Effects of Monetary Policy Transmission Mechanisms on Capital Market Fundamentals in Nigeria, (1981 – 2015)

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DEPARTMENT OF BANKING AND FINANCE
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DECLARATION

I, Akani Waleru Henry with the registration number **2012417003F,** do hereby declare that this research work titled Effects of Monetary Policy Transmission Mechanism and Capital Market Fundamentals in Nigeria,(1981-2015) was carried out by me .This work has not been previously presented to any other Degree or Diploma awarding Institutions.

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APPROVAL PAGE

This dissertation titled Effects of Monetary Policy Transmission Mechanism and Capital Market Fundamentals in Nigeria, (1981-2015) written by Akani Waleru Henry with the registration number **2012417003F**, has met the standard and satisfied the requirements for the partial fulfillments of the requirement for the award of doctor of philosophy (PhD) in Banking and Finance, faculty of management sciences, Nnamadi Azikwe University Awka .

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DEDICATION

With gratitude to God Almighty, I hereby dedicate this Dissertation work to my beloved mother Mrs. Esther Baby Waleru Akani for her enormous contributions, support, love, prayers and above all her encouragement which have made it possible for me to acquire a modern and decent education.

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ABSTRACT

This study examined the effects of monetary policy transmission mechanism on capital market fundamentals in Nigeria (1981 – 2015). These transmission mechanisms include the interest rate, credit, exchange rate and asset pricing channels on capital market variables such as market capitalization and stock market liquidity. The main objective of this study was to ascertain the relationship between monetary policy transmission mechanism and the capital market fundamentals in Nigeria. Specifically, the study aimed to find out the effects of interest rate channel, credit channel, exchange rate channel and asset pricing on market capitalization and stock market liquidity. The study will also determine the causal relationship between monetary policy channels and the capital market fundamentals. The study used secondary data collected from the Central Bank of Nigeria Annual Statistical Bulletin and Stock Exchange Fact Book various issues. The study employed descriptive statistics and multiple regression models to estimate the relationship that exists between monetary transmission channels and capital market fundamentals. The descriptive statistics were used to examine fluctuations in the variables within the time period. The null Hypotheses (H_0) were tested at 0.05 level of significance, Ordinary Least Square (OLS), Augmented Dickey Fuller Test, Johansen Co-integration test, normalized co-integrating equations, parsimonious vector error correction model and pair-wise causality tests were used to conduct the investigations and analysis. The empirical findings revealed that the level series (OLS) multiple regression results indicates that there may be some degree of time dependence in the level series results which could lead to spurious regression results, the unit root result (ADF) showed that the variables were stationary at the first difference of Order 1 (1). The co-integration tests revealed a long run dynamic relationship between the dependent and independent variables in the models. The parsimonious model summary shows that monetary policy transmission channels such as interest rate channel, credit channel, exchange rate channel and asset pricing channel explains a strong and positive significant relationship between the dependent and independent variables. However, the direction of causality between the monetary policy transmission channels and capital market fundamentals is mixed indicating uni and bi-directional causality. The study concluded that monetary policy transmission mechanisms (interest rate channel, credit rate channel, exchange rate channel and assets pricing channel) are important instruments of economic and sound financial system stabilization. It was also established in the study that the monetary policy transmission channels affected the capital market fundamentals significantly. The study therefore recommends for the strengthening of the interplay of monetary policy transmission mechanisms for the purpose of achieving monetary policy targets and sound financial sector stability in Nigerian in view of the observed nexus between monetary policy transmission channels and capital fundamentals.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

It is conventional that monetary policy can affect the economic activities of any Nation according to the Keynesian monetary economists such as Milton Friedman and Irvin Fishers. Monetary policy has long been acknowledged as instrument used to influence investment and other macroeconomic indicators. This has made the monetary authorities to formulate monetary policies that can facilitate the realization of set goals.

Economies of different sizes and at various stages of development have experienced varying degree of monetary policy shocks or imbalances which have been occasioned by the adoption of various monetary policy channels, policies and programme initiated by policy makers, practitioners, financial analyst and scholars. This is possible because of the internationalization and globalization of the economy which the Nigeria Capital Market is not excluded coupled with the fact that a singular policy action will automatically have an effect on the economy. Ogbulu and Torbira (2010) and Onoh (2002) stated that the financial market plays a crucial role in the financial and economic development of any economy as such; they act as conduits through which funds from the surplus sector of the economy are channeled to the deficit sector for investment purposes.

Monetary Policy can be said to represent measures taken by the government to influence money supply and interest rate (credit) in the economy with a view to influencing the overall level of economic aggregates such as economic growth, full employment, price stability and external balance (Ohale & Onyema, 2002). Thus, expansionary monetary policy reduces the cost of borrowing and increase investment. Exchange rate depreciation raises import price and this could result in asset price increase that can enhance

investment but may leads to inflation that discourage savings and crowd out investment (Ohale & Onyema, 2002). The financial market is the transmission mechanisms for monetary policy functionality through the vehicle of interest rates. Section 2 of Central Bank of Nigerian Act 2007 as amended empowered the Central Bank of Nigeria (CBN) to perform certain monetary policy functions with the objective of achieving set of monetary and macroeconomic goals such as full employment, price stability, balance of payment disequilibrium, economic growth and financial stability.

To achieve monetary stability, Central Bank of Nigeria adopt various strategies which include, capital market targeting, exchange rate targeting, monetary targeting, nominal Gross Domestic Product (GDP) targeting and inflation targeting (Allen, 2011). The theoretical assumption on the relationship between monetary aggregates and the general economic activities dates back to the monetarist such as Milton Friedman in the quantity theory of money and Irvin Fisher equation of exchange which assigned significant effects to the role of money in determining economic activities (Bauducco, 2011).This role facilitated the emergence of active capital market where short and long-term monetary instruments can be used to regulate the price system and balance liquidity in the financial market. This means that monetary policy whether direct, indirect, short-term or long-term can affect the activities of the capital market negatively or positively.

There are several schools of thought that offer theoretical explanation for the behaviour of the capital market in relation to monetary variables. To the fundamentalists, the activities such as stock price are determined by expectations regarding future earnings considering the future discount rate (Kevin, 2000). The Technical school beliefs that present stock price is a linear function of the preceding price. The macroeconomic approach argues that stock prices are sensitive to changes in macroeconomic variables (Ogbulu, 2012; Butler & Malaikah, 2002, Inegbedion, 2009). Gordon, Miller and Modigliani argued that stock prices are based on dividend policy of the firm (Maku &

Atanda, 2009), while Capital Assets Pricing Model (CAPM) and the Arbitrage Pricing Model (APM) argued that the price of stocks is a fundamental function of the risk factor and the market rate of return.

In Nigeria, it is difficult to determine factors that influence the stock prices as the monetary and the macroeconomic environment are prone to external and internal forces. For instance, the capital market crash of 2007/2008 was blamed to margin loans from the banking sector and the global financial crisis (Toby, 2010).

The Capital market has been known as an institution which contributes to the socio-economic growth and development of emerging and developed economies. The intermediation role played by the capital market in mobilizing funds from surplus units to deficits units to be invested into projects with positive net present value (NPV) which may enhance economic growth of the nation (Donwa & Odia 2011).

This market is constituted when a network of financial institutions interact to mobilize and allocate long term funds to productive investment. The funds are exchanged for financial assets issued by borrowers or traded by stockholders which in turn offer access to a variety of financial instruments that enable economic agents to pool, price, and exchange risk. However, through investment in assets with attractive yields, liquidity and risk characteristics, it encourages savings in financial form and which constitutes vital roles played by the capital market in the achievement of economic growth thereby enabling government, industries, corporate bodies to raise long-term capital for the purpose of financing new projects, expanding and modernizing industrial concerns. The importance of capital market and the financial sector at large motivates government keen interest in the performance of the institutions.

The Nigerian capital Market is made up of the primary and secondary markets. The primary market is one where new securities are created and the government, corporate

bodies can raise fresh capital and the securities traded are shares, stocks and bonds. Secondary market, on the other hand, is one in which sellers and buyers' trade on existing issued securities and indeed the efficiency of the primary market rests on the efficiency of the secondary market.

Monetary transmission mechanism is a measure in which assets prices and generally economic conditions are affected as a result of policy decisions and such decisions are intended to influence the aggregate demand, interest rate, exchange rate and credit in order to affect overall economic performance (Benassy, 2011).

These transmission mechanisms include the interest rate channel which explains the relationship expansionary monetary policy such as reduction in long-term interest rates which in turn affects business investment and consumers expenditure on durable goods. The asset price channel which shows that expansionary monetary policy leads to higher equity prices and make investment more attractive and raises aggregate demand, the exchange rate channel which proved that an expansionary monetary policy lowers the domestic real interest rate and through the foreign interest parity condition brings about a real depreciation of the domestic currency, this results to higher net exports and stronger aggregate demand on the supply side.

Bergholt (2012) noted that financial system fragility limit the effectiveness of monetary policy that affect negatively macroeconomic performance. The problems of monetary policy in Nigeria as it affects the monetary policy mechanism include policy inconsistency, poor coporate governance and policy mismatch amongst others. There have been various policies in the Nigerian exchange rate market, the financial system that were re-introduced after few years of abolishing, (Onoh, 2007). In search of ways to improve the Nigerian capital market to withstand monetary and macroeconomic shocks, Nigerian government has over the years embarked on structural, institutional and policy reforms. For instance the internationalization of capital market, the introduction of

Central Securities Clearing System (CSCS) in 1997, quantitative increases on the traded equities, the deregulation of the stock price and establishment of Second Tier Securities Market, the re-introduction of the Dutch Auction System (DAS) in 2009 that was introduced after the deregulation of the economy in 1996 (Onoh, 2007).

The monetary policy is characterized with policy ill-timing, conflicting monetary policy targeting such that monetary policy can be contractionary while fiscal policy would be expansionary and the excessive dependent on the external sector which is as a result of the mono-cultural nature of the Nigerian economy which in turns affect negatively the effectiveness of monetary policy transmission mechanism. The financial market is characterized with poor corporate governance, insider dealings, inadequate savings for investment and inadequate tradable instruments. Thus, Nigerian capital market is emerging compared with the capital markets of the developed countries such as USA, Japan and others (Onoh, 2002). The near collapse of Nigerian capital market in 2007 - 2009 was blamed on the global financial crises that affected negatively the exchange rate market, the interest rate and the asset to price in the Nigerian financial system. The withdrawal of all public funds from the banking system in the 1990s and 2015 threatened the liquidity of the banking sector which affects the efficiency of the capital market activities via the various monetary policy transmission mechanisms.

The monetary policy transmission mechanisms and the capital market can be affected negatively or postively depending on the monetary policy targets and the effectiveness of the channels, attest to the unique features of the capital market in the provision of long term fund. Studies on the relationship between monetary policy transmission mechanisms and the Nigerian Capital Market becomes necessary because of the emerging financial market and the sensitive nature of Nigeria Economy both international and domestic (CBN, 2015). To this end, the intention of this study is to examine the

effects of monetary policy transmission mechanisms on the Nigerian capital market fundamentals.

1.2 Statement of the Problem

The establishment of Investor Protection Fund (IPF), the introduction of Automated Trading System (ATS), the deregulation of stock price in 1993, the deregulation of the economy in the last quarter of 1986, the internationalization of the Nigerian capital market with the introduction of Central Securities Clearing System (CSCS), the enactment of Nigeria Investment Promotion Commission (NIPC) decree (Onoh, 2002) and the banking sector consolidation and recapitalization of 2005 among others are some of the reforms which are expected to add positively to stock prices and enhance the financial performance of the quoted firms, yet there are still cases of stock market clash, 2007/2008 global financial crises and the 2015/2016 economic recession currently been experience in Nigeria.

The debate on the effectiveness of monetary policy has been a point of departure between the classical and the Keynesians economist and the controversies have deepened as more schools of thoughts emerged over the years. The inability of the classical economists to provide solution to the great depression of the 1929 challenged the monetary policy theories. Cornerstone of neoclassical monetary policy is based on the tenets of classical theory which assumes perfect competition, use of real variables in decision making and application of representative agent models with agents that have the same preferences and act alike in every way. Neoclassical economics with classical monetary model based on quantity equation says less about the transmission channels of monetary policy. The main criticism toward neoclassical arguments is based on their main assumption of optimizing rational representative agents; firm and household. This 'straight jacket'

which runs across all models in neoclassical family neglects important features such as credit friction-constraints, imperfect markets and incomplete markets that embed all real economies (Gracia, 2011). The liquidity preference theory is one of the hallmarks that differentiate Keynesian monetary theory from the general family of neo-classical theories which explains why people individually express demands for money and to Keynes; the demand for money is determined by interactions between income and interest rate that is, the price of demand.

Theoretically, a change in interest rate, other things being equal, affects individual preferences for holding cash and illiquid assets. Again this theory has been that Keynesian activities on economic policy can generate or prolong inflation, unemployment, and instability in the economy and the monetarist such as Schwartz (2009) argues that Keynesian discretionary monetary policy was responsible for the great depression in the 1929. The theoretical assumption on these arguments is based on the financial market and macroeconomic environment of the developed countries compared with that of emerging countries like Nigeria. Application of the theories in Nigeria can results in policy mismatch.

The interaction between monetary policy transmission mechanisms and capital market activities in a large de-regulated market economy has been the subject of intense academic debate in financial economics literature especially against the background of the results of global capital market crash due to the globalizations and internationalization of the world economy. However, monetary policy transmission mechanisms in a free market setting can and infact affect capital market activities such that a fall in monetary policy transmission channel (credit channel) could lead to general decline in the capital market activities especially where the domestic economy is largely import dependent. On the other hand, a rise in monetary policy transmission channel (credit channel) may lead to a rise in capital market activities such as All Share Price Index, Market Capitalization,

Total Volume of Transactions Traded on the Stock Exchange, Total Volume of New Issues and Market Liquidity all things being equal.

However, despite the numerous literature on the relationship between the various channels of monetary policy transmission mechanism (interest rate channel,credit channel,exchange rate channel and asset pricing channel) and the capital market, the extent to which various monetary policy transmission channels impact on the capital market fundamentals remains a knowledge gap that needs to be filled, reasons been that existing studies such as Ishioro, 2013; Babatunde;2014; Nnanna, 2001; Adebiyi and Lawson, 2006; Obafemi and Ifere, 2015 examined the monetary policy and the Nigerian economic growth using simple regression analysis, Ludi and Ground (2016), used the VAR approach to investigate the Bank lending channel in South Africa while Ogbulu and uruakpa 2011,studied monetary policy and stock prices in Nigeria and Akani,Okonkwo and Ibenta 2016, studied monetary policy and capital market activities. However, these studies has focused on Aggregate Stock Prices (ASP), Total Volume of Transactions Traded (TVTT) and All Share Price Index (ASPI) as qualitative measure of capital market performance and monetary policy instruments such as Monetary Policy Rate (MPR), Cash Reserves Ratio (CRR), Reserve Requirement Ratio (RRR) and Liquidity Ratio (LR) as indicators of monetary policy transmission mechanism without consideration of other indicators of monetary policy transmission channels such interest rate, credit channel,exchange rate channel and asset pricing channel as our independent variables while Market Capitalization and Stock Market Liquidity as our dependent variables. Apart from the above, the findings of the studies has been controversial and inconclusive as some reports positive effect, other reports negative and also differs in time period and methodologies giving need for further study.

Therefore, this study is motivated to investigate the existing relationship between monetary policy transmission mechanisms and its effects on Nigerian capital market fundamentals.

1.3 Objectives of the Study

The broad objective of this study is to examine the effects of monetary policy transmission mechanisms on Nigerian capital market fundamentals. The specific objectives are:

1. To determine the relationship between interest rate channel of monetary policy and the Nigerian capital market fundamentals.

2. To assess the relationship that exists between credit channel of monetary policy and the Nigerian capital market fundamentals.

3. To evaluate the relationship between exchange rate channel of monetary policy and the Nigerian capital market fundamentals.

4. To ascertain the relationship between asset price channel of monetary policy and the Nigerian capital market fundamentals.

