by the Government and the output gap. This is seen as,

$$r_t^p = \alpha + \beta(\pi_t^*) + \rho(q_t - q_t^*) + \varepsilon, \quad (1)$$

Where r^p' is the RRP, α connotes the neutral monetary policy stance, $\square^f$ is the one-quarter ahead inflation forecast, * is the medium-term inflation target announced by the Government, q is real output, q* is potential real output, and an error term,

The RRP rate is transmitted to the benchmark interest rate r^d through the natural arbitrage condition. In the model, the benchmark interest rate is the 91-day Treasury bill rate. As seen in equation 2, r^d is also affected by other variables, such as the overnight RRP r^p, inflation expectations $\square^e$, foreign interest rate r^u, real money supply m and an error term.

$$r_t^d = \alpha + \beta r_t^p + \rho\pi_t^e + \gamma r_t^u - \vartheta m_t + \varepsilon. \quad (2)$$

Treasury bill rate is higher, the higher the overnight RRP rate, the higher the inflation expectations, the higher the foreign interest rate, and the lower the level of money supply. In this equation, there is a direct channel from the BSP's policy rate to the 91-day Treasury bill rate.

Changes in the 91-day Treasury bill rate r^d are then carried over to the changes in the other market interest rates, such as lending rates is the natural arbitrage condition.

$$r_t^l = \alpha + \beta r_t^d + \varepsilon. \quad (3)$$

It is also assumed that the short-run domestic inflation is relatively sticky, indicating that inflation expectations for the short term are similarly sticky. This further implies that by controlling the nominal overnight RRP rate, the BSP can also affect the short-term real RRP rate or the difference between the short-term REP rate and short-term inflation expectations. The overnight RRP is expected to lower short and longer real interest rates, and consequently affect economic activity.

Changes in the overnight RRP rate also affect bank credits as seen in equation 4 below

$$c_t^p = \alpha + \beta q_t - \delta(r_t^l - \pi_t^e) + \varpi m_t + \gamma k_t - \vartheta n + \varepsilon, \quad (4)$$

where C^p is private credit, q is real output, r^1 is bank lending rate, is inflation expectations, m is money supply, k is the bank regulatory capital to risk-weighted assets (in excess of the required BSP capital to asset ratio), fl is banks' non-performing loan ratio and an error term.

Meanwhile, k is expected to have a positive coefficient as higher capital buffer (relative to the regulatory capital) to absorb losses helps banks to expand credit. In Bayoumi and Melander (2008), the balance sheets of firms and households are included. In the absence of a longer and consistent series for the Philippines, the model is limited to the consolidated balance sheets of commercial/universal banks, thrift and rural banks. In the case of n, a negative coefficient is expected, as higher shares of non-performing loans to total loans are riskier, hence,

banks are expected to be prudent in extending new loans. Meanwhile, the presence of q in model 4 reflects the feedback look from income to bank credit via the financial accelerator effect.

Bank credit together with net other items determine the level of money supply from the asset side. It should be noted that in the model, money supply is an indicator of the quantity of money that the economy requires, without the BSP setting any target for it. From the liability side, the impact of changes in the real market interest rates $(r_t^d - \pi_t^e)$ affects currency in circulation in the monetary system as in equation 5:

$$c_t^c = \alpha + \beta q_t - \gamma(r_t^d - \pi_t^e) + \varepsilon. \quad (5)$$

Equation 5 is then added to deposit liabilities to arrive at the total money supply level (m) from the liabilities side and feeds back into model 4. To determine the impact of bank credit on spending, real personal consumption C and real investment spending I are re-specified. Real consumption C in model 6 follows the permanent income and life-cycle hypothesis. In the long run, it is assumed to depend on real disposable income di and real wealth m. The presence of di implies that a proportion of households are "liquidity constrained" while C^p implies that households are "credit constrained" in the short-run (Bayoumi and Melander, 2008; Greenlaw et al., 2008). The remaining households' consumption, however, is determined by their wealth positions. In this model, real wealth m includes real financial aspects (including the market value of domestic equity).

$$c_t = \alpha + \mu di_t + \lambda m_t + \varpi c_t^p - \gamma(r_t^d - \pi_t^e) + \varepsilon. \quad (6)$$

Meanwhile, the inclusion of the long-term real interest rate $r_t^d - \pi_t^e$ in equation 6 captures the direct substitution effect between consumption and savings. In addition, the presence of accounts for the time lag before consumption responds to changes in the real interest rate.The desired investment spending by domestic firms I_t in equation 7 uses the accelerator principle linking the desired fixed capital with output q_t, real lending rate $r_t^l - \pi_t^e$ and the exchange rate e (Montiel 2003)

$$I_T = \alpha + \beta r_t^p + \rho \pi_t^e + \gamma r_t^u - \vartheta m_t + \varepsilon. \quad (7)$$

The impact of bank credit is seen as directly affecting investment in equation 7. In this model, technology is fixed. Moreover, firms hold inventories which represent insurance against demand surprises. However, this is taken as exogenous in the model, implying that firms make their decisions regarding capital, labor and prices first, and then make decisions about the desired level of inventories. The choice of investment demand model stems from the ease of identifying the policy instruments (in this model interest rate and exchange rates) available to monetary authorities to influence the aggregate supply resulting from investment behavior. However, in the empirical estimation, an attempt is made to produce a complete and detailed estimation of investment in terms of capital stock and employment. This is essential in determining the link between investment and production capacity and consequently the output gap

In sum, changes in interest rates and bank credits lead to changes in the real sector through consumption and investment. All the changes in spending behavior, when added up across the whole economy, generate changes in aggregate spending. Total domestic expenditure plus the balance of trade in goods and services reflects the aggregate demand in the economy, and is equal to gross domestic product (GDP). GDP (demand) feeds into the GDP (production) side which consists of two sectors: the primary sector (agriculture) and the advanced sector

(industry and services). The output of the agriculture sector is exogenous in the model. This leaves us with the industry and services sectors which are assumed to have excess capacity. Hence, supply responds to the level of aggregate demand. GDP feeds into banks' capital to asset ratio k in equation 8 below.

$$K_t = \alpha + \beta q_t + \varepsilon. \quad (8)$$

From Bayoumi and Melander (2008), bank lending standards determine changes in banks' capital to asset ratio. A limitation of equation 8 is the absence of bank lending standards. In Bayoumi and Melander (2008), bank lending standards are based on answers from the quarterly Federal Reserve Bank's survey of bank loan officers. In the initial specification, there was an attempt to include the overnight RRP rate (equation 1) in equation 8 to examine the impact of monetary policy actions on changes in bank capital. However, in the empirical estimation, the overnight RRP rate was dropped as it yielded insignificant coefficient. Moving forward, there are two distinct and mutually reinforcing feedback channels in Bayoumi and Melander (2008) framework. The first channel is that as spending and income fall, loan losses increase and thus there are further negative effects on bank capital. The second feedback channel is that a deterioration of incomes (and balance sheets for households and firms) has a further negative financial-accelerator effect on credit and spending. This model allows for these two feedback channels through equations 4 and 8.

$$Y_t^g = q_t - q_t^* \quad (9)$$

Potential output and the resulting gap as measure of future inflationary pressures have regained importance under the IT framework. As indicated in equation 9, output gap in this model is estimated based on Dakila (2001) in which it is expressed as the difference between the log of a one quarter moving average of supply side (industry and services) GDP (depersonalized series) q and potential output q^*.

$$P_t^w = \alpha + \delta Y_t^g + \beta p_t^M + \theta m_t + \rho W_t + \varepsilon. \quad (10)$$

The output gap Y^g then feeds into the wholesale price index P^W in equation 10. The whole price index in this model is affected by the average prices of merchandise imports in pesos P^M the excess liquidity as indicated by real money supply m relative to gross domestic product and the average compensation (or wages) for industry and services sectors W. This specification makes the pricing decision based on a flexible mark up. Changes in the wholesale price drives prices of the industry and services sectors, and finally the final demand prices, final demand prices are dependent on the relative weights of industry and services sector prices and are contained in the implicit GDP deflator. This then is the basis of headline inflation. Because of the forward-looking nature of inflation targeting, the role of inflation expectations in this transmission mechanism becomes crucial. Indicators of inflation expectations include the two-year ahead inflation forecast.

$$\pi_t^e = \alpha + \beta \pi_t^* + \rho \pi_t + V \pi_{t-1}. \quad (11)$$

The estimation of long-run inflation expectations π_t^e in equation 11 follows a hybrid structure that contains both forward-looking and backward-looking expectations. The structure includes rational component of inflation, indicated by the medium-term (three to five years) inflation target announced by the Government π_t^*, and

contemporaneous and inertial components indicated by current π_t , and past inflation rate π_{t-1} The rational component is based on Demertzis' and Viegi's (2005) work on inflation targets as focal points for long run inflation expectations. The idea is that in the absence of concrete information of inflation expectations, the only information that agents have is the quantitative inflation target announced by the Government.