5. To examine the granger causality between monetary policy and the Nigerian capital market fundamentals.

1.4 Research Questions

In the course of the research, the study intends to proffer solutions to the following questions:

1. How does interest rate channel of monetary policy relate to capital market fundamentals?

2. Does credit channel of monetary policy significantly affects the capital market fundamentals?

3. To what extent does the exchange rate channel of monetary policy affects capital market fundamentals?

4. To what extent do asset price channel of monetary policy affects the capital market fundamentals?

5. How does monetary policy transmission mechanism granger cause the Nigerian capital market fundamentals?

1.5 Research Hypotheses

The study formulates the following null hypotheses:

H_{01}: There is no significant relationship between interest rate channel of monetary policy and capital market fundamentals.

H_{02}: There is no significant relationship between credit channels of monetary policy and capital market fundamentals.

H_{03}: There is no significant relationship between exchange rate channel of monetary policy and capital market fundamentals.

H_{04}: There is no significant relationship between asset price channel of monetary policy and capital market fundamentals.

H_{05}: There is no causal relationship between monetary policy transmission mechanism and the Nigerian capital market fundamentals.

1.6 Significance of the Study

This research work is significant to the following stakeholders:

Investors: The study will help educate investors on the role of monetary policy transmission mechanism on the performance of securities and the risk diversification opportunities that is within their reach.

Government: The result of this study is expected to assist policy makers know how monetary policy is linked to the capital market activities and thus help them formulate the right policies that will have great positive effect on capital market fundamentals.

The monetary authorities: To the Monetary authorities, this study will be significant in assisting the monetary authorities on structured policies that will facilitate the achievement of monetary policy goals.

The Capital market operators: The study will be significant to the capital market operators in assessing the efficient and effectiveness of the monetary authorities in achieving the development of the capital market and the stability of the financial system.

Policy makers: To the policy makers, this study will be significant in making polices that will enhance the operational efficiency of the capital market.

To the Academicians: This study will be significant to the Academicians in accessing the findings of other scholars, serve as a reference point and contribute to the existing body of knowledge.

The General Benefit to the Economy: The findings and conclusion of this study will be of a great significant to the economy as a whole and the recommendations of the study will help in general economy management of the nation's economy.

1.7 Scope of the Study

This study covered the four key (interest rate channel, credit channel, exchange rate channel and the assets pricing channel) monetary policy transmission mechanisms adopted by Nigerian policy makers for the overall performance of the financial system vise a visa the economy from 1981 – 2015. These periods were chosen in order to include the various changes, reforms, deregulation of the financial system during and after the structural adjustment programme of 1986 (SAP) and also ascertain the long run dynamic effects of the various monetary policy channels on Nigerian financial market and the economy in general. The work studied the effects of monetary policy transmission mechanism on capital market fundamentals in Nigeria using market capitalization to broad money supply proxied by market capitalization and stock market liquidity as a measure of total market transactions.

1.8 Limitations of the Study

The work studied modeling monetary policy transmission mechanism and capital market fundamentals in Nigeria using the Nigerian capital market capitalization and stock market liquidity as dependent variables. There are other Capital Market indicators that were not captured such as total volume of transaction traded and All Share price index. This research will approximate monetary policy transmission channels (interest rate channel, credit channel, exchange rate channel and assets pricing channel) as the only macroeconomic variable which affect capital market fundamentals in Nigeria. It may not be true in real life situation; other variables have influence on the capital market fundamentals. However, the statistical approach and methodology were deemed adequate in content and scope for meaningful decision on sound financial system and the Nigeria economy as a whole.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Conceptual Framework

2.1.1 Interest Rate Transmission Mechanism

This is the most conventional mechanism and, at the same time, the one used in empirical studies to embody the joint effect of all the channels. It is the mechanism that underlies public intuition and media debates on the role played by monetary policy in modern economies. It combines the central bank's ability to affect a real variable (the interest rate) and the existence of inter-temporal substitution elasticity on the components of aggregate demand (Ohale & Onyema, 2002).

The central bank induces the variations of the amount of money changes through the nominal interest rate. The shift in the real interest rate impacts consumption and investment (including inventory) and the output level and prices. The effectiveness of monetary policy will depend not only on its ability to affect the real interest rate, but also on the sensitivity of consumption and investment to changes in the price of inter-temporal substitution. The elasticity of aggregate demand to the interest rate both absolute and relative will determine how, when, and to what extent the monetary policy will affect the economy. Furthermore, the increase in the interest rate might not only have a substitution effect that discourages investment and consumption, but could also create wealth effects depending on the borrowing or lending position of economic agents (Ohale & Onyema, 2002).

In an underdeveloped financial market, the monetary authority control (direct or indirect) on the interest rates of other instruments can be large, thereby aiding the transmission of the policy decisions. The market can also interpret current interest rate movements as a

signal of future monetary policy actions, making longer term rates react consistently. A decline in interest rates, for example, can be construed as a factor that will raise future inflation. Since a contractionary monetary policy is expected to offset such an increase in inflation, long term rates may end up increasing as a reflection of the expected increase in the future policy rate and the basic model does not consider financial intermediation. It describes an economy with no banks, where borrowers and lenders exchange their resources directly. Therefore, a rise in the interest rate caused by a monetary contraction will result in discarding only those investment or consumption projects whose expected return, adjusting by risk, is lower than its financing cost. In this sense, no inefficiencies exist in the way investment or consumption contracts, as opposed to the credit mechanism (Cecchetti, 1999). Resources are assigned efficiently at the given interest rate.

Another dimension, which is relevant for the all transmission mechanisms described herein, is the source of the market imperfection that generates the real effect of the nominal policy change. Be it some price/wage rigidity in the neo Keynesian tradition, or an information problem as suggested by a Lucas-type supply function, one can expect that if agents are rational the real effect of a monetary shock is smaller (or non-existent) in unstable economies. This is the short-run Phillips curve can become vertical in a context of macroeconomic instability. For instance, economies in which inflation is more volatile should be associated ceteris paribus to smaller output effects of a given monetary shock (Cameron & Safaei, 2003).

Investment-based Channels: Direct Interest-Rate Channel

According the classical economists, the traditional channel of monetary transmission that have been embedded in macroeconomic models involve the impact of interest rates on the cost of capital and hence on business and household investment spending (residential and consumer durables investment). Standard neoclassical models of investment

demonstrate that the user cost of capital is a key determinant of the demand for capital, whether it is investment goods, residential housing or consumer durables. The user cost of capital (*uc*) can be written as:

$$u_c = p_c\left[(1-\tau)i - \pi_c^e + \delta\right] \quad (1)$$

Where, p_c is the relative price of new capital, i is the nominal interest rate, π_c^e is the expected rate of price appreciation of the capital asset, and δ is the depreciation rate. The user cost formula also allows for the deductibility of the interest rate by adjusting the nominal interest rate by the marginal tax rate τ . Regrouping terms, the user cost of capital can be rewritten in terms of after-tax real interest rate, $(1-\tau)i-\pi^e$, and the expected real rate of appreciation of the capital asset, $\pi_c^e - \pi^e$, where π^e is the expected inflation rate such that;

$$u_c = p_c\left[\left\{(1-\tau)i-\pi^e\right\}-\left\{\pi_c^e-\pi^e\right\}+\delta\right] \quad (2)$$

Several factors are important in determining the effects of monetary policy operating through these direct, user-cost channels. The first regards the horizon over which interest rates influence spending. Because capital assets are long-lived and the adjustment of these stocks involves costs (of planning, procurement, installation, etc.), businesses and households take the long view when factoring variation in interest rates into their investment decisions. As a result, the real interest rate and the expected real appreciation of the capital asset that influence spending will typically be related to the expected life of the asset, which is often very long.

With the monetary policy instrument being a short-term interest rate, this discussion makes clear that the monetary transmission mechanism involves the link between short and long-term interest rates through some version of the expectations hypothesis of the term structure. When monetary policy raises short-term interest rates, long-term interest

rates also tend to rise because they are linked to future short-term rates; consequently the user cost of capital rises and the demand for the capital asset falls. The decline in the demand for the capital asset leads to lower spending on investment in these assets and so causes aggregate spending and demand to decline.

The investment decisions of firms and households can also be considered in the framework of James Tobin (1969). For business investment, Tobin (1969) defined q as the market value of firms divided by the replacement cost of capital. When q is high, the market price of firms is high relative to the replacement cost of capital, and new plant and equipment capital is cheap relative to the market value of firms. Companies can then issue stock and get a high price for it relative to the cost of the facilities and equipment they are buying. As a result, investment spending will rise, because firms can buy a lot of new investment goods with only a small issue of stock. In principle, similar reasoning could be applied to household investment decisions.

Tobin' q theory can be linked to the user cost of capital approach, as shown by, for example, Hayashi (1982). Indeed, the q-formulation dominates formal micro-based modeling efforts and in large part because the formal links between q-theory and the user-cost approach in the dynamic adjustment cost approach of Hayashi (1982) allow for convenient analytical expressions in such models. In addition, the q approach does add a degree of richness, as it emphasizes that there is a direct link between stock prices and investment spending. In practice, Tobin's q therefore leads to another channel of monetary transmission: When monetary policy is eased and interest rates lowered, the demand for stocks increases and stock prices rise, thereby leading to increased investment spending and aggregate demand.

Consumption-Based Channels: Wealth Effects

Standard applications of the life-cycle hypothesis of saving and consumption, first developed by Brumberg and Modigliani (1954) and later augmented by Ando and Modigliani (1963), indicate that consumption spending is determined by the lifetime resources of consumers, which includes wealth, whether from stock, real estate or other assets. Expansionary monetary policy in the form of lower short-term interest rates will stimulate the demand for assets such as common stocks and housing, thereby driving up their prices; alternatively (and equivalently), lower interest rates lower the discount rate applied to the income and service flows associated with stocks, homes, and other assets, driving up their price. The resulting increase in total wealth will then stimulate household consumption and aggregate demand. Standard lifecycle wealth effects operating through asset prices are thus an important element in the monetary transmission mechanism.

Intertemporal Substitution Effects

A second consumption-based channel reflects intertemporal substitution effects. Indeed, this channel is central to the models. In this channel, changes in short-term interest rates alter the slope of the consumption profile, so that lower interest rates induce higher consumption today. This channel naturally arises through the models' use of the standard consumption Euler equation linking the marginal rate of substitution between current and future consumption with the real interest rate.

The Monetarist and Transmission of Monetary Policy

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

$$(M \uparrow \Rightarrow)\ i \downarrow \Rightarrow C \uparrow (1 \uparrow) \Rightarrow Y^d \uparrow \Rightarrow y \uparrow \Rightarrow \Pi \uparrow \qquad (3)$$

- 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 interest rate channel and policy responses

- Bernanke and Gertler (1989) stated 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.

2.1.2 Credit Transmission Mechanism

The traditional transmission model rules out the existence of the financial sector and every profitable project at the prevailing interest rate as stated by Modigliani & Miller (1958), the source of financing does not matter for the firm to make its (investment) decisions. Resources are always allocated efficiently. In a context of symmetrical information and no transaction costs, financial intermediation serves no purpose and thus no resources are devoted to it. Nonetheless, financial intermediaries particularly banks exist as the economy's efficient response to information asymmetries between lenders and borrowers, its associated transaction and monitoring costs, and the presence of liquidity risks. The financial intermediaries exist in a world with multiple financial instruments; at least two sources of financing must be recognized for firms. First, external or intermediated funds, where the firm accesses the financial market, but does not trade directly with individual investors, receiving their funds through an intermediary (bank loans). The second source are internal/direct funds, in which the firm either finances

itself, without accessing the financial market, or is able to raise fund directly from individual investors (through the issue of bonds or stocks).

The problem is that the second source, assumed implicitly in the traditional mechanism, can be restricted (totally or partially) for a significant number of firms. If so, the fall in investment may not depend, as in the traditional channel, on the project's profitability relative to its alternative costs but rather on the firm's access to bank credit. Two mechanisms have been proposed to explain the link between monetary policy actions and this cost, namely the balance sheet channel and the bank lending channel. This tries to separate the effects on the firms' borrowing capacity from the amount of credit offered by the banks. Both rely on a market imperfection, which conditions access to the financial market on the firm's characteristics, rather than on the profitability of its investment projects (Gerlach & Peng, 2005).

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. 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 & Gertler 2000).

Therefore, changes in interest rates and bank credits may lead to changes in the real sector through investment and influence of aggregates demand. 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).However, the Gross Domestic Product (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 (Igazio, 2002).

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:

$$M \uparrow \rightarrow \text{Bank deposits} \uparrow \rightarrow \text{Bank loans} \uparrow \rightarrow I \uparrow \rightarrow Y \uparrow \qquad (4)$$

(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) (King, 1991).

2.1.3 Exchange Rate Transmission Mechanism

This channel is a particular case of the assets channel, since it is the price of a particular financial asset, namely another country's currency. However, because of its widespread impact as one of the economy's most important relative prices, and its direct effect on inflation through the prices of tradable goods, it is worth treating it as a separate channel. If the exchange rate is not fixed, its behavior should depend on the behavior of the domestic interest relative to the foreign rate. The exact impact of a change in the policy rate is uncertain, because it depends again on the expectations on the interest rates and on domestic and foreign inflation. However, ceteris paribus, an unexpected increase in the domestic interest rate appreciates the local currency. The exchange rate must move to a level where investors expect a sufficiently large future depreciation so that the expected returns of domestic and foreign deposits become equal. The result is an instant appreciation of the exchange rate. The greater value of the local currency increases the

price of the country's goods in terms of foreign assets, thereby causing a drop in net exports and in aggregate demand. In addition, the exchange rate directly affects inflation through imported goods (Morale & Raei, 2013).

A contractionary monetary policy, leading to a currency appreciation, will reduce the imported component of inflation. The opposite process, the devaluation of the currency with an expansionary effect on exports and the overall level of activity, has been termed "competitive depreciation and has been traditionally advocated as a quick adjustment mechanism that prevents within a context of price stickiness a big rise in unemployment when facing an adverse shock. In practice, however, the uncovered interest parity, that underlies the expected relationship between domestic interest rate movements and exchange rate depreciation, has received scarce empirical support. The short-run behavior of the exchange rate appears to be extremely volatile, and expectations regarding its movements are closely related to the expected evolution of inflation.

The second mechanism through which the exchange rate operates depends, once again, on the financial market's depth and completeness, specifically regarding the set of hedging instruments it offers. If firms have currency mismatches between their assets and liabilities and no currency hedging is available, are unable to hedge, their balance sheets become sensitive to abrupt exchange rate fluctuations. If local residents are net debtors, as is the case in many emerging economies, a substantial appreciation of the exchange rate improves their balance sheet position, eventually leading to a significant domestic demand expansion, offsetting or even outweighing the effect of relative prices.

First, the direct impact of monetary policy on a nominal exercise is the nominal exchange rate. If the purchasing power parity held at any given time has no changes on relative prices or balance sheet effects would exist. For example, the increase in the foreign currency denominated debt would be offset by its liquidation upon its translation into

domestic money. Only if the central bank's actions are able to change the real exchange rate, this would be associated to obvious impact on inflation. The determinants of this transmission will be similar to those of any nominal shock to prices, such as the economy's competitive structure, inflation level and variance (McCarthy, 2000).

The logic of this transmission mechanism is consistent with a vision of relative money demands, where the exchange rate depends on interest rates, relative money stocks and the relative output levels. However, this approach has been questioned by empirical evidence, given the feeble predictive power of traditional models, even when taking the effective values of the right-hand variables (Flood & Rose, 1999). Cheung, Chinn and Paschal (2002), and Meese and Rogoff (1983), using a large batch of economic models and econometric techniques revealed that there is no model to be consistently superior in terms of forecasts to a simple random walk. Therefore, the same occurs with arbitrage equations derived from this approach, such as the uncovered interest rate parity. This combined with the high (excessive) volatility observed in free-floating countries. The relationship between monetary policy and the exchange rate channel is not as linear and univocal as stated in the theory. Relying on the exchange rate as the tool to control inflation or reallocate real resources can turn out as an extremely uncertain. As with the asset channel, some specific features present in different economies could indicate varying degrees of importance of this mechanism. Countries with higher exchange rate flexibility, in which the exchange rate has more space to adjust in response to a specific policy shock, could exhibit greater nominal (real) exchange rate variations after a change in monetary shocks. A given change in the exchange rate (caused by a monetary policy action) should have greater effect on economies that is more open to international trade, for which the exchange rate is a relevant price for a larger set of goods.

Exchange rates have an important role in the transmission mechanism of monetary policy effects and this is because the exchange rate channel which comes into play when

changes in interest rates impact through capital and current accounts, therefore causing appreciation or depreciation of real exchange rates. In a flexible exchange rate economy, monetary policy effects on exchange rate are transmitted through the following channels (Enders, 2010).

Firstly, a high interest rate means a stronger currency which leads to the decline in net export demand and lower output. Meanwhile, the low interest rates weaken domestic currency, which results in depreciation of exchange rates and increases in export of domestically-produced goods and services as they become competitive to foreign goods. A schematic diagram describes the exchange rate channel as follows: expansion of monetary policy leads to depreciation of domestic interest rates which make the domestic denominated bonds lose attraction for the foreign investors. This reaction locks in the depreciation of domestic currency, which stimulates net exports and increases total income in the economy (Mishkin, 2007).

Again, there is a genuine interest from central banks and applied economists to understand the transmission mechanism of monetary policy; specifically, how fast and to what extent a change in the central bank interest rate is influences the dynamic path of inflation and output.

Secondly, studies learnt that it is a daunting task to examine monetary transmission channels, and it requires good innovative ideas to set up a truly representative model. This observation supports the claim by King (1994) who attests that the qualitative aspect of the transmission mechanism is ‘at least relatively uncontroversial, but turning this qualitative into quantitative is a different story.

International-Trade Based Exchange Rate Channel

When the central bank lowers interest rates, the return on domestic assets falls relative to foreign assets. As a result, the value of domestic assets relative to other currency assets falls, and the domestic currency depreciates. The lower value of the domestic currency makes domestic goods cheaper than foreign goods, thereby leading to expenditure switching and a rise in net exports. The rise in net exports then adds directly to aggregate demand. Therefore, the exchange rate channel plays an important role in how monetary policy affects the economy. In this regard, two factors are important. First, the sensitivity of the exchange rate to interest rate movements is important: For example, using econometric models for the estimated sensitivities to be small, implying a small channel; whereas models that impose uncovered interest parity tend to find a larger role for this channel. Second, smaller, more open economies tend to see larger effects through this channel (Flood and Rose,1999)

The exchange rate channel: net exports

- The exchange-rate channel:

$$i \uparrow \Rightarrow e \downarrow \Rightarrow NX \uparrow \Rightarrow y \uparrow \Rightarrow \Pi \uparrow \qquad (5)$$

- 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.

The exchange rate channel: import prices

- The exchange-rate channel:

$$i \downarrow \Rightarrow e \downarrow \Rightarrow P_m \uparrow \Rightarrow \Pi \uparrow \qquad (6)$$

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 mechanis

The exchange rate channel: net wealth

- The exchange-rate channel:

$$i \downarrow \Rightarrow e \downarrow \Rightarrow NW\ \beta \Rightarrow y\ \beta \Rightarrow \Pi\ \beta \qquad (7)$$

- 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 (Eze, 2011).

2.1.4 Asset Prices Channel

The macroeconomic implications of asset prices have received a lot of attention from academia, central banks and governments. For example, significant research efforts have been made to understand the roles of equity prices, house prices and other real estate prices in the transmission mechanism of monetary policy and macroeconomic stabilization at large. The concerns about these prices are both about whether monetary policy reinforces asset price inflation or asset prices development encourages less active monetary policy stabilization. As a result macroeconomists have suggested that monetary policy should respond systematically to asset prices and exchange rate developments. It means that changes in asset prices and exchange rates should be considered as part of the reaction function for central banks. Monetary policy expansion (decrease in the repo rate) affects the short-term money market rates and subsequently long term rates. These money

market rate adjustments lower investment returns on domestic investment thus causing an outflow of financial capital and exchange rate depreciation. In addition, this expansions change banks and building society lending house prices and equity withdrawal. Asset prices such as stock prices and real estate prices lose their value affecting the economic activity as a whole (Fetai & Izet, 2012).

In the developed world, the focus has been on the effects of house prices on household wealth, consumption and finally the economy at large. Meanwhile, exchange rate prices have dominated the research focus in transition economies and the emerging markets. Despite these different emphases, many economists agree that asset prices and exchange channels play a very important role in the transmission mechanism. Montiel and Prisha (2012) showed that the limitation of exploring asset price channel effectively lies in the fact that there is a lack of quality empirical data particularly in developing countries.

Typically, asset prices should decline as a result from a monetary contraction, either by direct substitution effect (a reduced relative return of interest rates) or by a contraction in demand. As before, the intensity of this mechanism will depend of the role played by other channels: the sensitivity of the price of any given asset depends on the sensitivity of its expected future flows on current and expected monetary policy. The structure of the financial market, and the variety of investment and credit options available to agents, will determine the magnitude of the contraction of the demand for a given asset, and the ultimate elasticity of its price with respect to the policy decision. The logic, based on simple arbitrage conditions, is straightforward. For example, stock prices should rise with a monetary expansion, because they become comparatively more appealing than fixed income instruments. This increase in stock prices, in the line of Tobin's q theory, raises investment, as it becomes profitable for firms to devote their resources to expand their capital. The change in the price of shares also has a wealth effect on firms (by increasing their market capitalization) and households (by increasing the value of their portfolios).

For firms, the improvement in their balance sheets within a context of financial intermediation with asymmetrical information increases their access to credits and their investment possibilities. For households, higher wealth implies a higher permanent income, thus raising consumption (Mishkin, 2001). In addition, the change in stock prices should provoke a liquidity effect on households: an increase in the value of the liquid component of households' portfolios will reduce liquidity risk exposure, so they can increase their demand for non-liquid assets such as real estate properties and durable goods. A similar story can be applied to real estate. Monetary expansion reduces the cost of real estate financing, thus increasing the demand for properties and the net income of firms engaged in this activity. Because real estate is a very important component of households' asset portfolio, the wealth effect on these will be significant. Also, the effect will be strengthened through the credit channel, through an increase in bank credit availability resulting from the increased of collateral value (Kiyotaki & Moore, 1998).

Thus, the effects of monetary policy through this channel should be greater in economies where the share of the agents' wealth portfolio invested in assets that are sensitive to monetary policy changes is greater. In that sense, one could expect to see a higher impact of monetary policy through this channel if, for example, the importance of the stock market is greater. Clearly, for all these effects to have a real impact, the response of different assets' prices must differ. If all prices changed the same, relative prices would remain unaltered, the only variation being a shift in the economy's' nominal scale. No effect whatsoever would occur on the agents' real wealth (nominal wealth increasing by the same proportion as the general price level) or in relative incentives, and no shifts in portfolio, consumption or investment would be observed. Thus, once again some type of market imperfection is required.

Firstly, it is empirically shown that monetary policy effects on stock prices have significant influence on investments, firm balance sheets and household wealth and

liquidity. The immediate important reference in this topic is the schematic diagrams by Mishkin (1996), which illustrate how various transmission channels work in most advanced economies. Some exemplary works on the topic are Montiel and Prisha (2012), Goodhart and Hofmann (2007), and Benarnke and Kiyotaki (1998). Benarnke and Kiyotaki (1999) showed that there is a strong link between asset prices and monetary policy with empirical evidence supporting the assumption that a strong sustained growth in asset prices may lead to more borrowing by households and firms. This evidence shows that asset price provides valuable information to determine monetary policy.

The monetary transmission mechanism

Other asset price effects: investment (Tobin's q)

- The investment channel (Tobin's q):

$$i \downarrow \Rightarrow Pe \uparrow \Rightarrow q \uparrow \Rightarrow 1 \uparrow \Rightarrow y \uparrow \Rightarrow \Pi \uparrow \qquad (8)$$

Consider two ways of increasing the size of a firm:

- ✓ buy another firm (and acquire 'old' capital); or
- ✓ invest in new capital

- 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

Other asset price effects: consumption

Other asset price effects: consumption

$$i \downarrow \Rightarrow Pe \uparrow \Rightarrow TW \uparrow \Rightarrow C \uparrow \Rightarrow y \uparrow \Rightarrow \Pi \uparrow \quad (9)$$

- 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

Other asset price effects: housing wealth

- Other asset price effects: housing wealth

  $$i \downarrow \Rightarrow P_h \uparrow \Rightarrow TW \uparrow ? \Rightarrow C \uparrow \Rightarrow y \uparrow \Rightarrow \Pi \uparrow \quad (10)$$

- Increased house prices (rh) are often associated with increased private consumption.

✓ 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 (Lacoviello, 2005).

2.2 Theoretical Framework

2.2.1 Keynesian's Theory of Monetary Policy

Keynesian monetary economics revolves around the liquidity preference theory - Keynesian demand for money introduced in the monetary sector (Belke & Polleit, 2009).

This liquidity preference theory is one of the hallmarks that differentiate Keynesian monetary theory from the general family of neo-classical theories. It explains why people individually express demands for money; the motives for money as liquid asset (Lewis & Mizen, 2000). In this theory, the demand for money is determined by interactions between income and interest rate, that is, the price of demand. Thus, Keynesians argued that, to influence the demand for money, we should either control directly the price for money or indirectly by inducing changes through real income. Theoretically, a change in interest rate, other things being equal, affects individual preferences for holding liquid (cash) and illiquid assets.

Keynesians recognize the importance of the role of money, because it is "first and foremost a financial asset" (Lewis & Mizen, 2000). Money does not affect only the absolute price and quantity of trade, but it affects also the level of financial intermediation, stock prices, and its' own price -interest rates- (Knoop, 2008). Although there is a clear recognition for active roles of money in the money market, Keynesians assume that money is exogenous.

(i) Transaction demand for money

The first motive for demand for money is the transactions. This demand refers to nominal balances that individuals hold in their pockets or wallets. Transaction balances depend on the amount of nominal income, the length of interval between receipts and disbursement, and the mechanism of obtaining and delivering cash to individuals (Dennis, 1981). Blinder (2013) stressed that the transaction motive for holding money is unconnected with the level of interest rate. It is also positively related to individual income; meaning that as income increases, the total number of transactions an individual makes increases. This relationship is represented as follows:

$$L(t) = L(Y) = kY \qquad (11)$$

Where; L (t) is demand for transaction balances, k = income balance coefficient, Y = nominal income.

(ii) Precautionary demand for money

Precautionary demand for money is one of the major innovations by Keynes in the money demand theory. Keynes argues that people hold money to meet unforeseen (unexpected) expenses such as medical bills, car accidents and any other expenses that require immediate payment (Dennis, 1981). Keynes believes that these balances are held over and above what he terms the 'normal' requirements of planned expenditure. Therefore, he lumped together the transaction demand and precautionary demand for money. So the demand for transaction balances includes the demand for precaution balances.

(iii) Speculative demand for money

The third purpose for holding money is the speculative purpose. Keynes regards money as an asset like other assets that earns return and has an opportunity cost. Although money has a zero rate of return, the opportunity cost of holding money is the interest rate. Therefore lending or investing the money in other assets such as bonds can earn the holder interest. However, there is a risk associated with any asset, hence the return earning on the asset depends on the future interest and the inflation rate. Inflation reduces the purchasing power of money; this reduces the speculative demand for money. Therefore in Keynesian economics the demand to hold speculative balance is a decision to liquidate cash or interest bearing bonds (Belke & Polleit, 2009). The speculative demand for balances is as follows:

$$L(s) = L(r) = R - dr \qquad (12)$$

Where

R=autonomous speculative component, *d*=interest elasticity, *r*=representative interest rate.

The total demand for money (Md.) therefore combines the demand for transaction balances and speculative balances, which varies positively with income and negatively with interest rate.

$$Md = L\,(Y, r) \qquad (13)$$

Where, *Y* is the income and *r* is the interest rate. A rise in income leads to more transactions thereby requires increase in money supply. While a rise in the interest rate increases the opportunity cost of holding money thereby reducing the real demand for money balances at the existing level of money supply. Interest rate in the liquidity preference theory is different from the natural interest rate determined in the general equilibrium under neoclassical theory. Natural rate of interest is the interest rate that makes savings equal to investment demand in neoclassical economics. Belke & Polleit (2009) and Sorenson & Whitta-Jacobsen (2005) reveal that this natural real interest rate is determined by real factors productivity and real saving rate. Hence, in the neoclassical monetary theory, real interest rate is real factor phenomenon.

In contrast, interest rates in Keynesian are determined by two factors by demand and supply for money; thus, it is viewed as monetary phenomenon. It equates the demand for money and the supply of money in the money markets. This market interest rate can be above or below the natural interest rate. Sorenson & Whitta-Jacobsen (2005) assert that this is short term interest rate, since the closest substitutes for money are the most liquid interest bearing assets with short term to maturity. The role of the interest rate in the Keynesian monetary model is the reward of parting with liquidity. This feature makes interest rate a viable tool for government interventions through the monetary authority in the financial market to manage the economy in the short term. In addition, Keynesians

use money supply sparingly for stabilization purposes while fiscal spending is encouraged to induce domestic spending and expansion in investments and private consumption. This is because monetary policy through monetary channel is dotted with uncertainty and significant lags in monetary policy effects. Surprisingly, neoclassical and Keynesian economists take that there is a connection between the two views of interest rates. This is asserted by Lewis & Mizen (2000), who claim that whether it's the rate of interest which is determined in the money market under stock conditions or in the bond market under flow condition it is largely a semantic. Keynes disputed the theory of loan-able funds because he had less faith in the market. Therefore, he reasoned that when people increase their savings, this reduces consumption and further decreases aggregate demand. His conclusions are therefore that investment is a function of interest rate as claimed by classicalists who see it as a function of business confidence and other economic factors (Dennis, 1981).

Monetary policy in early Keynesians takes the 'quantity-oriented' view and its effects are transmitted indirectly through money markets to households, firms, and finally the total economy. It affects the availability of financial intermediary credit as central bank adjusts the level of money supply. An increase in money supply (exogenous supply by central bank) puts downward pressure on market interest rates thereby making additional funds available for investments at lower terms. This will further cause demand for investments to increase and subsequently, output will expand. Money is not neutral as it determines interest rates in the money market which impacts further on the profitability of investments. Hence, within the liquidity theory; the exogenous money supply was the monetary policy instrument that stimulates the economy in the short term.

Romer (2006) and Alvarez, Lucas & Weber (2001) point out that in modern Keynesian theory, money is no more assumed exogenous, but rather endogenous. This means that central banks do not explicitly target money supply or use it to set off the transmission

mechanism in the economy. Money supply figures form part of set of financial and economic information that feeds into monetary policy processes. Central banks set a nominal interest rate target which is based on the interest rate rule such as the Taylor rule.Today; central banks adjust money supply through market operations to keep interest rate close to the target. The money market equilibrium condition for real balances is now defined as follows:

$$\frac{M}{P} = L\left(r + \pi^{e}, Y\right), \tag{14}$$

Whereby M is the money supply, P is the price level, r is the real interest rate, π and π^{e} is the rate of inflation and expected inflation. The interest rate rule is implicitly given as follows:

$$r = r\left(Y, \pi\right), \tag{15}$$

$$M = L\left(r(Y, \pi) + \pi^{e}, Y\right), \tag{16}$$

While the nominal money supply endogenously is determined by interest rate rule, expected inflation and output. In this arrangement, money supply is less relevant and thus dumped to the background as information variable. Modern Keynesians emphasize fiscal spending or concentrate on stabilizing output fluctuations and the inflation rate in the short term through interest rate rule. The role of monetary policy is primarily to stabilize aggregate demand indirectly through financial markets by adjusting the level of liquidity in the money markets or set new interest rate target according to interest rate rule. Monetary policy is effective in stimulating the economy when unemployment is increasing, or when the economy is overheating. However, the effectiveness of monetary policy is doubted by early Keynesians because of uncertainty in financial markets. For example, banks might refuse to lend (the new available credit) to one-another or to non-

financial sectors when risk exposures in the economy cannot be ascertained. In addition, some Keynesians believe that monetary policy is ineffective if households decide to reduce their spending when they expect that government will raise taxes in the future to compensate for today spending. Keynesians view inflation as a cost-push phenomena, meaning excess demand is the main cause of inflation in the long run. Monetary policy is therefore useful to muzzle demand-inflation to stabilize the economy by inducing a recession in the domestic economy. This view is supported by New Keynesian advocacy for interest rate policy to manage aggregate demand, thus regard interest rate setting policy as a demand management policy. In summary, money supply is exogenous and its role as monetary policy instrument in Keynesian is to influence the price of money which is the interest rate; this encourages investment indirectly and consequently increases output. However, in the Keynesian era, the difficult part was on how to balance the operations of monetary policy in order to avoid damages to the economy. Gottschalk (2005) reveals, the task of demand policy is to strike the right balance between sustaining high employment level and keeping inflation under control, this is because monetary policy operates with lags, and trade unions bid for high wages when inflation is rising thereby risking out spiral of wage inflation. This therefore provides preference for fiscal policy as tool to stimulate the economy in Keynesian economy than the monetary policy.