2.3 The Monetarist and Transmission of Monetary Policy

- The traditional textbook (Keynesian) channel is known as the interest rate or the intertemporal substitution channel:

$$(M \uparrow \Rightarrow)\, i \downarrow \Rightarrow C \uparrow (1\uparrow) \Rightarrow Y^d \uparrow \Rightarrow y \uparrow \Rightarrow \Pi \uparrow \qquad (12)$$

- Expanding 'money' (M) reduces interest rates (i), reduces the cost of borrowing for firms (and consumers), leads to increased consumption (C) as well as investment (I) and therefore higher demand (Y^d), a bigger output gap (y) and finally higher prices and inflation (π)

The monetary transmission mechanism

2.4 The Interest Rate Channel and Policy Responses

- But Bernanke and Gertler (1989) pointed out that the macroeconomic response to policy-induced interest rate changes was considerably larger than implied by conventional estimates of interest elasticity's of consumption and investment

• This suggests that mechanisms other than the interest rate channel may also be at work in the transmission of monetary policy

2.5 The Exchange Rate Channel: Net Exports

- The exchange-rate channel

$$i \uparrow \Rightarrow e \downarrow \Rightarrow NX \uparrow \Rightarrow y \uparrow \Rightarrow \Pi \uparrow \qquad (13)$$

- Lower interest rates (i) lead to a depreciation of the exchange rate (e), an increase in competitiveness, an improved trade balance (due to higher net exports, NX) and increased demand, a larger output gap and finally higher inflation
- Moreover. The monetary transmission mechanism

2.6 The Exchange Rate Channel: Import Prices

- The exchange-rate channel:

$$i \downarrow \Rightarrow e \downarrow \Rightarrow P_m \uparrow \Rightarrow \Pi \uparrow \qquad (14)$$

- An exchange rate (e) depreciation also raises import prices (P_m), which are important determinants of firms' costs and the retail price of many goods and services: this directly affects the price level and (temporarily) inflation
- An appreciation should reduce inflation (with a longer lag if prices are sticky on the downside). The monetary transmission mechanism.

2.7 The Exchange Rate Channel: Net Wealth

- The exchange-rate channel:

$$i \downarrow \Rightarrow e \downarrow \Rightarrow NW \updownarrow \Rightarrow y \updownarrow \Rightarrow \Pi \updownarrow \quad (15)$$

- An exchange rate depreciation increases the relative value of foreign-denominated assets and liabilities and therefore net wealth (NW), affecting demand
- The sign of the effect depends on the make-up of balance sheets

The monetary transmission mechanism

2.8 Other Asset Price Effects: Investment (Tobin's Q)

- The investment channel (Tobin's q):

$$i \downarrow \Rightarrow Pe \uparrow \Rightarrow q \uparrow \Rightarrow 1 \uparrow \Rightarrow y \uparrow \Rightarrow \Pi \uparrow$$

- Consider two ways of increasing the size of a firm:
- ✓ buy another firm (and acquire 'old' capital); or
- ✓ invest in new capital
- The ratio of the market value of a firm to the replacement cost of its assets is known as Tobin's q
- Tobin (1969) argued that a firm should invest in new buildings and equipment if the stock market will value the project at more than its cost (that is, if the project's q is greater than 1)
- Increased equity prices (P_e) mean that new investment projects have become relatively cheaper to finance and therefore more attractive. The monetary transmission mechanism.

2.9 Other Asset Price Effects: Consumption

Other asset price effects: consumption

$$i \downarrow \Rightarrow Pe \uparrow \Rightarrow TW \uparrow \Rightarrow C \uparrow \Rightarrow y \uparrow \Rightarrow \Pi \uparrow \quad (16)$$

- The permanent income hypothesis postulates that consumers' spending is related to (total) wealth
- Increased wealth (as a result of higher equity prices, $P_{e,}$ say) if it is perceived to be permanent leads to a (much smaller) increase in (desired) consumption. The monetary transmission mechanism.

2.10 Other Asset Price Effects: Housing Wealth

- Other asset price effects: housing wealth

$$i \downarrow \Rightarrow P_h \uparrow \Rightarrow TW \uparrow ? \Rightarrow C \uparrow \Rightarrow y \uparrow \Rightarrow \Pi \uparrow \quad (17)$$

- Increased house prices (rh) are often associated with increased private consumption in the UK/US
- ✓ Housing wealth represents greater wealth for some (but for the economy as a whole?);
- ✓ Housing wealth increases available collateral and therefore reduces credit constraints; and
- ✓ People may be more likely to change house or spend on improvements/consumer durables (in a process

called mortgage equity withdrawal) The monetary transmission mechanism

2.11 Bank Lending Channel of Monetary Policy Transmission

The monetary policy transmission mechanism refers to the routes through which monetary impulses are communicated to the real sector of the economy. Mishkin, (1995), argued that to be successful in conducting monetary policy, the monetary authorities must have an accurate assessment of the timing and effect of their policies on the economy, thus requiring an understanding of the mechanism through which monetary policy affects the economy. The bank lending channel represents the credit view of this mechanism. According to this view, monetary policy works by affecting bank assets (loans) as well as banks' liabilities (deposits). The key point is that monetary policy besides shifting the supply of deposits also shifts the supply of bank loans. For instance, an expansionary monetary policy that increases bank reserves and bank deposits increase the quantity of bank loans available. Where many borrowers are dependent on bank loans to finance their activities, this increase in bank loans will cause a rise in investment (and also consumer) spending, leading ultimately to an increase in aggregate output, (Y). The schematic presentation of the resulting monetary policy effects is given by the following:

$$M \uparrow \rightarrow \text{Bank deposits} \uparrow \rightarrow \text{Bank loans} \uparrow \rightarrow I \uparrow \rightarrow Y \uparrow \quad (18)$$

(Note: M= indicates an expansionary monetary policy leading to an increase in bank deposits and bank loans, thereby raising the level of aggregate investment spending, I, and aggregate demand and output, Y,). In this context, the crucial response of banks to monetary policy is their lending response and not their role as deposit creators. The two key conditions necessary for a lending channel to operate are: (a) banks cannot shield their loan portfolios from changes in monetary policy; and (b) borrowers cannot fully insulate their real spending from changes in the availability of bank credit. The importance of the credit channel depends on the extent to which banks rely on deposit financing and adjust their loan supply schedules following changes in bank reserves; and also the relative importance of bank loans to borrowers. Consequently, monetary policy will have a greater effect on expenditure by smaller firms that are more dependent on bank loans, than on large firms that can access the credit market directly through stock and bond markets (and not necessarily through the banks).

2.12 Monetary Transmission Mechanism, Credit Frictions and Macro prudential Regulation

The monetary transmission mechanism describes how policy induced changes in the nominal money stock or the short-term nominal interest rates impact real variables such as aggregate output and employment (Ireland, 2005). Specific channels of monetary transmission operate through the effects that monetary policy has on interest rates, exchange rates, equity and real estate prices, bank lending, and firm balance sheets. Recent research shows how these channels work in the context of dynamic, stochastic general equilibrium models. Bernanke and Gertler (1995) classify three channels of monetary policy as the balance sheet channel, the bank-lending channel and the credit channel. The balance sheet channel focuses on monetary policy effects on the liability side of the borrowers' balance sheet and income statement, including variables such as borrowers' networth, cash flow and liquid assets whilst the bank lending channel centres on the possible effect of monetary policy actions on the supply of loans by depository institutions.

However, most of the previous empirical literature on the effects of credit aims to distinguish between different transmission mechanisms, such as the balance sheet channel, the bank lending channel and the bank capital channel (see Oliner and Rudebusch, 1996; van den Heuve, 2002). Since these different channels have similar predictions for aggregate quantities, many empirical studies use micro-level data from banks and/or firms rather than the aggregate data (Bayoumi and Melander, 2009). One consequence of these empirical studies is that the

general conditions of the banking sector and the specific characteristics of individual banks can have predictable impacts on the monetary transmission mechanism. In fact, recent studies have emphasised a risk-taking channel of monetary policy that places more emphasis on the willingness of banks to expand their balance sheet (Borio and Zhu, 2012; Adrian and Shin, 2011). The works of Adrian and Shin (2011) provide an overview of how changes in risk appetite, which is partly a function of monetary policy, generates a critical link between monetary policy changes, the actions of financial intermediaries, and the impact on the real economy.

Boivin *et al* (2010) have argued that the monetary transmission mechanism is one of the most studied areas of monetary economics for two reasons. First, understanding how monetary policy affects the economy is essential to evaluating what the stance of monetary policy is at a particular point in time. Second, in order to decide on how to set policy instruments, monetary policy makers must have an accurate assessment of the timing and effects of their policies on the economy.