Early Keynesian economists argue that the perception that increases in money supply will always lead to inflation is flawed (Dennis, 1981). Money supply cannot lead to inflation if the economy is operating below full employment capacity. This is because excess money supply will find extra demand, which will make the economy move close to full employment. Furthermore, we should point out that the impact of monetary expansion in Keynesian economics depends on investment elasticity and the stability of the demand for money function. The smaller the elasticity of interest rate on investments, the smaller the effect passed through to the real economy (Lewis & Mizen, 2000). Several criticisms have been put forth against the policy activism of Keynesian economics.

First, Keynesian activist economic policy can generate or prolong inflation, unemployment, and instability in the economy. For example, monetarist such as Schwartz (2009) argues that Keynesian discretionary monetary policy was responsible for the great depression in the 1929. Similarly, the discretionary monetary policy is the main culprit that caused the 2008-09 financial crises. For example, it is alleged that low interest rate that stays for a prolong period creates asset price bubbles from cheap credit in the financial markets. These low rates entice businesses and households to take more loans which in the long run become unsustainable. In addition, the preference of low interest rate policy particularly in developing countries is not always viable because of limited fiscal space to adjust. Greenwald and Stiglitz (2006) argue that monetary policy in the Keynesian economic did not help to lift Japan out of deflation; this shows that it is not effective in reviving the economy as it fails to stimulate investments when a country is experiencing deflation problem.

In developing countries, where the banking sector and financial markets are undeveloped, less credit facilities are used, hence the use of monetary policy to manage aggregate demand is usually limited. On the contrary, it turns out that the impacts of monetary policy are very severe because they are highly concentrated on the few sectors of the economy. Keynesian monetary theory recognizes the active role of money in the economy. Money affects economic activity in the short run; the quantity of trade, the level of financial intermediation, and its own price that is, interest rate. Romer (2006) shows that Keynesians have dropped the use of money supply as a policy instrument because money is endogenous. Alternatively, interest rate is set as policy target which is maintained through open market operation to keep interest rate close to the policy rate target.

2.2.2 Monetarist Theory of Monetary Policy

Cagan (1989) defines Monetarism as a theory associated with the view that the quantity theory of money affects economic activity and price level, and that, to control inflation, monetary policy must target the growth of money supply. This school of thought was spearheaded by the Chicago School of economics and Milton Friedman, acclaimed to be the torch bearer was later joined by Anne Schwartz. As the name implies Monetarists emphasize the role of money and the link between money growth and inflation (De Long, 2000). The monetary policy transmission mechanism is directly described by money inflation in the quantity equation as opposed to indirect link through financial markets described earlier in the Keynesian monetary theory. In his early works, Milton Friedman (1968), the god-father of monetarism asserts that there were clear evidences that monetary policy strongly affects the real variables in the short term. Thus, on this ground the growth rate of money formed a target base in order to achieve economic growth in the short term. In the early 1950s Friedman led a counter-revolution against Keynesian activism to reestablish neoclassical economics with some modification. Thus, Cagan (1989), Friedman and Laidler (1982) advocated the control of money supply as a policy instrument superior to Keynesian fiscal policy for economic management.

Monetarist economists believe that inflation is caused by too much money chasing few goods or too much liquidity in the economy relative to output produced (Neills & Parker, 2004). DeLong (2000) purported that "to understand the determination of prices look at the stock of money and the quantities in the economy of those assets that constitute readily spendable purchasing power." Thus to control inflation, it is essential to restrain the growth of money supply; of course, this understanding by Monetarism led to the notion of monetary rules such as the monetary aggregate targeting. It is important to note the differences here, that money plays an important larger role in monetarism than in

Keynesian transmission mechanism. On the contrast, Keynesian place large role on availability of credit to influence the investment growth and economic growth. This emphasis is similar to the position taken by most Post Keynesians who claim that it is credit inside money that matters most. Another fundamental that differentiates monetarism from Keynesian is the emphasis of real wage as the main determinant of demand and supply of labor. This view by monetarists led to a reformulation of Phillips curve in terms of real wage rather than nominal wage (Gottschalk, 2005). It is reinforced by the assumption that wage contracts are set with forward looking nature which points to expectation as a major determinant of wage inflation. The core assumptions of Monetarism are quite similar to those of Neoclassicism with the exceptions of the effects of money and equilibrium in the labor markets (Blinder, 1997).

2.2.3 The Bernoulli Hypothesis

Daniel Bernoulli (1873) was very much concerned with finding solution as to why the Russians of his time were very much averse to risk and are not willing to make bets at a better than 50 – 50 odds knowing that the expected monetary value (EMV) of such bets are infinite, a situation known as the St. Peterburg paradox. In resolving this paradox, he came to the conclusion that though the monetary gain or loss is equal, the loss in utility is greater than the gain in utility. Thus, in Bernoulli's view, rational decisions in the case of risky choices would be made on the basis of expectations of total utility rather than the mathematical expectations of monetary value. Therefore, the primary reason influencing peoples' choices in cases of uncertainty (risks) is that the fact that marginal utility of money diminishes as income rises. There is a greater loss in utility than a gain in utility in an equal amount of money lost or gained. This suggest why majority of Nigerian are seldom interested in the activities of the stock market, and makes it even more difficult restoring confidence in the market.

2.2.4 Gurley and Shaw Hypothesis

According to Gurley and Shaw (1955), it is the non-bank financial institutions that provide liquidity and safety to financial assets and help in transferring funds from ultimate lenders to ultimate borrowers for productive purposes. Thus, the quantity and composition of financial variables induce economic growth through increase purchase of financial assets. The buying of primary securities from ultimate borrowers and selling indirect securities to the ultimate lenders influence the availability of credit and of course, the structure and level of interest rate in the economy.

2.2.5 Loss-Aversion Theory

Loss-Aversion theory states that people's perceptions of gain and loss are skewed. That is, people are more afraid of a loss than they are encouraged by a gain. If people are given a choice of two different prospects, they will pick the one that they think has less chance of ending in a loss, rather than the one that offers the most gains. For example, if you offer a person two investments, one that has returned 5% each year and one that has returned 12%, lost 2.5%, and returned 6% in the same years, the person will pick the 5% investment because he puts an irrational amount of importance on the single loss, while ignoring the gains that are of a greater magnitude. In the above example, both alternatives produce the net total return after three years. Loss-Aversion theory for financial professionals and investors, although the risk/reward trade-off gives a clear picture of the risk amount an investor must take on to achieve the desired returns, prospect theory tells us that very few people understand emotionally what they realize intellectually. For financial professionals, the challenge is in suiting a portfolio to the client's risk profile, rather than reward desires. For the investor, the challenge is to overcome the disappointing predictions of prospect theory and become brave enough to get the returns you want (Goodhart, 2013).

2.2.6 Rational Expectations Theory

Rational expectations theory formulated by John F. Muth in 1960 state that the players in an economy will act in a way that conforms to what can logically be expected in the future. That is, a person will invest; spend according to what he or she rationally believes will happen in the future. Although this theory has become quite important to economics and financial analysts, its utility is doubtful. For example, an investor thinks a stock is going to go up, and by buying it, this act actually causes the stock to go up. This same transaction can be framed outside of rational expectations theory. An investor notices that a stock is undervalued, buys it, and watches as other investors notice the same thing, thus pushing the price up to its proper market value. This is the problem with Nigerian stock market trying to restore market confidence since after the global financial crunch. The general expectation of Nigerian investors is pessimistic and hence the market is dragging irrespective of the innovations introduced by the regulatory agency and the Nigerian stock exchange.

2.2.7 The Capital Asset Pricing Model (CAPM)

The CAPM is a model for pricing an individual security or a portfolio. The CAPM model was developed independently by William Sharpe (1964), and Parallel work was performed by Lintner (1965) and Mossin (1966) these model marks the birth of asset pricing theory. The CAPM suggests that the only variables that we need in calculating the expected return on security are: the risk-free rate (a constant), the expected excess return on the market, and the security's beta (a constant). The CAPM model is attractive because of its effectively simple logic and intuitively pleasing predictions relating to how it measures risk and the relation between expected return and risk. Unfortunately, the CAPM simplicity causes the empirical record of model to be poor, poor enough to

invalidate the method used in the application of the model. The models empirical problems may reflect true failings or they may also be due to the shortcomings of the empirical tests, most notably, poor proxies for the market portfolio of invested wealth, which plays a crucial role in the models predictions.

The CAPM is built on the model of portfolio choice developed by Harry Markowitz (1959). The Markowitz model is often known as a "mean-variance model", it describes the relationship between risk and the expected return of an asset under the conditions of market equilibrium in a capital market where all investors undertake optimal portfolio selection. The model assumes investors are not risk takers and that they care only about the mean and variance of their one-period investment return when choosing among portfolios.

Derivation of the CAPM

The CAPM is a simple linear model that is expressed in terms of expected return and expected risk. The model states that the equilibrium returns on all risky assets are a function of their covariance with the market portfolio.

Under the assumptions of the CAPM, if a risk-free asset exists, every investor's optimal portfolio will be formed from a combination of the market portfolio and the risk-free asset.

Assumptions of the CAPM

The CAPM rests on several assumptions. The most important are as follows:
All investors are rationally risk-averse individuals whose aim is to maximize the expected utility of their end of period wealth. Therefore, all investors operate on a common single-

period planning horizon. All investors are price-takers; so that, no investor can influence the market price by the scale of his or her own transactions.

Asset markets are frictionless and information is freely and simultaneously available to all investor. All investors have homogeneous expectations about asset returns, this mean that all investors arrive at similar assessments of the probability distribution of returns expected from traded securities. This says that investors will not be trying to beat the market by actively managing their portfolios Distributions of expected returns are normal. All securities are highly divisible, i.e. can be traded in small packages. All investors can lend or borrow unlimited amounts of funds at a rate of interest equal to the rate of risk-free securities. Investors pay no taxes on returns and there are no transaction costs entailed in trading securities, so expected return is only related to risk.

2.2.8 The Arbitrage Pricing Theory (APT)

The Arbitrage Pricing Theory (APT) is another model of asset pricing based on the idea that equilibrium market prices should be perfect, in such a way that prices will move to eliminate buying and selling without risks (arbitrage opportunities). The basis of this theory is the analysis of how investors construct efficient portfolios and offers a new approach to explaining the asset prices and also states that the return on any risky asset is a linear combination of various macroeconomic factors that are not explained by this theory. Therefore unlike CAPM model this theory specifies a simple linear relationship between assets, returns and the associated k factors. There are two empirical testable versions of the APT, the statistical APT and the macro variable APT. However, the macro variable model differs from the statistical factor model mainly because the factors are specified in advance and they are interpretable. The APT equilibrium rests on investors, ability to construct an arbitrage portfolio by simultaneously holding a short and a long position in two different portfolios which offers positive expected return with zero

risk and zero net investment. Asserted risk-expected return relation is known as the Arbitrage Pricing Theory, Which is formulated by Ross (1976). It is probably safe to assume that both the CAPM and APT will continue to exist and will be used to price capital assets.

Assumptions of the APT

Asset markets are perfectly competitive and frictionless; all investors have homogeneous expectations that returns are generated randomly according to a k-factor model. Investors have monotonically increasing concave utility functions; the number of assets existing in the capital market from which portfolios are formed is much larger than the number of factors. There are no arbitrage opportunities. (Because there is no arbitrage condition holding for any subset of securities, it is unnecessary to identify all risky assets or a market portfolio to test the APT) There are no restrictions on short selling. (This assumption is crucial to the equilibrium, as it constitutes one side of the arbitrage portfolio; equally important is the requirement that the proceeds from short selling are immediately available) (Ross, 1976).

The Capital Market Reflection and Economic Growth in Nigeria

The capital market enhance, resource allocation and increase economic growth and development through different channels by reducing transaction costs, liquidity costs and positively affecting the average productivity of capital (Levine, 1991; Bencivenga, 1996) by pooling resources on larger projects which would otherwise have difficulty accessing finance and mobilize savings which in turns encourage high rate of investment (Greenwood & Smith, 1997). However, through increase in the acquisition of information about firms, the capital markets can promote and improve resource allocation and the average productivity of capital (Kyle, 1984; Holmstrom & Tirole, 1993). The stock

markets positively affect firms' investment decisions and the average return on investments (Jensen & Murphy, 1990; Laffont & Tirole 1988; Scharfstein 1988).Improving risk diversification through internationally-integrated capital markets and increasing the array of possible investments, capital markets augment on the rate of saving and the rate of investment (Saint- Paul, 1992; Devereux & Smith, 1994; Obstfeld, 1994).

2.2.9 Application of Theoretical Framework to the Study

This research work is anchored on three basic theories, namely:

1 Keynesian Monetary Policy Theory
2 Monetarist Monetar Polcy Theory
3 Arbitrage Pricing Theory

The justifications for the selection of these theories for our study include;

The Keynesian theory of monetary policy adopted in this study explained the relationship between liquidity, the investment in financial market and returns. It also explain why individual investors expressed that the demand for money is determine by interactions between income and interest rate which is the price of assets traded in the capital market. All things being equal, changes in interest rate will affect individual preference for holding liquid cash and illiquid assets.

The Monetarist argued that increase in money supply will create more demand for goods and a rise in prices. As long as the rapid expansion of money continues, the price level will conyinue to rise as individual investors continue to spend their cash balances and money supply does not only affect the absolute price and quantity of trade, but also influence the level of financial intermediation, stock prices and which is the interest rate.

Similarily, we also adopted the arbitrage pricing theory which is the basis of the analysis of efficient market portfolios and offer a new approach to explaining the assets prices.This theory states that the returns on any risky asset is a combination of various monetary and macroeconomic factors.

In this study, we assumed that there is a positive relationship between the Keynesian monetary policy theory, Monetarist monetary policy theory, Arbitrage pricing theory through the monetary policy transmission channels (interest rate, credit rate, exchange rate and asset pricing channel) and the capital market fundamentals proxied by market capitalization and stock market liquidity as capital market indicators as used in this study.

Therefore in this study, the researcher is of the opion that with proper interplay of monetary policy channels, the resultant effect amounts to increase in capital market operational efficiency which will in turn impact on the financial system vise a visa the Nigerian economy as a whole within the period under review.

2.3 Empirical Review of Related Literature

Arturo (2001) used the income-saving equation for indentifying the effects of securitization on the monetary policy transmission mechanism. The author concluded that the housing investment and real output both have less sensitivity to the real interest rate because there is increase of asset securitization in 1980s and 1990s. This implies that interest rates are not directly related to the securitization largely affected channels. The impact of monetary policy on the housing prices is examined by Aoki, Prandman and Vlieghe (2004) and concludes that the financial innovation like easy access to credit brings changes in the monetary transmission mechanism.