Over the last two decades, beginning with the pioneering works of Bernanke and Gertler (1989), economists began to introduce credit frictions into models that allowed for borrowing and lending in equilibrium. A number of studies have shown that these credit frictions could amplify the macroeconomic fluctuations introduced by certain shocks, hence the credit frictions are often referred to as the "financial accelerator" (Kiyotaki and Moore, 1997, Carlstrom and Fuersto, 1997 and Bernanke, *et al*, 1999). The recent papers have contributed to this literature by adding a relatively simple realistic, and well-defined financial intermediation sector into a large-scale dynamic stochastic general equilibrium (DSGE) model (Gertler and Kiyotaki, 2009; Curdia and Woodford, 2010). These works analyze the relationship between the financial intermediation sector and macroeconomic volatility by examining both the indirect effect of the sector on the propagation of non-financial shocks and the direct effects of financial shocks that inhibit financial intermediation.

Tayler and Zilberman (2014) examine the macro prudential roles of bank capital regulation and monetary policy in a Dynamic Stochastic General Equilibrium (DSGE) model with endogenous financial frictions and a borrowing cost channel. The model identifies various transmission channels through which credit risk, commercial bank losses; monetary policy and bank capital requirements affect the real economy. These mechanisms generate significant financial accelerator effects, thus providing a rationale for a macro prudential toolkit. Following credit shocks, counter cyclical bank capital regulation is more effective than monetary policy in promoting financial, price and overall macroeconomic stability. For supply shocks, macro prudential regulation combined with a strong response to inflation in the central bank policy rule yield the lowest welfare losses. The findings emphasize the importance of the Basel III regulatory accords and cast doubts on the desirability of conventional Taylor rules during periods of financial stress.

2.13 Banks and the Transmission of Monetary Policy

The traditional interest rate, or money, view of the transmission of monetary policy focuses on the liability side of bank balance sheets. The important role played by banks in this transmission mechanism arises from the reserve requirement constraint faced by banks. Because banks rarely hold significant excess reserves, the reserve requirement constraint is typically considered to be binding at all times. Thus, shifts in monetary policy that change the quantity of outside money result in changes in the quantity of inside money in the form of the reservable deposits that can be created by the banking system.

The transmission mechanism functions as follows. When the monetary authority undertakes open-market operations in order to tighten monetary policy (by selling securities), the banking industry experiences a decline in reserves. The fractional reserve system then forces banks (as a whole) to reduce reservable deposits in order to continue to meet the reserve requirement. This shock, which is exogenous to the banking sector, thus constrains

bank behavior. To induce households to hold smaller amounts of reservable deposits (transactions accounts), interest rates on other deposits and non-deposit alternatives must rise. That is, since the supply of transactions deposits has declined relative to the supply of alternative assets, interest rates on these alternative assets would have to rise to clear the market for transactions deposits.

While that accurately describes non-crisis times, two recent notable exceptions are the episodes of quantitative easing policies undertaken by the Bank of Japan in response to the crises experienced by Japan in the 1990s and, in response to the most recent financial crisis, also by the Federal Reserve, the Bank of England, and the European Central Bank. rate is transmitted to longer term interest rates, aggregate demand declines. However, an important characteristic of the recent financial crisis has been the substantial expansion of excess reserves in the U.S. banking system. Consequently, with the reserve requirement failing to serve as a binding constraint on most institutions, an increasing focus has been placed on the important role of alternative transmission mechanisms.

2.14 The Broad Credit Channel

The broad credit channel, also referred to as the balance sheet effect or financial accelerator, does not require that a distinction be drawn among the alternative sources of credit. Instead, it is predicated on credit market imperfections associated with asymmetric information and moral hazard problems. Research on the credit channel was motivated, in large part, by the puzzle that monetary policy shocks that had had relatively small effects on long-term real interest rates appeared to have had substantial effects on aggregate demand. This literature attributes the magnification, or propagation, of monetary policy shocks to frictions in the credit markets Because of the information asymmetries between borrowers and lenders, external finance is an imperfect substitute for a firm's internal funds.

The broad credit channel posits that an increase in interest rates associated with a tightening of monetary policy causes deterioration in firm health, in terms of both net income and net worth. A firm's net income is impaired both because its interest costs rise and because its revenues deteriorate as the tighter monetary policy slows the economy. A firm's net worth is adversely impacted as the lower cash flows emanating from the firm's assets are discounted using the higher interest rates associated with the tightening of monetary policy. The deterioration in the firm's net income and the reduction in the collateral value of the firm's assets, in turn, cause an increase in the external finance premium that must be paid by the firm for all sources of external finance. This increase in the cost of external funds for borrowers over and above the risk-free interest rate then results in a reduction in aggregate demand in addition to that due to the increase in the risk-free interest rate associated with the interest rate channel of the transmission of monetary policy.

2.15 The Bank Lending Channel

With the bank lending, or credit, view, in contrast to the money view, the focus of the transmission mechanism operating through bank balance sheets shifts from bank liabilities to bank assets. When monetary policy tightens, the reduction in available bank reserves forces banks to create fewer reservable deposits, banks must then either replace the lost reservable deposits with non-reservable liabilities, or shrink their assets, such as loans and securities, in order to keep total assets in line with the reduced volume of liabilities. Typically, one would expect to observe some combination of these responses, although Romer and Romer (1990) question the extent to which banks, in an age of managed liabilities, are unable to easily replace reservable deposits.

However, to the extent that banks are unable or unwilling to fully insulate their loan portfolio, the interest rate effect on aggregate demand is supplemented with an additional effect stemming from a reduction in the

availability of bank loans that further slows aggregate demand. In a simple world with three assets money, government bonds, and bank loans—three conditions must be satisfied for the bank lending channel to be operational in the transmission of monetary policy (see, for example, Bernanke and Blinder 1988; and Kashyap and Stein 1994). First, as with the interest rate view, prices must not adjust fully and instantaneously to a change in the money supply. That is, money is not neutral, at least in the short run. Second, open-market operations must affect the supply of bank loans. Third, loans and bonds must not be perfect substitutes as a source of credit for at least some borrowers. Of course, the set of assets can be expanded to include private sector bonds and nonbank intermediated loans, in which case the narrower bank lending channel is distinguished from the broad credit channel by requiring that private sector bonds and nonbank intermediated loans not be perfect substitutes for bank loans as a source of credit for at least some borrowers. Because only the second and third conditions distinguish the bank lending view from the money view, and because substantial evidence exists that wages and prices are not perfectly flexible, it will be assumed for the purposes of this discussion that the first condition holds.

2.16 Bank Lending and the Transmission of Monetary Policy

Empirical researchers investigating the bank lending view face several challenges. First, they need to determine whether a change in monetary policy does affect bank lending. Then, if bank lending is affected, the issue becomes the extent to which shifts in bank loan supply do, in fact, affect aggregate demand. The difficulties in establishing the first point are twofold. First, to what extent are banks able to insulate their loan portfolios from monetary policy shocks by adjusting other components of their balance sheet? The second difficulty concerns identifying a bank-loan supply shock, insofar as a decline in bank loans following a tightening of monetary policy may simply reflect a decline in loan demand rather than a decline in the supply of loans.

2.17 Monetary Policy and Bank Loan Supply

While the theoretical conditions required for bank loan supply to be affected by changes in monetary policy are clear, it is not straightforward empirically to disentangle shifts in loan supply from shifts in loan demand. At an aggregate level, Bernanke and Blinder (1992), among others, show that bank lending does contract when monetary policy becomes tighter. However, such an observed correlation may reflect a reduction in loan demand as the economy weakens in response to the tighter monetary policy, rather than reflecting a reduction in bank loan supply.

Furthermore, even if one observed an initial increase in bank loans or a notable delay in the decline in bank loans following a tightening of monetary policy, such evidence would not necessarily conflict with an inward shift in bank loan supply in response to a tightening of monetary policy. For example, the initial response of firms to a tightening of monetary policy may be an increase in loan demand resulting from the need to finance the buildup of inventories, as aggregate demand initially declines faster than production. Even though banks may decrease loan supply immediately to borrowers without loan commitments, the total amount of bank loans may temporarily increase, as banks are forced to honor existing loan commitments (Morgan 1998). Thus, the endogeneity issues associated with using aggregate data for total loans make it impossible to obtain a clear answer.