Noyer (2007) points out that there is increase in the effectiveness of monetary policy due to the financial innovation through the interest rate channel. According to the author

financial innovation leads to decrease the transaction cost with the result of increase in holding of financial asset and facilitate the funding and investment strategies. Firms have large access to securities markets due to the financial innovations which leads to decrease the information asymmetries.

Ho (2006) noted that transmission mechanism can be affected by those financial developments which have the impact on the financial market conditions. The author found the three main channels that can affect the monetary policy which are the interest rate channel, asset channel and the channel of exchange rate. He further argues that the financial innovation leads to improve the economic agent's ability to lock in current interest rate for future funding needs.

Ignazio (2007) observed that due to the financial innovation economic agents have a large range of financing and investment opportunities. The strength and speed of monetary policy transmission mechanism is affected with the developments in the financial sector in the economy. These developments lead to more liquid and complete financial markets and the cost of investment financing and return on saving affects the whole economy.

Boivin and Giannoni (2002 and 2006) estimate a VAR over two samples corresponding to the pre- and post-Volcker periods (pre- and post-1979) and identify the monetary policy shock using a recursive identification scheme. They find that exogenous changes in monetary policy have had a smaller effect in the post Volcker period: for instance, they report that the through response of output in the post-1979:4 period is about a quarter of that in the previous period. Primiceri (2005), Galí and Gambetti (2009) and Canova and Gambetti (2009) use time varying VARs with random walk coefficients to allow for a much richer evolution of the transmission of monetary policy.

Canova and Gambetti (2009) find out strategy that monetary policy shocks are identified through sign restrictions and real economic activity has become more responsive to monetary policy shocks on impact. A careful look at the relationship between the strategy adopted and the results obtained provides some clues that are useful to sort out this conflicting evidence.

Mahadeva and Sinclair (2002) point out that monetary analysis of transmission channels requires good quality data in order to provide correct policy advices. Therefore, without good quality data and comprehensive quantitative analysis monetary policies are based on guess works and speculations. Second, research about the monetary policy transmission mechanism is complex while the research capacity in developing countries is limited because of limited research skills, lack of commitment and shortage of funds from governments. Third, the financial systems in developing economies are undeveloped, often exist in two tier system formal and informal; and they also tend to have fairly dominant public sector activities with the government crowding out private firms. All these factors were alleged to inhibit research works on monetary policy transmission mechanism in developing countries. As a result, some countries operate monetary policy without a clear set of monetary policy framework that stipulate the policy instrument, target and how the ultimate objectives will be achieved. Finally, there is apathy toward analysis of monetary transmission mechanism from some academics community. Some economists are of the view that there is nothing to say any more about monetary policy transmission mechanism.

Alvarez, Lucas and Weber (2001) points out that: A consensus has emerged among practitioners that the instrument of monetary policy ought to be the short term interest rate, that policy should be focused on the control of inflation, and that inflation can be reduced by increasing short-term interest rates. With the reasons of what we have leaned in chapter one, our position supports the view that the central bank sets interest rate as the policy instrument to stabilize the economy. Therefore, in the following review of

empirical studies on transmission channels, we did not include those studies that investigate the role of the money channel.

Bernanke and Gertler (1995) and Mojo & Peersman (2003) produce empirical works with evidences, which support that monetary policy operates through the interest rate channel. Bernanke & Gertler (1995) used the SVAR approach to analyze the effects of monetary policy shocks in the US economy. These authors applied a semi-structural VAR and identified the innovation in federal funds rate as the exogenous shock (a monetary policy instrument), and their system includes real GDP and GDP deflator as measures of economic activity. Bernanke and Gretler's results show that output declines in response to a positive monetary policy shock. They indicate that the general price index responds after the fourth quarter; this seems to show that it lags behind the response in output. These findings confirm the operation of the interest rate channel through which monetary policy impacts the real economy in the US.

Mojon and Peersman (2003) examine the monetary transmission process in 10 countries in the Euro area. Using the method of structural VAR, they evaluate cross-country differences in the transmission mechanism. Mojon and Peersman included variables such as world commodity price index, US GDP and short term interest rates. The world commodity index and the US GDP group are assumed exogenous and they are used to represent world inflation and capture the so-called 'price puzzle after a increase in monetary policy shock inflation goes up rather than going down' associated with the VAR studies (Favero, 2001).

Al-Raisi, Pattanaik and Al-Raisi (2007) investigate the transmission mechanism in Oman, using two econometric methods which include the structural New Keynesian model with three equations (Output gap, New Keynesian Phillips curve and monetary policy reaction function), and the SVAR approach. The structural equation model and

SVAR both produce evidence that suggests that changes in interest rates do not influence aggregate demand and aggregate supply in Oman. They noted that these results are ascribed to the lack of responses by market-determined interest rate to interest rate policy in Oman.

Al-Raisi, Pattanaik and Al-Raisi (2007) also discovers the evidences of the interest rate puzzle and the 'Phillips curve puzzle' which are common occurrences in the analysis of transmission mechanism using the SVAR method. Interest rate puzzles turn up in other empirical studies about transmission mechanism such as Mojo and Peersman (2003) and Westerway (2002). The IS puzzle implies that an increase in real interest rate leads to an increase in aggregate demand instead of a decline; while the Phillips curve puzzle denotes the empirical finding of a negative relationship between output and inflation (i.e. prices increase when monetary policy is tightened).

Kapur & Patra (2010) applied the Generalized Method of Moments (GMM) to estimate the structural New Keynesian model in order to examine monetary policy effects without any reference to money supply in India. They modeled monetary policy within the so-called 'live policy-making environment' as referred to by Westerway (2002). The sample period is from 1997 to 2009 and the variables in the model are: GDP, GDP deflator, repo rate by the Reserve Bank of India, US Federal Fund rate and the World index on non-fuel commodity prices. Evidence from their model suggests that aggregate demand as measured by output gap reacts to monetary policy through the interest rate channel.

Kapur & Patra (2010) also found that aggregate demand reacts with at least three quarters delay; while inflation takes seven quarters to react to a change in the interest rate in India. They conclude that monetary policy has an impact on real activity and inflation with waning effects in the long run. Kapur and Patra's study resonates well with our thesis that embraces the consensus view which does not emphasize the role of money.

Antigi-Ego (2000) examines how interest rate compares with monetary base targeting as a monetary policy instrument in the Ugandan economy. He constructed a small structural VAR model that captures the structural dynamic features representing Uganda's economy. Antigi-Ego used the model to compare the monetary base and interest rate operating procedures for monetary policy with a sample from 1981 to 1997. The SVAR results indicate that the transmission effects from interest rate is rapid compared to the effects from base money. He claimed that it takes less than six months for a 1% rise in the interest rate to cause an approximately equal fall in inflation. Antigi-Ego reveals that base money is slower in Uganda and that transmission effects take a year for a change in base money to impact on the interest rate through the money market. Therefore, he argues that there is favorable evidence to support a move to an interest rate setting strategy in Uganda.

Smal and de Jager (2001) investigate the monetary transmission mechanism in South Africa with the aim of giving a description of how monetary policy has evolved in the past two decades. In 2000, South Africa adopted the Inflation-Targeting in their monetary policy framework with the inflation target set in a range of 3-6 percent. Smal and de Jager's macro-econometric model comprises three equations that define aggregate demand, aggregate supply and monetary policy rule to represent the reaction function of the South Africa Reserve Bank. In their model the repo rate is the monetary policy instrument by which the reserve bank influences variables such as money, credit and other asset prices. Smal and de Jager's results indicate that the repo rate has a significant impacts on real output and inflation in South Africa. The study further shows that monetary policy effects are felt after four to six quarters which thus confirms the existence of the interest rate channel in South Africa.

Brischetto and Voss (1999) examined monetary policy effects in Australia using the structural VAR model similar to Kim and Roubini (2000). Their model includes variables

such as World Oil price index in US dollars, Federal fund rate, domestic output, domestic price index, monetary aggregates, domestic policy rate, and exchange rate. The oil price index is included to capture anticipated inflation, while the Federal fund rate is included to control the response of domestic monetary policy to US financial variables. In this study Brischetto and Voss used the official cash rate as policy instrument which has been an official instrument over the sample period in Australia.

Brischetto and Voss (1999) described the results of monetary policy shocks thus: it has delayed and gradual effects on the price level and small temporary effects on output. In addition, the results are consistent with other empirical works in Australia and other similar economies.

Kashyap and Stein (2000) and Suzuki (2004) provide comparable methods that evaluate monetary policy through the credit channel. In their papers, they illustrated the importance of bank credit in the transmission mechanism of monetary policy. Generally, the credit channel emphasizes that monetary policy tightening affects the supply of bank credit. The squeezed credit supplies therefore constrain business investments, reduce planned production, and ultimately total output. Under the broad credit view, economists analyze monetary policy effects under the assumption that bank loans and bonds are imperfect substitutes in the capital market. Thus, an increase in monetary policy instrument (i.e. a rise in interest rate) shifts the loan supply and consequently reduces the amount of credit available to make new loans.

Jimenez, Ongena, Peydro and Saurina (2011) have revealed that the identification of monetary policy effects through the credit channel is a ‘steep challenge’; this is because monetary policy tightening affects bank credit in both supply and demand. Thus, to overcome this problem individual studies devised different techniques; this makes the results from these models rarely comparable, but nevertheless very informative.

Jimenez, Ongena, Peydro and Saurina (2011) used the firms' loan application to gauge the monetary policy effects on the probability that a particular loan is granted. Another avenue that explores the effects of monetary policy on output through credit channel is the use of credit rationing models. Credit rationing models suggest that there is a threshold level after which monetary policy effects become stronger when credit market rigidity surpasses this particular point (Shao, 2010). However, the weakness of credit rationing models is that the threshold level is unknown, and it depends on the sample space in the study; it changes from sample to sample.

Kashyap and Stein (2000) examine bank business lending behaviours by disaggregating lending from large banks and lending from small banks. These authors claim that it is hard to deny the existence of lending channel of transmission mechanism at least in the US referring to the sample period from 1976 to 1993. Using a GMM Two-Step method and pooled data from the US financial sector on insured commercial banks, the evidence from this study suggests that bank business lending declines when monetary policy is tightened giving evidence of a lending channel. Kashyap and Stein's results show that total loans and loans from smaller banks respond to monetary policy tightening, while loans by large sized banks remain unaffected by monetary policy tightening. Of course previous work on the same topic by Kashyap, Stein and Wilcox (1996) supports the line that small bank lending falls substantially in comparison to larger bank lending in response to a monetary policy shock.

Sengonul and Thorbecke (2005) examined the effects of monetary policy contraction on banks with weak balance sheets in Turkey. Using the Kashyap and Stein methodology, the results indicate that banks with weak balance sheets curtail their lending in the wake of new increases in the interest rate. Thus, Sengonul and Thorbecke (2005) argue that banks apply this strategy in order to rebuild their liquidity positions.

Suzuki (2004) investigates the evidences on both views of the credit channel in the Japanese economy. Suzuki's structural VAR model includes the following variables: output, consumer price index, monetary aggregates and overnight call rate for interest rate (proxy for a Japanese central bank instrument), base money, and quantity of loan outstanding, loan price, exchange rate, and US federal interest rate. Suzuki finds evidence that monetary policy tightening in Japan affects the real economy by shifting the supply schedule of bank loans. However, he also indicates that it is difficult to tell whether this contraction in bank loans is a result of the leftward shift in supply of loans or the leftward shift in the demand schedule of loans.

Shabbir (2008) examines the monetary transmission channels in two pacific countries: Fiji and Papa New Guinea (PNG). He applies the structural VAR model to investigate the monetary and credit channels, and analyzes the forecast error decomposition to compare the relative strength of monetary channel and credit channel in the two countries. The model has six variables (central bank reserves, bank deposits, bank loans, effective exchange rate, consumer price index and total output) that he utilizes to capture the economic structures of these two Pacific Islands. The results suggest that there is evidence to support the monetary channel, as reserves and deposits accounts for large variation in output in Fiji. The credit and exchange rate channels did not account for a significant role in output variation in Fiji. In the case of PNG the result is reversed, credit channel plays a significant role as it accounts for a large variation in output. These results seem to react to changes in credit conditions within the PNG economy.

Shabbir (2008) further claims that such evidences are in line with the stylized facts for the bank lending channel. The common understanding about credit lending channel is that it is more pronounced in less developed countries than in countries with established financial market. This is because; the financial sector in less developed countries rarely offers alternatives to firms apart from bank's finance. Shabbir further reveals that there is

lack of developed financial market in the Fiji as compared to PNG which, according to him, could be a result of the difference in transmission channel between the two countries.

Sellon and Morris (1995) examined the hypothesis that monetary policy tightening affects bank business lending in the US. This study explores the debates as to whether bank business lending plays a role in the monetary transmission mechanism. Using the Effective Federal funds targeting as a measure for monetary policy, they determined the so-called 'policy window periods' when Federal monetary policy was tightened.

Gordon and Morris (1995) identified four examples of 'window periods' over the sample period from 1976 to 1994. They asserted that over this period the US Federal monetary policy was occasionally tight. This is shown by the sustained reduction of the bank reserves which were reduced by the US Federal Reserve with the aim of raising the Federal Funds rate.

Gordon (2008) found out that bank business lending in each window period rises and there is no evidence of decline until the Federal Reserve begins to reverse the policy. Furthermore, results show that bank business lending lags behind economic activity. All in all, during the policy windows, there was no evidence that monetary policy tightening constrained bank business lending; however, they pointed out that this result does not indicate that credit channel is unimportant or that none existed.

Montiel and Prisha (2012) showed that the limitation of exploring asset price channel effectively lies in the fact that there is a lack of quality empirical data particularly in developing countries.

Agundu, Akani & Agbahive (2013) examined the intervention strategy, banking re-engineering and capital formation in Nigeria. The study revealed that there is significant

relationship between intervention strategy, banking re-engineering and capital formation within the period understudy.

Benarnke and Kiyotaki (1999) showed that there is a strong link between asset prices and monetary policy with empirical evidence supporting the assumption that a strong sustained growth in asset prices may lead to more borrowing by households and firms. This evidence shows that asset price provides valuable information to determine monetary policy.

Nastansky and Strohe (2010) empirically examined the transmission channel of monetary policy through asset prices (stock and property prices) on aggregate consumption and investments. Using a cointegration procedure Nastansky and Strohe (2010) find that there are significant wealth effects on consumption and investment effects from stock and property prices in Germany. These authors proposed that central banks should aim to understand the transmission mechanism through stock and property prices; however, these prices should not become explicit targets of monetary policy but rather serve as information variables in setting the targets of monetary policy. Fundamentally, the major strength of wealth effect and investment effect channels depends firstly on whether household mortgages are on variable interest rates; and second, whether the changes in the policy rate are seen as permanent or temporary. Permanent change in the policy rates influences future expectations and consumption spending by households, which ultimately affect aggregate demand as a whole in the long run.

Goodhart and Hofmann (2007) examined the predictive power of asset prices on output gap and CPI inflation in the G7 countries. From the identified VAR they find that asset prices significantly affect output gap but the response of inflation was generally insignificant. They argued that this might be explained by the forward-looking nature in

stock price movements. Monetary policy affects the financial health of firms through debts repayment, firms' investments and their ability to borrow from the financial markets. This relationship is suggested by the Tobin-q theory of investment, which says that investment activity is determined by the ratio of market value to cost of acquiring it.

Bofinger (2001) argued that monetary policy rates have a strong direct and important effect on firms' balance sheets by reducing or increasing firms' profits and this has final implications for overall investments and firms' demand for labour. Finally, the asset price channel also works through balance sheets as property prices affect financial institutions' willingness to lend. This channel is similar to the credit channel discussed in the last section.

Gerlach and Peng (2005) examined the relationship between residential properties and property prices using a vector error correction model (VECM). Gerlach and Peng (2005) find that there is a unidirectional causal relationship flowing from property prices to bank lending. This evidence is consistent with (Goodhart & Hofmann, 2007) who find that real property prices for residential and commercial properties have strong and persistent positive effects on bank lending, and further help to explain the long run relationship between real GDP and real interest rate in the industrialized countries.