Kashyap, Stein, and Wilcox (1993) provide an alternative approach for identifying an effect of monetary policy on bank loan supply, although the analysis is still based on aggregated data. They investigate the change in the mix of bank loans and commercial paper in the composition of firms' external finance, with the argument being that if the decline in loans is due to a general decline in credit demand associated with a slowing of the real economy, then demand for other types of credit should decline similarly. Finding that a tightening of monetary

policy is associated with an increase in commercial paper issuance and a decline in bank loans, they conclude that a tightening of monetary policy does reduce bank loan supply rather than the decline in bank loans simply reflecting a reduction in credit demand as the economy slows. In the same vein, Ludvigson (1998) investigates the composition of automobile finance between bank and nonbank providers of credit. She finds that, in fact, a tightening of monetary policy reduces the relative supply of bank loans, consistent with the bank lending channel. In contrast, Oliner and Rudebusch (1996b) revisit the Kashyap, Stein, and Wilcox (1993) approach using a different measure of the mix of external finance and disaggregating the data into two separate components, one for small firms and one for large firms. They argue that their evidence is consistent with the broad credit channel rather than with the more narrowly defined bank lending channel. However, this only highlights the weaknesses associated with attempting to isolate bank loan supply shocks from shifts in credit demand using aggregate data. In fact, in their reply, Kashyap, Stein, and Wilcox (1996) close by suggesting that a more definitive answer will have to rely on an analysis using micro data at the individual bank and firm levels. By advancing the analysis to focus on panel data, the literature has been able to obtain more definitive results about the impact of changes in monetary policy on bank loan supply. The key has turned out to be relating cross-sectional differences in bank, or banking organization, characteristics to differences in the extent to which banks were able to insulate their loan portfolios from a tightening of monetary policy. Two aspects of bank characteristics appear to have been the primary focus. First, the ability of banks to raise nonreservable liabilities to replace the lost reservable deposits is a key factor in determining the extent to which a bank must adjust its loan portfolio when monetary policy is tightened. Because these funds are, for the most part, uninsured liabilities, bank characteristics related to banks' access to external funds—for example, size, health, and direct access to capital markets—play an important role in determining the ability of banks to insulate their loan portfolios from the effects of changes in monetary policy. Second, because banks face a capital requirement constraint in addition to the reserve requirement constraint on their activities, banks may differ in their response to a change in the stance of monetary policy, depending on which constraint is more binding. If the capital ratio requirement is the binding constraint, easing the reserve requirement constraint through open market operations should have little, if any, effect on bank lending. That is, because the binding constraint has not been eased, expansionary monetary policy, at least if operating through the bank lending channel, would be like 'pushing on a string.'

Kashyap and Stein (1995) note that with a tightening of monetary policy and the associated loss in reservable deposits, it is costly for banks to raise uninsured deposits, however, banks differ in the degree to which they have access to external funds. Kashyap and Stein hypothesize that bank size is a reasonable proxy for the degree of access to uninsured liabilities, with smaller banks having more limited access, and thus having their loan portfolio impacted more by a tightening of monetary policy. Indeed, they find empirical support for the proposition that small banks are more responsive (shrink their loan portfolios by more) than large banks to a monetary policy tightening.

Kashyap and Stein (2000) extend their analysis of the relative ease with which banks can raise uninsured deposits following a monetary policy tightening, noting that the bank loan response will also differ depending on the liquidity position of the bank. A bank that finds it relatively costly to raise uninsured deposits but that has large securities holdings has the option of adjusting to the shrinkage of reservable deposits by selling some of its securities, while a less liquid bank may be forced to shrink its loan portfolio by a greater degree. In a large cross-section of banks, they find evidence that the loan portfolios of smaller, more illiquid banks are the most responsive to monetary policy shocks.

Campello (2002) distinguishes among these smaller banks based on whether the bank is affiliated with a large

multibank holding company, finding that the lending of small banks that are affiliated with large multibank holding companies reacts less to a tightening of monetary policy than does the lending of similar small (standalone) banks that are not affiliated with multibank holding companies. Although this evidence indicates that small banks affiliated with multibank holding companies are better able to insulate their lending from a tightening of monetary policy, the extent to which this is due to the channeling of internal holding company funds to bank subsidiaries rather than due to the fact that large multibank holding companies have easier access to external funds is not clear. Campello tries to address this issue by using capital-to-asset ratios to distinguish among bank holding companies. Kishan and Opiela (2000) use the capital-to-asset ratio as the proxy for a bank's ability to raise uninsured deposits, finding that the loan portfolios of well-capitalized banks are less sensitive to monetary policy shocks than are those of poorly capitalized banks of the same size. However, for reasons discussed below, capital-constrained banks may behave differently for reasons other than their ability to raise uninsured deposits.

Holod and Peek (2007) utilize the distinction between publicly traded and non-publicly traded banks to classify banks by the ease with which they can access external funds. They find that after controlling for size, capitalization, and other factors, the loan portfolios of publicly traded banks shrink less than those of non-publicly traded banks when monetary policy tightens due to the banks' ability to raise external funds, including by issuing large time deposits. Furthermore, as one would expect, when a distinction is made between tightening and easing monetary policy, the estimated effect can be attributed to the effects of monetary policy tightening (tightening a binding constraint) rather than to monetary policy easing (possibly pushing on a string). Loutskina and Strahan (2009) argue that growth in loan securitization, in particular the expansion of the secondary mortgage market, has weakened the transmission of monetary policy through the lending channel by increasing bank balance sheet liquidity.

Cetorelli and Goldberg (2012) argue that the domestic amplification of monetary policy through the lending channel has been mitigated by the increasing globalization of banking. Banking organizations with international operations are able, at least partially, to insulate themselves from domestic liquidity shocks, such as from a monetary policy tightening, though the cross-border operation of their internal capital markets. That is, multinational banks can react to a tightening of monetary policy by using internal flows of funds to offset the impact on their domestic banks. On the other hand, this mechanism also suggests that the total effect of the lending channel has been understated by focusing only on domestic lending, insofar as changes in monetary policy are propagated internationally through the internal capital markets of global banks.

Peek and Rosengren (1995b) focus on the direct impact of the enforcement of capital regulations by bank supervisors on the ability of capital-constrained banks to lend, and thus to be able to increase loans in response to an easing of monetary policy. They examine the impact on bank lending of formal regulatory actions (cease and desist orders and written agreements) imposed on banks that experienced asset quality problems. They find that the enforcement actions by bank regulators included explicit capital targets that needed to be achieved over a short time frame. The result was an immediate and significant reduction in bank loan portfolios associated with the imposition of the enforcement action that persisted for some time thereafter while the bank continued to operate under the enforcement action.

Hall (1993) found that the introduction of the Basel I Accord had a significant impact on bank portfolios. Hancock and Wilcox (1994) also find that the implementation of the Basel I Accord affected banks' willingness to lend. However, Berger and Udell (1994) do not find evidence that the Basel I Accord created a bank capital crunch. More recently, a concern raised with the proposed Basel II Accord has been that the new capital

regulations would magnify potential capital constraints during recessions (for example, Kashyap and Stein 2004), making banks less responsive to an easing of monetary policy. Thus, a very real concern with the effectiveness of the bank lending channel, and thus the overall effectiveness of monetary policy, is whether banks are capital constrained at the time of an easing of monetary policy.

2.18 Real Effects of Shifts in Bank Loan Supply

Given that the empirical evidence generally supports the proposition that banks, particularly those that may find it relatively expensive to raise uninsured liabilities, respond to a monetary policy tightening by reducing loans, we turn to the next link in the bank lending channel mechanism. For the reduction in bank loans to have an impact on economic activity, firms must not be able to easily substitute other sources of external finance when bank loan supply is cut back. Gertler and Gilchrist (1994) find, at a somewhat aggregated level, that the investment of an aggregate of small firms is more responsive to changes in monetary policy than is the investment of an aggregate of large firms, a set of firms that presumably is less bank dependent.

Ludvigson (1998), comparing bank and nonbank sources of automobile loans, finds that the composition of automobile credit impacts automobile sales, even after controlling for the standard factors that probably impact automobile demand. Additional evidence at an aggregate level is provided by Driscoll (2004), who uses a panel of state-level data to investigate the extent to which shocks to bank loan supply affect output. Using state-specific shocks to money demand as an instrumental variable to address the endogeneity problem, he does not find a meaningful effect of loan supply shocks on economic activity at the state level.

Ashcraft (2006), similarly basing his analysis on state-level data, attempts to exploit differences between standalone banks and banks affiliated with multibank holding companies in their degree of access to external funds in order to identify loan supply shocks related to changes in monetary policy. While he does find a difference between the two types of banks in their lending response to changes in monetary policy, he does not find a significant effect of these bank loan supply shocks on state income growth.

Ashcraft (2005), using the cross-guarantees of two failed Texas bank holding companies as his identification mechanism to address the endogeneity problems, finds that the failures of healthy banks forced by the cross-guarantee provisions were associated with reduced local economic activity. This suggests that bank lending is special, insofar as it appears that other lenders (even other banks) did not fill the gap created by the sharp reduction in lending by the failed banks, and is consistent with an operative lending channel.

Another approach that provides direct evidence that a reduction in bank loan supply adversely affects macroeconomic activity is provided by Peek and Rosengren (2000). Using the banking problems in Japan as the source of an exogenous loan supply shock in the United States, they are able to avoid the common endogeneity problem faced by studies that rely on domestic shocks to bank loan supply. Furthermore, by focusing on commercial real estate loans that tend to have local or regional markets, they are able to exploit cross-sectional differences across geographic regions to show that the decline in loans had real effects. That is, the pull-back by Japanese banks in local U.S. markets was not fully offset by other lenders stepping in to fill the void. Taking still a different tack, Peek, Rosengren, and Tootell (2003) obtain evidence of a macroeconomic effect of shifts in bank loan supply. They find that adverse shocks to bank health weaken economic activity in the major GDP components that one would expect to be most affected by bank loan supply shocks for example, the change in business inventory investmentwhile not impacting other major components of GDP whose fluctuations would be correlated with demand shocks.

Slovin, Sushka, and Poloncheck (1993) observe that the failure of Continental Illinois Bank adversely impacted

borrowers that had a close banking relationship with that bank. However, this outcome did not hold if the Continental Illinois loan was part of loan participation unless Continental Illinois was the lead underwriter of the loan. In terms of the strength of the banking relationship, Petersen and Rajan (1995) note that a firm's banking relationship often involves both a deposit and a lending relationship. They find that the strength of lending relationships, as indicated by a firm holding deposits at the bank, is indicative of how extensively the firm relies on bank lending.

Fields et al. (2006) argue that the value of lending relationships has diminished substantially over time, due in part to the further development of financial markets and the increased availability of information about borrowers. However, their sample includes only publicly traded firms, precisely those firms that are the least likely to be bank dependent. Consistent with the view of Fields et al. (2006), Gande and Saunders (2012) argue that the development of the secondary loan market has reduced to some extent the 'specialness' of banks due to the weakening of banks' incentives to monitor borrowers.

2.19 Adverse real-side effects of Contractionary Monetary Policy

One important problem with monetary policies that constrains domestic credit is that they may have substantial adverse supply effects. The conventional view is that tight monetary policy that results in credit contraction causes private expenditures (especially durable goods and investment) to decline, causing a decline in aggregate demand, which reduces inflation. The decline in credit is also supposed to cause a reduction in the demand for imports, which ameliorates the current account deficit and reduces (imported) inflation. If credit contraction had only aggregate demand effects, then central banks could indeed control inflation by using contractionary monetary policy. However, availability of credit determines the ability of firms to accumulate capital and hire labor. Thus, credit contraction causes a decline in capacity utilization, employment, and production. Tight monetary policy, which is usually associated with high interest rates and a strong currency, particularly hurts export-oriented sectors by undermining international competitiveness. The decline in production and exports causes upward pressure on the price level and deteriorates the current account, causing inflation to accelerate. The increase in the price level results in a decline in real credit, which causes investment and employment to decline further. If these supply effects are significant, contractionary monetary policy will fail to reduce and contain inflation.

The inability of monetary policy to control inflation has long been recognized even in the Real Business Cycle school of thought. Sargent and Wallace (1981) pointed out that "even in an economy that satisfies monetarist assumptions, Friedman's list of things that monetary policy cannot permanently control may have to be expanded to include inflation." Friedman had argued that monetary policy could not permanently influence real output, employment, and real returns on assets, but that it could definitively influence inflation (Friedman, 1968). In practice, however, because monetary policy has both supply and demand effects, especially through the credit channel, contractionary monetary policy may be ineffective in controlling inflation while it has substantial adverse real effects.

Blinder (1987) offers a simple theoretical framework to illustrate that the supply side effects of tight monetary policy through credit contraction may outweigh the demand effects on the price level. In Blinder's model, supply (y) is determined by factor utilization (F), which in turn depends on real credit (c/p) (c is nominal credit and p is the price level):

$y_t = \gamma F_{t-1}; F_t = \alpha(c/p)_t; \quad y_t = \gamma\alpha (c/p)_{t-1}; \quad$ Where $\gamma < 1; \alpha < 1$

Aggregate demand (d) is determined by income:

$d_t = a + by_t$; where $0 < b < 1$ (19)

Equations 18 and 19 can be combined to yield aggregate demand as a function of real factor utilization and real domestic credit:

$$d_t = a + b\gamma F_{t-1} = a + b(c/p)_{t-1} \quad (20)$$

The price adjustment process is summarized in the following equation:

$$P_{t+1} = \lambda(d_t - y_t) \quad (21)$$

It follows from the above relations that credit contraction decreases demand (*d*), which causes the price level to decrease, but it also decreases supply (*y*) which causes the price level to increase. From equations 1 and 3, the effects of a one percent decrease in credit may have a larger effect on supply than on demand under reasonable assumptions about the values of the parameters *b*,γ , and α : as long as *b*,γ ,α < 1, it follows that *b*, γ, α < γ α , so that | *dy* / *d*(*c* / *p*) | > |*dx*/*d*(*c* / *p*) |, implying that *p*! > 0. Under these conditions, tight monetary policy is stagflationary as it causes output to decline while inflation accelerates. Contractionary monetary policy arguably reduces inflation by reducing domestic aggregate demand. However, low aggregate demand may be a constraint to output expansion. In the case of SSA countries, domestic markets for goods and services are thin, which is a constraint to production. A contraction in bank credit to the private sector therefore depresses production. Under such circumstances, even if price stability were achieved, the economy may incur a high cost in terms of reduced investment, employment, and output. Therefore, the monetarist orientation espoused by central banks in SSA countries to control inflation may constrain domestic credit, which exacerbates credit rationing arising from market imperfections.

In the context of SSA countries, the negative effects of contractionary monetary policy on private credit are exacerbated by pressure from deficit financing. Contractionary monetary policy in the context of chronic budget deficits automatically creates a *captive market* for government debt. Given that government borrowing is outside of the control of the monetary authority, tight domestic credit amounts to squeezing credit to the private sector, which has negative effects on domestic investment.

2.20 Bank Credit and Domestic Investment

There is a large and well established literature on the determinants of investment and methodologies for empirical investigation of investment behavior. A selected list includes Baddeley (2003), Chirinko (1993), Jorgenson (1971), Junankar (1973), and Nickell (1978). Fazzari et al. (1988) provide theoretical motivation and empirical evidence on the importance of credit constraints for investment at the firm level. This study focuses on the implications of the links between monetary policy and bank credit for investment at the aggregate level. Here, we derive a testable relationship between investment and monetary policy to illustrate the effects of monetary policy on domestic investment through bank credit to the private sector. This relationship goes beyond the standard situations of credit rationing (Stiglitz and Weiss, 1981) and financial repression typically examined in the development finance literature (McKinnon, 1973). In the case presented here, the monetary policy stance can be explicitly pro- or anti-domestic credit, which affects private investment. In addition to the usual interest rate effect, monetary policy affects investment through the quantity of credit and its overall effects on financial intermediation. By reducing overall financial intermediation, credit contraction depresses business investment and overall economic activity.

The role of the "state of credit" has been emphasized for a long time in the economic literature. Keynes (1973) pointed out that "the banks hold the key position in the transition from a lower to a higher scale of activity… The

investment market can become congested through shortage of cash. It can never become congested through shortage of saving.Well-functioning domestic credit markets facilitate long-term investment by pooling resources, thus resolving the firm's problem of mismatches between revenue and expenditure flows. Credit markets also stimulate investment by facilitating risk sharing among investors. In particular, limited liability associated with credit financing makes investors more comfortable in undertaking large long-gestation investment projects. As a result, increased access to low-cost credit stimulates domestic investment. Therefore, the "state of domestic credit" is an enhancing "X-factor" in the capital accumulation process. The foregoing discussion suggests that a better credit environment, or abundant and affordable credit, is being associated with higher optimal capital stock. This can be formalized by the following equation:

$$K^*_t = a + bX_t + Z_t\,\theta \qquad (22)$$

where X is the indicator of the state of credit and **Z** is a vector of other determinants of investment demand. The adjustment to optimal capital stock is as follows:

$$\Delta K_t = \gamma\,(K^*_t - K_{t-1})\,K\,6 \qquad (23)$$

where γ is the flexible accelerator parameter assumed to be between 0 and 1. Gross investment, the sum of net investment and replacement, is given by:

$$I\,t = \Delta Kt + \delta K_{t-1} \qquad (24)$$

Where δ is the depreciation rate. Combining the above three equations yields investment as a function of the "state of credit":

$$1_t = a\gamma + b\gamma X_t + \theta\gamma Z_t + (\,\delta - \gamma)\,K_{t-1} \qquad (25)$$

Monetary policy also has direct effects on domestic investment through the interest rates. These will be tested empirically in the next section. The empirical analysis also takes into account the effects of other factors of private investment, notably growth, political risk and trade. Given that investment is inherently irreversible, undertaking a new investment project carries a certain degree of risk (Bernanke, 1983; Dixit and Pindyck, 1994). This risk will be higher the higher the level of economic and political uncertainty. Using various measures of economic and political instability, some studies have found that risk has a quantitatively significant negative effect on investment.