Fetai and Izet (2010) examined the effects of exchange rate on real GDP and prices in Macedonia. Using a SVAR method they find that changes in money stocks and exchange rate do not show significant effects on real GDP. However, exchange rate shock effects are rather significantly observed on the price level in Macedonia.

Arratibel and Michaelis (2014) examined the impact of monetary policy and exchange rate shocks in Poland. Using a time-varying VAR method they found significant time-varying effects from exchange rate shock on output and consumer prices. Specifically,

consumer prices are more responsive to exchange rate than the response from other macroeconomic variables. Other works on exchange rate include (Kim & Roubini, 2000) who investigated the transmission mechanism in a group of small developing countries. They find that the exchange rate channel plays an influential role in transmitting effects from monetary policy to output and prices.

Abradu-Otoo, Amoah, and Bawumia (2003) used a structural vector error correction model to examine monetary policy effect through the exchange rate channel. Using a system of seven variables they found strong evidence that the exchange rate channel is the main medium through which monetary policy effects are transmitted to output and inflation. However, in a fixed exchange rate economy monetary policy effects are transmitted through import prices of goods and services from the anchor country. The effects of domestic monetary policy on exchange rates are curtailed by the exchange rate peg. Another route through which exchange rate effects are transmitted is the future expectation of future exchange rate changes in the anchor country. This happens when nominal interest rate affects the long-term rate thereby changing expectations regarding the future exchange rates.

Akani and Lucky (2014) examined the relationship between money supply and aggregate stock prices in Nigeria using time series data from 1980 – 2012, Dickey Fuller Unit Root Test, Engle-granger and Johansen-Joselinus method of co-integration in a Vector Error Correction Model setting. Empirical results demonstrated that there exists a long-run relationship between Currency in Circulation (CR) and Demand Deposit (DD) and Aggregate Stock Price, Time Deposit (TD), Savings Deposit (SD) and Net Foreign Assets (NFA) have negative relationship with aggregate stock prices.

Akani, Okonkwo and Ibenta (2016), examined the effects of monetary policy on capital market activities using evidence from Nigeria Economy, 1980 – 2013. The purpose of

this study is to investigate the nature of the relationship between monetary policy instruments as our independent variables proxied by Broad Money Supply (M2), Liquidity Ratio (LIR), Interest Rate (INTR), Monetary Policy Rate (MPR) and Treasury Bill Rates (TBR) while the dependent variable capital activities are represented by All Share Price Index (ASPI) and Market Capitalization (MC). In course of this study, secondary data were sourced from the Central Bank of Nigeria Statistical Bulletin, the granger causality test and the Johansen co-integration test in a Vector Error Correction Model (VECM) setting were employed. The empirical result demonstrate that there exists a long-run equilibrium relationship between monetary policy tools such Broad Money Supply (M2), Liquidity Ratio (LIR), Interest Rate (INTR), which has a positive significant effect on Market Capitalization (MC) while Monetary Policy Rate (MPR) and Treasury Bill Rates (TBR) has negative and insignificant relationship on Market Capitalization (MC). In model II, the results shows that the independent variables have positive and significant relationship with the dependent variables of All Share Price Index (ASPI) except Monetary Policy Rate (MPR). The model summary revealed an R2 of 75% in model I and R2 of 94% in model II meaning that there is a strong and positive relationship between the dependent and independent variables during the period. The study also shows that there is no bi and uni directional causality running from the dependent and independent variables in the models except a uni directional causality running from Money Supply (M2) to Market Capitalization (MC) in model I. It was recommended that Monetary Policy tools should be used for the purpose of enhancing efficient capital market

Bernanke (2003) studied the relationship between US price index and macroeconomic variables using quarterly data from 1975-1999 using Johansen co-integration and Vector Error Correction Model (VECM). Findings revealed that stock price has positive relationship between industry output, inflation, money supply, short term interest rate and exchange rate. The causality relationship revealed that the macroeconomic variables in

the study cause the stock price in the long run but not in the short-run. Beivin, Kiley and Mishkin (2010) examined that the existing relationship between stock market return and sets of macroeconomic variables which are exchange rate, inflation, money supply, industrial production index, long term bond rate and call money rate using Vector Error Correction Model (VECM) in Japan. Findings revealed that the sets of macroeconomic variables are co-integrated with Japanese stock price.

Anderson and Gascon (2009) investigated the effect of macroeconomic variables as systematic influence on stock market returns using equity return and non-equity return as dependent variables. Results of the estimated models indicates that industrial production, anticipated and unanticipated inflation, yield spread between long and short term government bonds has significant relationship with Stock market return in United State.

Courtois-Halton and Hatebondo (2011) examined the relationship between stock market return in Malaysia, Indonesia, Philippines, Singapore and Thailand using macroeconomic variables such as Gross National Product (GNP), Inflation, money supply, interest rate and exchange rate from 1985-1996 using monthly data. The study found that stock prices of the five countries are having long-run positive relationship with growth in output but negatively related to aggregate price level. Interest rate has positive relationship with the stock price of Philippine, Singapore and Thailand but positively related to Indonesia and Malaysia.

Ferrero and Secchi (2010) studied the relationship between macroeconomic variables and stock market index of New Zealand from January 1990 to January 2003 by employing cointegration and Granger causality test. Findings revealed long-run relationship between the macroeconomic variables and stock price. The Granger causality test revealed that stock index was not a leading indicator for changes in macroeconomic variables. The

general finding showed that the stock market index was consistently determined by interest rate, money supply and real GDP.

Humpe and MacMillian (2007) found that the Japan stock prices are influenced negatively by the money but found positive and insignificant relationship between money supply and stock price in US.

Maghayereh (2002) investigated the relationship between money supply and stock return in Singapore; the result found that coefficient of money supply (M1) is negative but statistically at 10% level.

Al-Sharkas (2004) found that Broad money supply (M2) has positive correlation between changes in money and stock return.

Abugri (2008) examined the relationship between money supply and stock return in Brazil and Argentina; finding indicates that responses of return to money supply are negative and significant in the countries but insignificant in determining the stock prices of Mexico and Chile.

Nishat and Shaleen (2004) indicates that Kenachi stock exchange index and money supply (M1) are co-integrated and two-term equilibrium relationship exist between the variables, that money supply does Granger cause stock price movement.

Yildirtan (2007) found a positive and strong relationship between money supply multiplier ISE 100 indexes.

Karamustafa and Kucukkale (2003) found that stock price is neither the result variable nor the cause variable of money supply while Oztuk (2008) found that money supply

does Granger cause the Stock return but stock return does not Granger cause Central Bank money.

Akani (2013) studied the relationship between inflation rate, interest rate, money supply on aggregates stock prices in Nigeria from 1985-2011 using Granger causality, Johansen co-integration and Vector Error Correction Model. Findings revealed that changes in the variables exists significant impact on aggregate stock price.

Eze (2011) examined the relationship between monetary policy and the stock market performance in Nigeria. The study employed Ordinary Least Square, co-integration and Error Correction Model; Findings revealed that stock market performance is strongly determined by broad money supply, exchange rate and consumers' price index in the short and the long run.

Maku and Atannda (2010) examined the determinants of stock market performance in Nigeria. The study used Augmented Dickey Fuller Unit Root Test, Augmented Eigen Granger Co-integration test and Error Correction Model. The result revealed that Nigerian stock price All Share Index is more significant to variation in Exchange rate, Inflation rate, and Money supply and real output.

Boivin and Marc (2002) suggest that there was evidence of important changes in the transmission of monetary policy since the start of European Monetary Union. They also found that the exchange rate channel had become more powerful in the monetary union period than in the previous decade. They used a Factor Augmented Vector Auto regression model proposed by Barnanke. The author limited the sample data to six largest European economies Germany, France, Italy, Spain, Netherlands and Belgium.

Karagiannis (2010) suggest that Money Market (MM) rate compared to the Central Bank (CB) rate is more effective as a policy vehicle variable in the Euro-Zone. They used

monthly data from the USA and Euro-zone. More so and found that not all of the change in the policy rate is transmitted to the loan rates. His findings in the USA analysis were that CB rate increases and decreases are both transmitted to the deposit and loan rates and that MM rate is not transmitted to the retail rates which probably show that the MM does not work effectively as a policy vehicle variable in the USA.

Gerdesmeier (2013) examined monetary policy transmission on Economic growth in Kenya suggests that there is positive contribution of treasury bill rate and required reserve ratio to the cost of credit. Monetary transmission mechanism has strong influence on credit growth, cost of credit and amount of deposit in Kenya. Further analysis by the author suggests that there is an inverse relationship between real money supply, required reserve ratio and Treasury bill rate. The researcher therefore concludes that an action by CBK to lower the required reserve ratio, Treasury bill rate or both will immensely increase the amount of money supply in the economy. The author used data between 1997 and 2009 and the Structural Vector Autoregressive Model (SVAR).

Cevik and Teksoz (2012) notes that one weakness of the SVAR model is that the estimation results are sensitive to the identifying assumptions which sensitivity can lead to substantial variations in the estimated effects of monetary policy and in their relative importance over the sample period.

Munyanzwe (2011) noted that the exchange rate transmission channel is not significant in explaining the variability of the consumer price index when it interacted with financial innovation variables M2/M1 (ratio of broad money to narrow money and bank credit to GDP. The researcher's study sought to examine the effectiveness of exchange rate transmission chance of monetary policy in Kenya amidst rapid financial innovation using the regression analysis. The research observed the impact of exchange rate in explaining CP1 volatility when the exchange rate is interacted with financial innovation variables.

Nyanmo and Misati (2011) examined financial innovation variables represented by (Bank to GDP ratio and M3/M2). They found that with increased financial innovation will lead to efficiency in access of finances to households and firms and therefore, more investments which lead to increased output. However, the overall effects suggest that with financial innovation, the effectiveness of interest rate channel in monetary transmission is weakened and so, as financial innovation intensifies, the more positive the output gap is likely to be.

Mburu,Kethi and Maana (2012) suggests that changes in money supply are the predominant determinants of changes in inflation, as the coefficient of change in money supply is highest at 41%, which was consistent with the monetarists' theory that the effe3ct of an expansionary monetary policy on an economy operating at optimum is inflationary in nature. Also, the results suggest that change in interest rate follow closely with changes in exchange rate being the last significant variable with a coefficient rate of 21%.The author used the error correction model and granger causality test and found that changes in money supply, granger cause change in prices and that changes in exchange rate granger cause changes in money supply and changes in interest rate. The researcher however failed to find direct causality between interest rate and prices. These findings however contradicts Njuguna and Duravell (1997) who noted that exchange rates, foreign prices and terms of trade have long term effects on prices while interest rates and money supply have short term effects.

Masati and NyamOngo (2011) examined asset prices and monetary policy in Kenya, results shed light on issues on linkages between monetary policy and financial stability. Empirical analysis based on quantitative analysis which incorporates both descriptive analysis and empirical approach where the study employed use of the VAR approach. Findings were that while monetary policy effects on stock prices volatility don't last for long, instability in the stock market prices creates instability in GDP and inflation and

that the asset price channel of monetary transmission mechanism in Kenya is not compelling.

Maturu, Kethi and Maana (2006) found that contrary to other researcher's evidence that inflation is one of the most dominant determinants of money; the researcher's results suggest it not. Moreover, results suggest that interest rate shock temporarily reduced real output for the first 4 months and permanently reduces money demand/supply and inflation. That interest rate interpreted as monetary tightening significantly and permanently reduces headline inflation and therefore interest rate channel is operational in Kenya. The author noted that repo rate is potentially more useful as a policy instrument compared to reserve money. This is because it predominantly self driven and hence more of an exogenous variable than reserve money. He used a SVAR considering eight endogenous variables assuming a small open economy. Consistent to Cheng (2006) whose results found that monetary policy effects on output appeared to be insignificant but however notes that there was persistent significant impact on prices and nominal effective exchange rate.

Davoodi,Dixit and Pirter (2013) suggest that channel of monetary transmission mechanism differ across EAC with exchange rate and credit channel being important in Kenya, credit in Rwanda and interest rate in Burundi. More so, a loose policy stance increases prices significantly in Kenya and Uganda and output in Burundi, Kenya and Rwanda. Also, monetary policy measured by shock to policy rate has long lags to prices and output of all countries while policy measured by shock to reserve money, has short lags in Uganda but long lags in Burundi and Rwanda. They applied the use of a Bayesian VAR model which has affected way of dealing with problem of over-parameterization by using previously acquired information.

Morales and Raei (2013), in their study on the evolving role of interest rate and exchange rate channels in monetary policy transmission in EAC countries, generally concluded that there was evidence for the existence of interest rate and exchange rate channels of transmission of monetary policy in the EAC. Move over, for countries with imperfect financial markets the exchange rate channel proves a strong vehicle. They noted that deposit rates are more responsive to changes in discount rate in across all EAC countries in the short run. More so for leading rate, the contemporaneous pass through of both discount and Treasury bill rate is significant only for Kenya and Tanzania.

Ludi and Ground (2006) used the VAR approach to investigate the Bank lending channel in South Africa, citing its ability to incorporate endogenity and the fact that it is pervasive in nature, because everything affects everything else. Results suggest that loans in South Africa are governed by consumer demand and not by bank supply which tends to disapprove the fact that bank lending channel has effectively worked as a tool of monetary policy in South Africa. They suggest further research since with presence of demand driven loans in essence nullifies the bank lending channel.

Kendall Patrick (2001) examined determinants of interest rates in the Caribbean he used the VAR estimation model and impulse response function (IRF) in his analysis. The author emphasized on the timing and effects of monetary policies on the economy. The researcher used five variable VAR i.e. the lending rate, deposit rate, discount rate Tb rate and found that the *R* was greater than 0.7 after running the regression. In addition he found that it was difficult to discern response pattern of Tb rates in Barbados, Belize, Guyana and Jamaica but response was strongest and most consistent in Bahamas and Trinidad.

Cheong and Boodoo, (2008) in a study, monetary transmission mechanism: A closer look at the interest rate channel in Trinidad and Tobago used IRF and the variance

decomposition of the VAR model. The authors used the analysis to provide an idea of the strength of interest rate transmission and also the time it takes on interest rate policy on target variables. The aim of the study was to determine the relative importance of the Repo rate in explanation of market interest rates, the importance of interest rates on credit and finally, the importance of credit in the explanation of movements in inflation and income. Consistent with the IRF, the variance decomposition suggest that there was weak pass through from interbank rate and Tb rate to prime lending rate and that there was no strong relationship and pass through effects among the variables, particularly between short term interest rates and lending rates. But the positive aspect was that while the relationship may not have been strong, they never the less existed. The results also shows that the model also suggest high liquidity in financial systems was one of the reasons for incomplete Repo pass through. The results are not consistent with Kendall (2001) whose findings suggest that Trinidad's interest rate response was strongest and most consistent.

Cheng (2006) discovered that Kenya's nominal exchange rate is highly susceptible to monetary policy with appreciation following an increase in the short term interest rates and that monetary policy seemed to have little impact on real output. The author used the vector autoregressive model, using data between 1997 and 2005. His findings suggest that the possible explanation for the sluggish response of output to monetary policy shock is the weak financial system, plagued with structural weaknesses.

Saborowski and Weber (2013) assessed the determinants of interest rate transmission through conditional impulse response function; they employed the use of a panel VAR framework and supported their choice of the panel VAR being that it uses monthly instead of annual data to assess how a country affects not only long run pass through but also its dynamics over time. In addition, the model permits computing a country's specific pass through and decomposing these in to the respective contributions of the different country characteristic. Results suggest that structural characteristics that matter

for interest rate transmission are exchange rate flexibility, regulatory quality, financial development, dollarization, inflation and finally, banking sector related variables such as competition, ratio of liquidity to assets and as an indicator of asset quality, the performance of bank's loan portfolios. Their findings suggest that an increase in banking sector liquidity from 20th to 80th percentile is associated with a fall in pass through of around 20 percentage points. An increase of between 25 and 50 percentage points was as a result of moving from a pegged to a floating exchange rate regime. The major weakness with the approach was that they imposed coefficients to be the same across countries, which may be problematic because the characteristics they used did not fully explain pass through heterogeneity across countries. The researchers were however observant that it was necessary to distinguish between facts on the ground and the methodological deficiencies and that interpretation of the absence of evidence for strong monetary transmission would have to await and pay careful attention to studies on individual countries and not geographical regions.