International trade may have a positive or a negative effect on domestic investment. If the increase in trade is accompanied by a reduction in the cost of imported inputs and more access to export markets, then trade will stimulate domestic investment in the relevant sectors. However, trade openness may depress domestic private investment due to foreign competition. A number of studies have found that openness exerts a positive effect on domestic investment (see Ndikumana (2000) for evidence on sub-Saharan African countries). However, an important empirical issue is the difficulty in identifying the exact channels through which the effects of trade openness on investment actually operate. Another problem is measurement of openness. In particular, due to the lack of consistent data on trade policy indicators, empirical studies typically rely on measures of trade outcomes (imports plus exports) as proxies of trade policy indicators. In practice, however, a country may experience an increase in trade without any change in trade policy, as in the case of a resource-rich country during commodity price hikes. Conversely, trade policy reforms aimed at promoting exports (e.g., reduction in export duties) may not necessarily result in expansion of exports, especially if a country's products are not price elastic as is the case of agricultural products. These caveats must be kept in mind while interpreting the results on measure of openness.

2.21 Theoretical Framework: Theories of Financial Intermediation The Perfect Theory of Financial Intermediary

Three pillars are at the basis of the modern theory of finance: optimality, arbitrage, and equilibrium. Optimality refers to the notion that rational investors aim at optimal returns. Arbitrage implies that the same asset has the same price in each single period in the absence of restrictions. Equilibrium means that markets are cleared by price adjustment through arbitrage at each moment in time. Levine et al (2000). In the neoclassical model of a perfect market, e.g. the perfect market for capital, or the Arrow-Debreu world, the following criteria usually must be met:

- No individual party on the market can influence prices;
- Conditions for borrowing/lending are equal for all parties under equal circumstances;
- There are no discriminatory taxes;
- Absence of scale and scope economies;
- All financial titles are homogeneous, divisible and tradable;
- There are no information costs, no transaction costs and no insolvency costs;
- All market parties have ex ante and ex post immediate and full information on all factors and events relevant for the (future) value of the traded financial instruments.

The Arrow-Debreu world is based on the paradigm of complete markets. In the case of complete markets, present value prices of investment projects are well defined. Savers and investors find each other because they have perfect information on each other's preferences at no cost in order to exchange savings against readily available financial instruments. These instruments are constructed and traded Costless and they fully and simultaneously meet the needs of both savers and investors. Thus, each possible future state of the world is fully covered by a so-called Arrow-Debreu security (state contingent claim). Also important is that the supply of capital instruments is sufficiently diversified as to provide the possibility of full risk diversification and, thanks to complete information, market parties have homogenous expectations and act rationally. In so far as this does not occur naturally, intermediaries are useful to bring savers and investors together and to create instruments that meet their needs. They do so with reimbursement of costs, but costs are by Definition an element – or, rather, characteristic – of market imperfection.

Therefore, intermediaries are at best tolerated and would be eliminated in a move towards market perfection, with all intermediaries becoming redundant: the perfect state of disintermediation. This model is the starting point in the present theory of financial intermediation. All deviations from this model which exist in the real world and which cause intermediation by the specialized financial intermediaries are seen as market imperfections. This wording suggests that intermediation is something which exploits a situation which is not perfect, therefore is undesirable and should or will be temporary. The perfect market is like heaven, it is a teleological perspective, an ideal standard according to which reality is judged. There are different views on how the financial structure affects economic growth exactly Levine (2000).

- The bank-based view holds that bank-based systems – particularly at early stages of economic development – foster economic growth to a greater degree than market-based systems.
- The market-based view emphasizes that markets provide key financial services that stimulate innovation and long-run growth.

- The financial services view stresses the role of banks and markets in researching firms, exerting corporate control, creating risk management devices, and mobilizing society's savings for the most productive endeavors in tandem. As such, it does regard banks and markets as complements rather than substitutes as it focuses on the quality of the financial services produced by the entire financial system.
- The legal-based view rejects the analytical validity of the financial structure debate. It argues that the legal system shapes the quality of financial services La Porta et al., (1998).

The legal-based view stresses that the component of financial development explained by the legal system critically influences long-run growth. Political factors have been introduced too, in order to explain the relationship between financial and economic development (Zingales, 2000).

2.22 Modern Theories of Financial Intermediation

In order to give firm ground to our argument and to illustrate the paradox, we will first review the doctrines of the theory of financial intermediation. These are specifications, relevant to the financial services industry, of the agency theory, and the theory of imperfect or asymmetric information. Basically, we may distinguish between three lines of reasoning that aim at explaining the raison d'être of financial intermediaries: information problems, transaction costs and regulatory factors.

First, and that used in most studies on financial intermediation, is the informational asymmetries argument. These asymmetries can be of an ex ante nature, generating adverse selection, they can be interim, generating moral hazard, and they can be of an ex post nature, resulting in auditing or costly state verification and enforcement. The informational asymmetries generate market imperfections, i.e. deviations from the neoclassical framework. Many of these imperfections lead to specific forms of transaction costs. Financial intermediaries appear to overcome these costs, at least partially. For example, Diamond and Dybvig (1983) consider banks as coalitions of depositors that provide households with insurance against idiosyncratic shocks that adversely affect their liquidity position. Another approach is based on Leland and Pyle (1977). They interpret financial intermediaries as information sharing coalitions. Diamond (1984) shows that these intermediary coalitions can achieve economies of scale. Diamond (1984) is also of the view that financial intermediaries act as delegated monitors on behalf of ultimate savers. Monitoring will involve increasing returns to scale, which implies that specializing may be attractive. Individual households will delegate the monitoring activity to such a specialist, i.e. to the financial intermediary. The households will put their deposits with the intermediary. They may withdraw the deposits in order to discipline the intermediary in his monitoring function. Furthermore, they will positively value the intermediary's involvement in the ultimate investment (Hart, 1995).

Also, there can be assigned a positive incentive effect of short-term debt, and in particular deposits, on bankers, for example, Qi (1998) and Diamond and Rajan (2001) show that deposit finance can create the right incentives for a bank's management. Illiquid assets of the bank result in a fragile financial structure that is essential for disciplining the bank manager. Note that in the case households that do not turn to intermediated finance but prefer direct finance, there is still a "brokerage" role for financial intermediaries, such as investment banks. Here, the reputation effect is also at stake. In financing, both the reputation of the borrower and that of the financier are relevant. Dinç (2001) studies the effects of financial market competition on a bank reputation mechanism, and argues that the incentive for the bank to keep its commitment is derived from its reputation, the number of competing banks and their reputation, and the competition from bond markets. These four aspects clearly interact.

2.23 An Alternative Approach of Financial Intermediation

When information asymmetries are not the driving force behind intermediation activity and their elimination is not the commercial motive for financial intermediaries, the question arises which paradigm, as an alternative, could better express the essence of the intermediation process. In our opinion, the concept of value creation in the context of the value chain might serve that purpose. And, in our opinion, it is risk and risk management that drives this value creation. The concept of value creation, introduced by Michael Porter (1985), can be seen as a dynamic extension of the theory of industrial organization, in the tradition of Joseph Schumpeter. It represents the other side of the coin, which glitters in the theory of the firm: transaction costs are incurred to create value. It is amazing that the value added approach, now widely recognized and applied in the literature on business organization, management and finance describes the value creation process in banking in his book "Competitive Strategies in European Banking", making reference to Porter. However, he does not elaborate on this concept to create an alternative to the existing paradigm of financial intermediation. Nor does he go into depth to explain the basic process of value creation by financial intermediaries. David Llewellyn's concept of contract banking is also based on the value chain idea (Llewellyn, 1999). But here too, there emerges no alternative for the mainstream view on financial intermediation.

2.24 Theories of Monetary Policy

- *The Keynesian Monetary Policy*

In the Keynesian monetary theory, an increase (or decrease) in money supply is attributed to the open market purchase (or sale) of government debt instruments by the central bank. Interest once government decides to enter the market it usually purchases or sells securities on a large scale (Afolabi, 2003). If the intention is to stimulate a sluggish economy government repurchases securities on a large scale and injects cash into the economy to increase aggregate demand for goods and services, and encourage more output. If the intention is to reduce the high inflationary rate and create a conducive environment, government sells securities on a large scale. A large volume of money withdrawn from circulation and the level of money supply falls, dragging transactions balances of the community to a lower level. Consequently general prices fall bringing down the rate of inflation.

Although the Keynesians define financial assets (government securities) as short-term papers, e.g. treasury bills, they consider long-term bonds as a representative of financial assets. Naturally the interest return on a long-term financial asset is expected to be higher than that of a short-term financial asset. Short-term cyclical disturbances or changes in short-term rates are bound to affect the long-term interest rate of a 1ong-term financial asset.

The Keynesian theory talked about money, interest rate and their economic importance. Money has. Its value but it is not neutral to the general level of economic activity. Money is a generalized claim against all things that have economic value.