Andrle, Berg and Morales (2013) examined Forecasting and monetary policy analysis in low income countries, with a focus on Kenya, they developed a semi structural new Keynesian open-economy model, by use of existing Forecasting and Policy Analysis (FPAS) frame works which embody the fairly general view that aggregate demand and monetary policy matter for output dynamics in the short run. At their core, they consist of a forward looking IS equation, a hybrid Philips curve with two separate Philips curve, one for food and the other for nonfood, a monetary policy rule and an uncovered interest parity equation. They used in sample and out of sample forecasting where the results suggest that imported food price shocks accounted for some inflation dynamics in 2008 and that an accommodative monetary policy played an important role. They noted that the out of sample performance together with its in sample properties and more generally its ability to provide a plausible interpretation of recent events in Kenya validates the use of the models in policy analysis in low income countries.

Andrew and Zivot (1992) found clear evidence of a working transmission mechanism after a large policy induced rise in short term interest rate, lending and other interest rate rise, the exchange rate tend to appreciate, output growth tend to fall and inflation declines. The case study illustrates that the policy frame work made a big difference to the strength of transmission of policy decisions. Where countries target money, such as Rwanda and Tanzania, short rates are less likely to be informative or to move long rates. Their results suggest that transmission of monetary policy was less evident in Tanzania and Rwanda which conduct monetary policy under dejure and defacto exchange rate respectively. Also, transmission was clearest in Kenya and Uganda where the regimes most resembled inflation targeting in that the authorities prioritized inflation, emphasized the role of the policy rate, allowed the exchange rate a large degree of flexibility and broadly avoided multiple objectives.

Davoodi, Dixil and Pinter (2013) results generally suggest that monetary policy measured by shock to policy rate has long lags to prices and output of all EAC nations. The results are equally shared by Morales and Raei (2013) who suggest there was evidence for existence of interest rate and exchange rate channels of monetary policy in EAC.

Nyamongo and Ndirangu (2010) examined financial innovation and monetary policy in Kenya, noted that financial innovation has dad positive outcomes and seem to improve the interest rate channel of monetary policy transmission. The study was conducted using data from period 1998-2012. Tests were carried out on stability of velocity of circulation, money multiplier and money demand with use of impulse response function with results showing that innovation has improved the monetary policy environment in Kenya.

Misati, Njoroge, Kamau and Ouma (2010) differ from those of Nyamongo and Ndirangu (2013) examined financial innovation and Monetary policy transmission, applied use of two stage least square (2SLS) and monthly data covering period 1996-2007. Based on

their findings, they concluded that financial innovation poses complex challenges to the conduct of monetary policy and thus financial innovation dampens the interest rate channel of monetary transmission mechanism.

2.4 Literature Gap

(1) The impact of monetary policy transmission mechanism on macroeconomic activities has well been documented in literature. Existing literature has focused more on the effect of the instruments on the real sector of the economy, measuring the relationship between monetary policy variables and economic growth. This study focused on the existing relationship between monetary policy transmissions mechanisms on capital market fundamentals.

(2) The literature examined in this study did not investigate direction of causality between the monetary policy variables and the performance of Nigeria capital market. Studies that attempt to do so failed to establish the exact causal relationship between the monetary policy transmission mechanisms and the capital market fundamentals (Davoodi, 2013; Saborowski & Weber, 2013; Cheong & Boodoo, 2008; Ludi & Ground, 2006; Kendall Patrick, 2001). This study will enhance the analysis by establishing the causal relationship that exists between the four channels of monetary policy and Nigerian capital market fundamentals.

(3) Several related study in the developed financial markets modeled asset price as the function of monetary policy variables. The findings of these studies only reveal the relationship between monetary policy transmission mechanism and its effect on asset price without examining the effect on other financial market fundamentals such as liquidity. In this study, we intend to examine the extent to

which various channel of transmission of monetary policy affect other capital market fundamentals such as market capitalization and Stock Market liquidity.

(4) Again, existing studies fail to disaggregate the four channels of monetary policy and its variables on the financial market. For instance, the interest rate structure that defines the interest rate channels has the lending rate, the monetary policy rate, the maximum lending rate, long and short term savings rate. The credit channels also have various components of credit. In this study, we intend to disaggregate the analysis of the monrtary policy transmission channels and study how each of the variables affects Nigeria capital market fundamentals.

CHAPTER THREE

RESEARCH METHODOLOGY

The chapter explains the various methods and techniques adopted in this study.It encompasses the overall research plan and design guiding the process of data collection and the range of approaches used in research to collect data.

3.1 Research Design

Research design is a master plan specifying the methods and procedures for collecting and analysing needed information. Baridam (2001) suggested that the choice of a design is influenced by the purpose of the study, the study setting, unit of analysis and time horizon. This study uses ex-post facto research design approach for the data analysis. Ex-post facto research is systematic empirical inquiry in which the reseracher does not have direct control of independent variables because their manifestations have already occurred. Also this kind of research is based on a scientific and analytical examination of dependent variables. Independent variables are studied in retrospect for seeking possible and plausible relations and likely effects that the changes in independent variables produce on a single or set of dependent variables. This approach combines theoretical consideration (a prior criterion) with the empirical observation and extract maximum information from the available data.

The research also adopted descriptive research method. The study relied on historical time series for its secondary data which formed the entire source for the study. An initial investigation of the time series properties of the data is followed by examination of the existence of the possible long-run relationship between Monetary Policy Transmission Mechanism (interest rate channel ,credit channel,exchange rate channel and asset pricing channel) and Capital Market Fundamentals (market capitalization and stock market

liquidity) in Nigeria by applying the multivariate co-integration methodology suggested by Johansen (1995).

3.2 Sources and Nature of Data

This study employed secondary data sourced mainly from the Central Bank of Nigeria (CBN) statistical bulletin, Nigerian Stock Exchange Factbook, Financial Statement of quoted Deposit Money Banks in Nigeria (DMBs), National Bureau of Statistics (NBS), Business Journals, Banking and Finance Journal, websites, seminar papers and Federal Ministry of Finance (FMF) Publications and other related books of readings. The data for the study comprise of Percentage of Capital market capitalization to Broad Money Supply and Stock Market Liquidity as dependent variables, the interest rate channel has prime lending rate, monetary policy rate, savings rate, maximum lending rate and long term savings rate; the credit channel has net domestic credit, credit to private sector to gross domestic product, long term credit, short term credit and credit to real sector of the economy; the exchange rate channel has Nigeria Naira exchange rate per US Dollar, British Pounds, Japanese Yen and Chinese Yuan. Nigerian Naira exchange rates are chosen from the above countries due to the various investments and bilateral treaties between Nigeria and the specified countries and the asset price channel comprises: Treasury bill rate, stock prices of deposit money banks, stock prices of real estate, and stock prices of manufacturing firms, stock prices of service sector and percentage of market capitalization to broad money supply.

3.3 Model Specification

Determining the long run relationship between variables is important as it enables the understanding of the impacts they have one against the other. However, each endogenous variable is explained by its lagged, or past, values and the lagged values of all other endogenous variables in the model; which eliminates the use of any exogenous variables

in the model (Gujarati, 2004). Since the methodology allows comprehensive information about the dynamics of the interactions, long-term trends are easily explained. This enables shocks within the regressions and the system to be easily seen. The study adopts the Ordinary Least Square method of Vector Error Correction Mechanism (VECM) and granger causality. The Vector Error Correction Mechanism (VECM) however, minimizes the shortcomings of the Vector Auto regression Model (VAR) procedure while retaining its attributes as it incorporates the co-integrating variables by forcing the model to converge in the long run. It equally allows for deviations, which are corrected through a series of adjustments that are dictated by the long run relationship.

However, the absence of any co-integrating vectors amongst them suggests the need to use Vector Autoregressive model. Irrespective of the number of variables used in the performance of the VEC, the first vector is the most important co-integrating vector because it is the one associated with the highest Eigen value. The number of lagged difference terms to include is often determined empirically, the idea being to include enough terms so that the error term is serially uncorrelated (Gujarati, 2004). In addition, when two time series are co-integrated, then regression results may not be spurious and the usual *t* and *F* test are valid. The study adapted the models specified by Ogbulu & Uruakpa (2011) on Monetary Policy and Stock Prices in Nigeria: Co-integration and Error Correction Approach with a slight modification. The original model was specified as;

ASI = f (BMS, INT, FXR, NFL) (3.1)

Where:

ASI = NSE All Share index (proxy for stock market prices)

BMS = Broad money supply (M2)

INT = Monetary policy rate in Nigeria

FXR = Foreign exchange rate of the Naira to the US dollar

NFL = Year on change in inflation rate

The study also adapted and modified the work of Akani, Okonkwo and Ibenta (2016) on the Effects of Monetary Policy on Capital Market Activities in Nigeria.The models are written as:

MC = f (M_2, LIR, MPR, IR and TBR) (3.2)

ASPI = f (M_2, LIR, MPR, IR and TBR) (3.3)

Transferring equ (1 and 2) into a testable form, we obtain the following regression equation;

$MC = bo + b_1 M_2 + b_2 LIR + b_3 MPR + b_4 IR + b_5 TBR + e_1$ (3.4)

$ASPI = ao + a_1 M_2 + a_2 LIR + a_3 MPR + a_4 IR + a_5 TBR + e_2$ (3.5)

Where; b's, a's	=	Regression Coefficients
MC	-	Market Capitalization
ASPI	-	All Share Price Index
MS	-	Money Supply
LIR	-	Liquidity Ratio
MPR	-	Monetary policy rate
IR	-	Interest Rate
TBR	-	Treasury Bill Rate
$e_1 - e_2$	-	Error term (unexplained variation)

Therefore, a priori expectation ($b_1>b_2>b_3>b_4>b_5 >0$ and $a_1>a_2>a_3>a_4>a_5 >0$)

In this sub-section, models that seek to examine the effects of monetary policy transmission mechanism on capital market fundamentals are considered evident; the models are written as:

Model I: **Interest Rate Channel**

MKTC/M2 = f (PLR, MPR, SR, MLR, LSR) (3.6)

SMLIQ = f (PLR, MPR, SR, MLR, LSR) (3.7)

Transferring equ (3.6) and (3.7) into a testable form, we obtain the following regression equation;

$$MKTC/M2 = \beta_0 + \beta_1 PLR + \beta_2 MPR + \beta_3 SR + \beta_4 MLR + \beta_5 LSR + et_1 \quad (3.8)$$

$$SMLIQ = X_0 + X_1 PLR + X_2 MPR + X_3 SR + X_4 MLR + X_5 LSR + et_2 \quad (3.9)$$

Where:

MKTC/M2	=	Percentage of Market Capitalization to Broad Money Supply
SMLIQ	=	Stock Market Liquidity Measured as Total Transaction to market Capitalization
PLR	=	Prime Lending Rate
MPR	=	Monetary Policy Rate
SR	=	Savings Rate
MLR	=	Maximum Lending Rate
LSR	=	Long-term Savings Rate Defined as Savings Rate of Deposit above 1 year
et_1-et_2	=	Error Term
β_0	=	Regression Intercept
X_0	=	Regression Intercept
β_1 - β_5	=	Coefficient of the independent variables to the dependent variable
X_1 - X_5	=	Coefficient of the independent variables to the dependent variable

Therefore, a priori expectation $(b_1>b_2>b_3>b_4>b_5>0)$ and $(X_1>X_2>X_3>X_4>X_5>0)$

Model II: **Credit Channel**

$$MKTC/M2 = f(NDC + CPS/GDP + LTC/TC + STC/TC + MTC/TC + \%\Delta CTRS) \quad (3.10)$$

$$SMLIQ = f(NDC + CPS/GDP + LTC/TC + STC/TC + MTC/TC + \%\Delta CTRS) \quad (3.11)$$

Transferring equ (3.10) and (3.11) into a testable form, we obtain the following regression equation;

$$MKTC/M2 = S_0 + S_1NDC + S_2CPS/GDP + S_3LTC/TC + S_4STC/TC + S_5MTC/TC + S_6\%\Delta CTRS + et_3 \quad (3.12)$$

$$SMLIQ = a0 + a_1NDC + a_2CPS/GDP + a_3LTC/TC + a_4STC/TC + a_5MTC/TC + a_6\%\Delta CTRS + et_4 \quad (3.13)$$

Where:

MKTC/M2	=	Percentage of Market Capitalization to Broad Money Supply
SMLIQ	=	Stock Market Liquidity Measured as Total Transaction to market Capitalization
NDC	=	Net Domestic Credit
CPS/GDP	=	Credit to Private Sector to Gross Domestic Product
%ΔLTC	=	Percentage Change in Long Term Credit
%ΔSTC	=	Percentage Change in Short Term Credit
%ΔMTC	=	Percentage Change in Medium Term Credit
%ΔCTRS	=	Percentage Change in Credit to the Real Sector of the Economy
et_1-et_2	=	Error Term
S_0	=	Regression Intercept
a_0	=	Regression Intercept
$S_1 – S_6$	=	Coefficient of the independent variables to the dependent variable
$a_1 – a_6$	=	Coefficient of the independent variables to the dependent variable

Therefore, a priori expectation ($S_1>S_2>S_3>S_4>S_5>S_6>0$) and ($a_1>a_2>a_3>a_4>a_5>a_6>0$)

Model III: Exchange Rate Channel

MKTC/M2 = f (EXR/US+ EXBP + EXR/JY + EXR/SF) (3.14)

SMLIQ = f (EXR/US+ EXBP + EXR/JY + EXR/SF) (3.15)

Transferring equ (3.14) and (3.15) into a testable form, we obtain the following regression equation;

MKTC/M2 = $T_0 + T_1EXR/US + T_2EXBP + T_3EXR/JY + T_4EXR/CY + et_5$ (3.16)

SMLIQ = $P_0 + P_1EXR/US + P_2EXBP + P_3EXR/JY + P_4EXR/CY + et_6$ (3.17)

Where:

MKTC/M2 = Percentage of Market Capitalization to Broad Money Supply

SMLIQ = Stock Market Liquidity Measured as Total Transaction to market Capitalization

EXR/US = Nigerian Naira Exchange Rate per US Dollar

EXBP = Nigerian Naira Exchange Rate per British Pounds Sterling

EXR/JY = Nigerian Naira Exchange Rate per Japanese Yen

EXR/CY = Nigerian Naira Exchange Rate per Chinese Yuan

et_5 - et_6 = Error Term

T_0 = Regression Intercept

P_0 = Regression Intercept

$T_1 – T_4$ = Coefficient of the independent variables to the dependent variable

$P_1 – P_4$ = Coefficient of the independent variables to the dependent variable

Therefore, a priori expectation ($T_1>T_2>T_3>T_4>0$) and ($P_1>P_2>P_3>P_4>0$)

Model IV: **Asset Price Channel**

MKTC/M2 = f (TBR+ ASPCB/MKTC + ASPFI/MKTC + SPCMS/MKTC + ASPS/MKTC) (3.18)

SMLIQ= f (TBR+ ASPCB/MKTC + ASPFI/MKTC + SPCMS/MKTC + ASPS/MKTC) (3.19)

Transferring equ (3.18) and (3.19) into a testable form, we obtain the following regression equation;

$$MKTC/M2 = Y_0+Y_1TBR+ Y_2ASPCB/MKTC + Y_3ASPFI/MKTC + Y_4SPCMS/MKTC + Y_5ASPS/MKTC + et_7 \quad (3.20)$$

$$SMLIQ = Z_0 + Z_1TBR+ Z_2ASPCB/MKTC + Z_3ASPFI/MKTC + Z_4SPCMS/MKTC + Z_5ASPS/MKTC + et_8 \quad (3.21)$$

Where:

MKTC/M2	=	Percentage of Market Capitalization to Broad Money Supply
SMLIQ	=	Stock Market Liquidity Measured as Total Transaction to market
TBR	=	Treasury Bill Rate
ASPCB	=	Aggregate Stock Prices of Commercial Banks
ASPFIs	=	Aggregate Stock Prices of Non Bank Financial Institutions
SPCMS	=	Stock Prices of Manufacturing Sector
ASPS	=	Aggregate Stock Price of Service Sector
et_7 –et_8	=	Error Term
Y_0	=	Regression Intercept
Z_0	=	Regression Intercept
Y_1 - Y_5	=	Coefficient of the independent variables to the dependent variable
Z_1 - Z_5	=	Coefficient of the independent variables to the dependent variable

Therefore, a priori expectation ($Y_1>Y_2>Y_3>Y_4>Y_5 >0$) and ($Z_1>Z_2>Z_3>Z_4>Z_5 >0$)

DESCRIPTION OF VARIABLES OF THE STUDY

Studying the effects of monetary policy transmission mechanisms to ascertain the relationship between the different variables discussed earlier becomes easy with the various theories, indices, and the hypotheses intended to be tested in the study. The variables include dependent and independent variables.