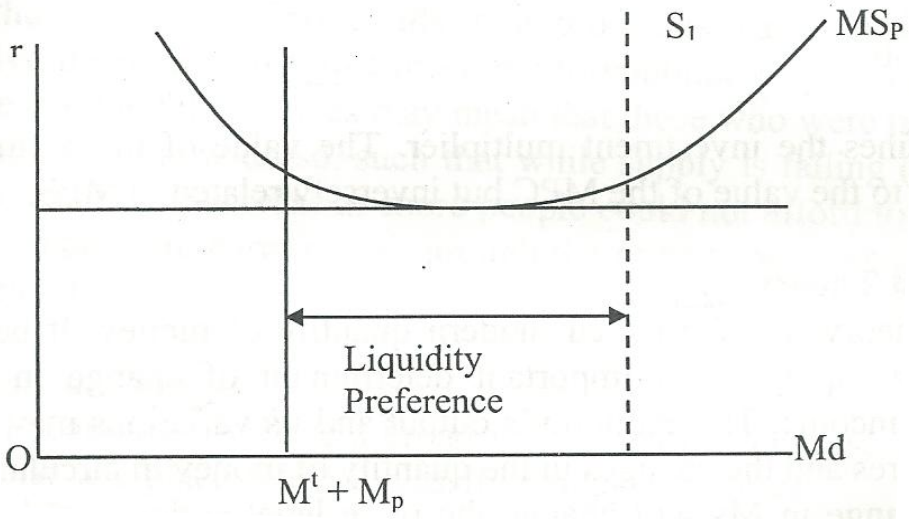
In Keynes view the rate of interest is determined by the demand and supply money. Money supply (Ms) is fixed in the short-run and does not vary with interest rate. Money demand consists of:

Md = Mt + M + MSP where

Mt = Transactions demand for money.

M = Precautionary demand for money.

MSp = Speculation demand for money (Osiegbu, 2005).



- *Adopted from Osiegbu 2005*

Note that in Fig. 1.1 r is measured on the vertical axis and Md on the horizontal, M1 + M remain inelastic with respect of changes in r. MSP is how people could do better holding more cash than the compensation from financial institutions and vice versa. Keynes provided the explanation for holding cash through the concept of liquidity preference. Money is the most liquid of all assets and liquidity means for ease and convenience with which an asset (money) can be converted from without loss of value. Liquidity preference shows that individual prefers to demand money to hold as cash and all demand increase unit the liquidity preference region is 1EI. Liquidity preference operates at very low r when the demand for money is infinitely elastic (below r) (Okereke, 2003).

- *Empirical Review*

Gertler and Gilchrist (1994) revealed that business lending does not decline when policy is tightened. They concluded that the entire decline in total lending comes from a reduction in consumer and real estate loans.

Kashyap and Stein (1995) find evidence that business lending may respond to a tightening of monetary policy. They find that when policy is tightened, both total loans and business loans at small banks fall, while loans at large banks are unaffected. The differential response of small banks may indicate they have less access to alternative funding sources than large banks and so are less able to avoid the loss of core deposits when policy is tightened.

Gambacorta and Iannoti (2005) studied the velocity and asymmetry in response of bank interest rates (lending, deposit, and inter-bank) to monetary policy shocks (changes) from 1985-2002 using an Asymmetric Vector Correction Model (AVECM) that allows for different behaviours in both the short-run and long-run. The study shows that the speed of adjustment of bank interest rate to monetary policy changes increased significantly after the introduction of the 1993 Banking Law, interest rate adjustment in response to positive and negative shocks is asymmetric in the short run, with the idea that in the long- run the equilibrium is unique. They also found that banks adjust their loan (deposit) prices at a faster rate during period of monetary tightening (easing) (Somoye and Ilo, 2009).

Van den Heuvel (2005) in his study shows that monetary policy affects bank lending through two channels. They argued that by lowering bank reserves, contractionary monetary policy reduces the extent to which banks can

accept reservable deposits, if reserve requirements are binding. The decrease in reservable liabilities will, in turn, lead banks to reduce lending, if they cannot easily switch to alternative forms of finance or liquidate assets other than loans. A study by Punita and Somaiya in 2006 on the impact of monetary policy on profitability of banks in India between 1995 and 2000 provided some dissenting evidence that lending rate has a positive and significant influence on banks' profitability, which indicates a fall in lending rates will reduce the profitability of the banks. It was also found out that bank rate, cash reserve ratio and statutory ratio significantly affect profitability of banks negatively. Their findings were the same when lending rate, bank rate, cash reserve ratio and statutory ratio were pooled to explain the relationship between bank profitability and monetary policy instruments in the private sector.

Amidu and Wolfe (2008) examined the constrained implication of monetary policy on bank lending in Ghana between 1998 and 2004. There study revealed that Ghanaian banks lending behaviour are affected significantly by the countries economic also support and change in money supply. Their findings also support the finding of previous studies that the central bank prime rate and inflation rate negatively affect bank lending. Prime rate was found statistically significant while inflation was insignificant. Based on the firm level characteristics, there study revealed that bank size and liquidity significantly influence bank's ability to extend credit when demanded.

Mohammed and Simon (2008) Somoye and Ilo (2009) investigated the impact of macroeconomic instability on the banking sector lending behaviour in Nigeria between 1986 to 2005. Their study revealed the mechanism transmission of monetary policy stocks to banks operation. The result of cointegration and Vector Error correction suggests a long-run relationship between bank lending and macroeconomic instability.

3. Research Methodology

The study uses quasi experimental research design approach for the data analysis. The approach combines theoretical consideration with the empirical observation and extract maximum information from the available data. Therefore, the research design in this study is the quasi-experimental which allows us to examine the causal relationship between the dependent and the independent variables. The data in this study will be sourced from the publications of Central bank of Nigeria Statistical Bulletin. This constitutes the time series data sourced from the secondary data. The model below is adopted from Toby and Thomson (2014).

3.1 Model Specification

Model I

CBLA/TCBL = f (INTR, MPR, TBR, EXR, M2, LIQR) ……(1)

Model II

CBLM/TCBL = f (INTR, MPR, TBR, EXR, M2, LIQR) ……(2)

Transforming Equation 1 to 4 above to methodological form

$CBLA/TCBL = \beta_0 + \beta_1 INTR + \beta_2 MPR + \beta_3 TBR + \beta_4 EXR + \beta_5 M2 + \beta_6 LIQR\ \mu$ ..(3)

$CBLM/TCBL = \beta 0 + \beta_1 INTR + \beta_2 MPR + \beta_3 TBR + \beta_4 EXR + \beta_5 M2 + \beta_6 LIQR\ \mu$ ……(4)

Where:

CBLA/TCBL = Percentage of Commercial Banks Lending to the Agricultural Sector to Total Commercial Bank Lending.

CBLM/TCBL = Commercial Banks Lending to the Manufacturing Sector to Total Commercial Bank Lending.

INTR = Interest Rate

MPR = Monetary Policy Rate

TBR = Treasury Bill Rate

EXR = Exchange Rate

M2 = Broad Money Supply

LIQR = Liquidity Ratio

β_0 = Intercept

$\beta_1 - \beta_6$ = Coefficient of the explanatory variable

μ = Error term

In analyzing the data, and results of this study, the multiple regressions with the use of Statistical Package for Social Sciences (SPSS) will be used. This is used to test the hypotheses and the variables in the study.

4. Data Presentation, Analysis and Discussion of Findings

Table 1: Tolerance and Variance Inflation Factor (VIF)

MODEL I	TOLERANCE	VIF
INTR	.095	10.524
MPR	.138	7.249
TBR	.151	6.601
EXR	.382	2.616
M2/GDP	.523	1.192
LIRQ	.578	1.729

Source**:** SPSS print out 22.0 (2017)

Table1: Shows the tolerance Value results and variance inflation factors of the variables in the model. The tolerance values are less than 1.00 but above 0.1 in all the variables examined in the model with relation to commercial banks lending. This is inverse to the traditional level and the rule of thumb which is contrary to testing the multicolinearity on the tolerance. The variance inflation factor result shows that interest rate, monetary policy rate, Treasury bill being above 5.0 but less than 10.0 while other variables in the model are less than 5.0 and 10.0 as the conventional rule of thumb.

Table 2: Colinearity Diagnostic and Durbin Watson Test

Model	Eigen val	Cond index	Constant	Variables Proportion					
				INTR	MPR	TBR	EXR	M2/GDP	LIQR
1	6.321	1.000	.00	.00	.00	.00	.00	.00	.00
2	.418	3.890	.00	.00	.00	.01	.26	.01	.00
3	.174	6.030	.01	.00	.00	.02	.14	.09	.02
4	.057	10.497	.00	.01	.00	.01	.11	.35	.19
5	.015	20.543	.26	.00	.45	.22	.00	.12	.01
6	.011	23.589	.31	.08	.05	.63	.00	.40	.17
7.	.004	39.158	.42	.91	.53	.12	.48	.03	.60
	Durbin Watson Test		1.771						

Source: SPSS print out 22.0 (2016)

The above table illustrates the colinearity diagnostic test result. The result shows an Eigen value that corresponds to the highest Cond index and the variance constant are less than 0.05 at 5% level of significance. This indicates the significant relationship between the dependent and the independent variables in the long run. The Durbin Watson statistics of 1.771 approximates 2.000 which signify that there is no serial correlation between the variables in the time series.

Table 3: Effect of monetary policy on commercial banks lending to the agricultural sector: Multiple Regression Result

Model Variables	INTR	MPR	TBR	EXR	M2/GDP	LIQR
β	.163	.263	-.041	.-060	-.291	-.070
Beta (β)	-167	191	-.035	-.637	-.299	-.115
Corel	.116	.159	-.031	-.667	-.441	-.194
T. test	.606	.839	-.160	-4.646	-2.551	-1.028
Sig-t	.549	.409	.874	.00	.017	.313
Constant(α_0)	15.113	t-test	3.496	T-Sig.	.002	
R	.898	89.8%				
R^2	.806	80.6%				
F-Ratio	18.694					
F-Sig.	.000					

Source: SPSS print out 22.0 (2017)

The estimated regression model shows that with the positive value of 15.113 as constant and regression intercept, the independent variables in the study positively affects the dependent variable at constant. However, the negative coefficient of -.041, -.060, -.291 and -.070 as β coefficient for Treasury Bill Rate, Exchange Rate, Broad Money Supply and Liquidity Reserve proved that increase in the variables will reduce bank lending to the agricultural sector of .163 and .263 as β coefficient for interest rate and monetary policy rate shows that increase in the variable will lead to increase on bank lending to the agricultural sector. The correlation coefficient shows 89.8% which means the relationship between the dependent and the independent variable is strong of the variables to the dependent. The R^2 proved that 80.6% variation in commercial banks lending to the agricultural sector can be explained by variation in the monetary policy variables examined in this study. The F-statistics and sig. T shows that the model is significant.

Table 4:Effect of monetary policy on commercial banks lending to the manufacturing: Multiple Regression Result

Model Variables	INTR	MPR	TBR	EXR	M2/GDP	LIQR
β	-.158	.195	-.225	-.067	-.646	-.070
Beta (β)	-.100	.416	-.120	-.443	-.414	-.072
Corel	-.065	-.310	-.098	-.501	-.534	-.115
T. test	-.340	1.695	-.152	-3.005	-3.286	-.600

Sig-t	.736	.102	.613	.006	.003	.554
Constant(α_0)	38.924	T-Test	5.222	T-Sig.	.000	
R	.881	88.1%				
R^2	.776	77.6%				
F-Ratio	15.601					
F-Sig.	.000					

Source: SPSS print out 22.0 (2017)

The estimated regression model shows that with the positive value of 38.924 as constant and regression intercept, the independent variables in the study positively affects the dependent variable at constant. However, the negative coefficient of -.158, -.225, -.067, -.646 and -.070 as β coefficient for Interest Rate, Treasury Bill Rate, Exchange Rate, Broad Money Supply and Liquidity Reserve proved that increase in the variables will reduce bank lending to the manufacturing sector by 1.8%, 2.2%, 0.6%, 6.4% and 0.7% while the positive β coefficient of .915 for monetary policy rate shows that increase will lead to increase on bank lending to the manufacturing sector by 9.1%.

The correlation coefficient shows 88.1% which means the relationship between the dependent and the independent variable is strong of the variables to the dependent. The R^2 shows that 77.6 variations in commercial banks lending to the manufacturing sector can be explained by the monetary policy variables examined in the study. The F-statistics and sig. T shows that the model is significant.

4.1 Test of Hypotheses

Table5: Monetary Policy and Commercial Banks Lending to Agricultural Sector

VARIABLES	**T-STATISTICS**	**SIGNIFICANT - T**	**REMARK**	**DECISION**
INTR	.606	.549	Not Significant	Accept H_0
MPR	.839	.409	Not Significant	Accept H_0
TBR	-.160	.874	Not Significant	AcceptH_0
EXR	-4.646	.000	Significant	Reject H_0
M2/GDP	-2.551	.017	Significant	Reject H_0
LIQR	-1.028	.313	Not Significant	Accept H_0

Source: SPSS (20.0)

Table 6: Monetary Policy and Commercial Banks Lending to Manufacturing Sector

VARIABLES	**T-STATISTICS**	**SIGNIFICANT - T**	**REMARK**	**DECISION**
INTR	.180	.858	Not Significant	Accept H_0
MPR	-2932	.007	Significant	Reject H_0
TBR	2.619	.014	Significant	Reject H_0
EXR	7.420	.000	Significant	Reject H_0

M2/GDP	-.060	.952	Not significant	Accept H_0
LIQR	-.313	.757	Not Significant	Accept H_0

Source: SPSS (20.0)

4.2 Discussion of Findings

The Nigerian real sector is tagged "The Preferred Sector of the Economy" and government policies over the years has been how to promote the industry to achieve the growth of the economy. For instance, the government mandated commercial banks to lend significant of its credit to the real sector at a lower cost of credit prior to the abolition of the mandatory sectoral credit facility in 1st October, 1996. The objective was to promote the growth of the sector due to the importance contribution of the sector to the economic growth. Other policies through the commercial banks credit include the Small and Medium Equity Investment Scheme.

The objective of this study was to examine monetary policy and commercial banks lending to the real sector of the economy. Findings of the study from the two regression models shows that Treasury bill rate, exchange rate, broad money supply and liquidity reserve have negative relationship with commercial banks lending to the real sectors of Nigerian economy. Interest rate was found to have a positive effect on commercial banks lending to the agricultural sector but was found to have a negative effect of commercial banks lending to the manufacturing sector. The negative effect of liquidity reserve and interest rate confirm the expectation of the results as increase in the variables contract bank lending ability. It also confirms the trade-off relationship between earning assets and liquidity reserve in the commercial banks as illustrated by Nwankwo (1998). The positive effect of the variables confirm the findings of Gambacorta and Iannoti (2005) who studied the velocity and asymmetry in response of bank interest rates (lending, deposit, and inter-bank) to monetary policy shocks (changes) from 1985-2002 using an Asymmetric Vector Correction Model (AVECM) that allows for different behaviours in both the short-run and long-run. The findings of Van den Heuvel (2005) who argued that by lowering bank reserves, contractionary monetary policy reduces the extent to which banks can accept reservable deposits, if reserve requirements are binding, the decrease in reservable liabilities will, in turn, lead banks to reduce lending, if they cannot easily switch to alternative forms of finance or liquidate assets other than loans, Amidu and Wolfe (2008) who examined the constrained implication of monetary policy on bank lending in Ghana between 1998 and 2004 and Mohammed and Simon (2008) Somoye and Ilo (2009) investigated the impact of macroeconomic instability on the banking sector lending behavior in Nigeria between 1986 to 2005.

The negative effect of broad money supply on commercial banks lending to the real sectors of the economy is contrary to the expectation of the results and the theory of expansionary monetary policy, increase in money supply is expected to enhance bank lending to the various sectors of the economy. The negative effect can be traced to non compliance to monetary policy directives, overregulation, unattractiveness of the sectors to bank lending and increase in liquidity reserve or monetary policy shocks such as the withdrawal of all public funds from the banking sector with the advent of the Treasury single account.

5. Conclusion and Recommendation

5.1 Conclusion

From the findings of the study, the study concludes as follows;

- Interest rate has positive but not significant relationship with commercial banks lending to the agricultural sector but negatively related to commercial banks lending to the manufacturing sector of the economy.
- Monetary policy rate have positive relationship with commercial banks lending to the agricultural sector

but negatively related to commercial banks lending to the manufacturing sector.

- Treasury bill rate have negative but not significant relationship with commercial banks lending to the real sectors of the economy.
- Exchange rate, Broad money supply has negative and significant relationship with commercial banks lending to the real sectors of the economy.
- The study reveal 80.6% and 77.6% explained variation. The F-ratio of 15.601 and 18.694 and F-probability of 1% level. From the above, the study concludes inductively that there is significant relationship between monetary policy and commercial banks lending to the real sector of Nigerian economy.

5.2 Recommendation

From the findings of the study, we draw the following recommendations:

- Monetary policy should be formulated to avoid negative outcome as a result of monetary policy measures and mismatch of bank lending with monetary policy, bank lending objectives should be formulated, harmonized and carefully aligned with monetary policy
- Commercial bank lending objectives should be optimally implemented within the ambit of the monetary policy measures, exchange rate, interest rate, monetary policy rate etc.
- Monetary policy and monetary policy variables such as interest rate, should answer the objective of bank lending to the real sector of the economy.
- There should be policies to revamp the real sector to attract bank lending that will enhance the growth of the sector.
- All policies directed towards the re-organization of the real sector should be fully implemented to speedy recovery of the industry.

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