Dependent Variables

(i) Market Capitalization

Capital Market capitalization refers to the total naira market value of a company's outstanding shares. Commonly referred to as "market cap," it is calculated by multiplying a company's shares outstanding by the current market price of one share. The investment community uses this figure to determine a company's size, as opposed to using sales or total asset figures (Osinubi, 2004). In this study, capital market capitalization is measured in relationship to Broad Money Supply which signifies percentage of Broad Money Supply that is invested in the Nigeria capital market.

(ii) Capital Market Liquidity

Liquidity is used to refer to the ability of investor to buy and sell securities easily. It is an important indicator of stock market development because it signifies how the market helps in improving the allocation of capital and thus enhancing the prospects of long-term economic growth. This is possibly reducing the risk of their investment and facilitating investments in projects that are more profitable though with a long gestation period. Two main indices are often used in the performance and rating of the market: total value traded ratio; and turnover ratio. Total value traded ratio measures trading of equities as a share of national output, turnover ratio is used as an index of comparison for market liquidity rating and level of transaction costs. This ratio equals the total value of shares traded on the stock market divided by market capitalization (Osinubi, 2004).

Variables of Interest Rate Channel

(i) Prime Lending Rate

The prime lending rate is the interest rate that commercial banks charge their most credit-worthy customers. Generally, a bank's best customers consist of large corporations. The prime interest rate, or prime lending rate, is largely determined by the Central Bank rate, which is the overnight rate that banks use to lend to one another; the prime rate is also important for individual borrowers, as the prime rate directly affects the lending rates available for a mortgage, small business loan or personal loan. The prime rate serves as a basis, or point of reference, for determining most other interest rates lenders make available to borrowers, even though it might not be specifically listed as a component of the rate ultimately charged. Interest rates serve as compensation for the risk taken on by the lender based on the borrower's credit history and other financial details, and provide a way to cover costs associated with lending.

(ii) Maximum Lending Rate

This is defined as the highest lending rate which the commercial banks can lend money to the various sectors of the economy. It is strictly determined by the money supply and the market forces of demand and supply. Maximum lending rate is sometime influenced by the monetary policy authority to channel bank credit to some specific sectors of the economy (CBN, 2015).

(iii) Monetary Policy Rate

The monetary policy rate is the rate at which the Central Bank of Nigeria (CBN) lends money to banks gripped by temporary liquidity squeeze and it usually goes a long way to determine the rate banks will apply when lending funds to businesses in the country. A

lower monetary policy rate can have a salutary effect on general lending rates depending on the degree of dependence of banks on Central (CBN, 2015)

(iv) Short Term Savings Rate

The structure of bank deposit as classified by Ezirim and Emeyonu (1998) are that some deposit are short term between the period of one day to three hundred and sixty five days. Short term savings rate is defined as interest rate of deposit with maturity of not more than one year as it is reported in Central Bank of Nigeria Statistical Bulletin.

(v) Long term savings rate

Long term savings rate is defined as savings rate of deposit with maturity above one year as it is reported in Central Bank of Nigeria Statistical Bulletin.

(i) Net domestic Credit

This is defined as credit of both commercial and non commercial lending institutions in the economy. This broad definition of credit is necessary since the Radcliffe Committee meeting discovered that the activities of the non-bank financial institution have significant relationship with the liquidity of the financial market (CBN, 2015)

(ii) Long term credit

This is classified by Ezirim and Emeyonu (1998) as credit whose maturity term is above three years. It is important to note that long-term credit is prone to credit risk; however the rate of return as illustrated by the yield curve is higher and therefore expected to add positively to bank profitability performance (Ezirim & Emenyonu, 1998).

(iii) Medium term credit

Medium term credit is a facility which maturity structure of two to five years. In Nigeria, medium term facilities are used to finance projects and mainly influence by monetary policy with interest margin very low and posses greater risk (Ezirim & Emenyonu, 1998).

(iv) Short term credit

A credit is known to be short-term if the maturity structure of the facility is within one year repayment. The conventional bank lending concepts placed higher interest rate on short-term credit facility thereby affecting profitability of the banking institution (Ezirim & Emenyonu, 1998).

(v) Credit to real sector

The key sectors that make up the real sector are the primary sector (Agriculture & Mining), the secondary sector (manufacturing and building & construction) and the tertiary sector (services and commerce). Therefore, credit to the real sector comprises bank credit to the listed sectors above.

(vi) Credit to private sector

Domestic credit to private sector by banks refers to financial resources provided to the private sector by other depository corporations (deposit taking corporations except central banks), such as through loans, purchases of non equity securities, and trade credits and other accounts receivable, that establish a claim for repayment.

Variables of Exchange Channel

(i) Exchange Rate against the US Dollar: This measure the appreciation or depreciation of Nigeria naira against the dollar as independent variable.

(ii) Exchange Rate against the British Pound Sterling: This measure the appreciation or depreciation of Nigeria naira against the pound sterling as independent variable.

(iii) Exchange Rate against the Japanese Yen: This measure the appreciation or depreciation of Nigeria naira against the Japanese Yuan as independent variable.

(iv) Exchange Rate against Chinese Yuan: This measure the appreciation or depreciation of Nigeria naira against the Chinese yuan as independent variable.

Variables of Asset Price Channel

(i) Treasury Bill Rate

The Treasury bill is a money market and monetary policy instruments that is used to influence the quantity of money supply that affect the rate of interest rate, domestic credit and investment. The rate measures the Central Bank of Nigeria discounting rate for Treasury bill holders. The theoretical relationship is built on the Keynesian's speculative theory of holding money.

(ii) Aggregate Stock Prices of Commercial Banks

There are fifteen quoted commercial banks listed in the floor of Nigerian stock exchange, each bank has its stock price that is influenced by monetary policy, macroeconomic policy and dividend policy. The aggregate stock price of commercial banks measures the cumulative stock prices of the fifteen quoted banks to the stock market aggregate stock price. Increase in the aggregate stock prices of commercial banks is expected to enhance the performance of the capital market as banking sector equities remain the most traded equities in the Nigeria stock exchange (Lucky, Akani & Anyamaobi, 2015).

(iii) Aggregate Stock Prices of Non Bank Financial Institutions

Apart from the banking sector, there are other financial intuitions such as the insurance firms that are active players in the Nigerian capital market. Reforms in the financial such as the insurance recapitalization were motivated for the institutions to play an active role of fund mobilization in the capital market. Aggregate stock prices of the non financial

institutions is therefore defined as all non bank financial institution that are listed on the floor of Nigeria stock exchange to the aggregate stock price of the stock market.

(iv) Stock Prices of Manufacturing Sector

The manufacturing sector is the preferred sector of the economy and attracts monetary policy attention such as direct credit to the sector and reduces interest rate. The effect of the manufacturing sector to the capital market is expected to add positively and significantly. The aggregate stock price of the sector is defined as the stock prices of all the listed firms in the sector to aggregate stock prices of the market.

(v) Aggregate Stock Price of Service Sector

Aggregate stock price of the service sector is defined to be the cumulative stock prices of all the service firms that are listed on the floor of Nigeria stock exchange to aggregate stock prices of the market. Based on theory, such as the liquidity preference theory as formulated by Keynes, increase in the stock prices of the firms as a result of variation in the monetary policy transmission mechanism is expected to enhance the stock market fundamentals.

3.4 Techniques of Data Analysis

3.4.1 Data Analysis Procedure

The main tool of analysis is the Ordinary Least Squares (OLS) using the multiple regression method for a period of 36 years, annual data covering 1981– 2015. Statistical evaluation of the global utility of the analytical model, so as to determine the reliability of the results obtained were carried out using the coefficient of correlation (r) of the regression, the coefficient of determination (r^2), the student T-test and F-test.

(i) **Coefficient of Determination (r^2) Test:** This measure the explanatory power of the independent variables on the dependent variables.R^2 gives the proportion or

percentage of the total variation in the dependent variable Y that is accounted for by the single explanatory variable X. The higher the R^2 value the better. For example, to determine the proportion of financial market penetration through capital fundamental in our model, we used the coefficient of determination. The coefficient of determination varies between 0.0 and 1.0. A coefficient of determination say 0.20 means that 20% of changes in the dependent variable is explained by the independent variable(s).Therefore, we shall use the R^2 to determine the extent to which variation in capital market fundamentals variables are explained by variations in monetary policy transmission mechanism using various transmission channels.

(ii) **Correlation Co-Efficient (R):** This measures the degree of the relationship between two variables x and y in a regression equation. That is, it tries to establish the nature and magnitude of the relationship when two variables are been analyzed. Thus correlation co-efficient show whether two variables are positively or negatively correlated. That is, it takes the value ranging from – 1, to + 1.

(iii) **F-Test:** This measures the overall significance. The extent to which the statistic of the coefficient of determination is statistically significant is measured by the F-test. The F-test can be done using the F-statistic or by the probability estimate. We use the F-statistic estimate for this analysis.

(iv) **Student T-test:** measures the individual statistical significance of the estimated independent variables. This is a test of significance used to test the significance of regression coefficients (Gujurati, 2003).Generally speaking, the test of significance approach is one of the methods used to test statistical hypothesis. A test of significance is a procedure by sample results are used to verify the truth or falsity of a null hypothesis (Ho) at 5% level of significance.

(v) **Durbin Watson Statistics:** This measures the colinearity and autocorrelation between the variables in the time series. It is expected that a ratio of close to 2.00 is not auto correlated while ratio above 2.00 assumed the presence of autocorrelation.

(vi) **Regression coefficient:** This measures the extent in which the independent variables affect the dependent variables in the study.

(vii) **Probability ratio:** It measures also the extent in which the independent variables can explain change to the dependent variables given a percentage level of significant.

3.4.2 Stationarity (Unit Root) Tests

The study investigates the stationarity properties of the time series data using the Augmented Dickey Fuller (ADF) test. According to Nelson and Plosser (1982), Chowdhury (1994) there exist a unit root in most macroeconomic time series. While dealing with time series, it is necessary to analyze whether the series are stationary or not. Since regression of non stationary series on other non-stationary series leads to what is known as spurious or nonsense regression causing inconsistency of parameter estimate. The Null hypothesis of a unit root is rejected against the one sided alternative if the t-statistic is less than the critical value. Otherwise, the test fails to reject the null hypothesis as a unit root at 5% significance level. However, the statistical analysis of time series data differs in some respect from that of cross-sectional data, especially due to the effect of time and other variables on the data. Specifically in analyzing time series data, it is assumed that the time series is stationary (Gujarati, 2003). Test for stationarity would therefore have to be carried out on our data first to determine whether or not these time series data are stationary. To go ahead with multiple regression when the data are not stationary can result in the problem of spurious or nonsense regression. If a time series is

stationary, it means that its variable and auto-covariance (at various lags/gaps/distances) remain the same (i.e constant over time) no matter at what point we measure them (i.e they: are time invariant). Non stationary time series will have a time varying mean or a time- varying variance or both. If a time series is non stationary, we can study its behaviour only for the time period under consideration, and cannot generalize it to other time periods, and hence remain of little practical value if we intend to forecast (Gujarati, 2003). It should be noted that a time series is a set of observations on the values that a variable takes at different times (daily weekly, monthly quarterly, annually etc). Stationary test therefore checks for the stationarity of the variables used in the models. If stationary at level, then it is integrated of order zero. i.e. 1(0). Thus, test for stationarity is also called test for integration. It is also called unit root test. Stationarity denotes the non existence of unit root. We shall therefore subject all the variables to unit root test using the augmented Dickey Fuller (ADF) test specified in Gujarati (2004) as follows.

$$\Delta y_t = \beta_1 + \beta_2 + \delta y_{t-1} + \alpha i \sum_{i-1}^{m} \Delta y_{t-1} + Et \qquad (3.22)$$

Where:

Δy_t = change time t

Δy_{t-1} = the lagged value of the dependent variables

Σ_t = White noise error term

If in the above δ =0, then we conclude that there is a unit root. Otherwise there is no unit root, meaning that it is stationary. The choice of lag will be determined by Akaike information criteria.

Decision Rule

t-ADF (absolute value) > t-ADF (critical value) : Reject H_o (otherwise accept H_1)

Note that each variable will have its own ADF test value. If the variables are stationary at level, then they are integrated of order zero i.e 1(0). Note that the appropriate degree of freedom is used. If the variables are stationary at level, it means that even in the short run they move together. The unit root problem earlier mentioned can be explained using the model:

$$Y= Y_{t-1} + \mu_I \quad (3.23)$$

Where; Yt is the variable in question; μ_i is stochastic error term. Equation (a) is termed first order regression because we regress the value Y at time "t" on its value at time (t- 1). If the coefficient of Y_{t-i} is equal to 1, then we have a unit root problem (non stationary situation). This means that if the regression.

$$Y= Y_{t-1} + \mu_I \quad (3.24)$$

Where Y and I are found to be equal to 1 then the variable Yt has a unit root (random work in time series econometrics).

If a time series has a unit root, the first difference of such time series are usually stationary. Therefore to salve the problem, take the first difference of the time series. The first difference operation is shown in the following model:

$$\Delta Y= (L-1)\ Y_{t-1} + \mu_I \quad (3.25)$$

$$\delta Y_{t-1} + \mu_I \quad (3.26)$$

(Note: δ =1-1= 0; where L =1; $\Delta Yt = Yt - Y_{t-i}$) (3.27)

Integrated Of Order 1 Or I (I)

Given that the original (random walk) series is differenced once and the differenced series becomes stationary, then the original series is said to be integrated of order I or I (1).

Integrated of Order 2 Or I (2)

Given that the original series is differenced twice before it becomes stationary (the first difference of the first difference), then the original series is integrated of order 2 or 1(2).

Therefore, given a time series has to be differenced Q times before becoming stationary it said to be integrated of order Q or I (q). Hence, non stationary time series are those that are integrated of order 1 or greater.

The null hypothesis for the unit root is: Ho: a = 1;

The alternative hypothesis is Hi: a < 1.

We shall test the stationarity of our data using the ADF test.

3.4.3 Co-integration Test (The Johansen' Test)

It has already been warned that the regression of a non stationary time series on another non stationary time series may lead to a spurious regression. The important contribution of the concept of unit root and co-integration is to find out if the regression residual are stationary. Thus, a test for co-integration enables us to avoid spurious regression situation. This study employed Johansen Multivariate Co-integration Test to ascertain if there is the existence of a long run equilibrium relationship among time series variables. Johansen (1988, 1991) pointed out that a linear combination of two or more non stationary time series may be stationary, if such a stationary linear combination of two or

more non-stationary time series exists, the non-stationary time series are said to be co-integrated and may be interpreted as long-run relationship among the variables. The lag length is one and is based on the Akaike (1969) information criterion (AIC). The lag is taken into account at Mckinnon critical values at 5% level. If the residuals from the regression are 1(1) or 2(2), i.e. stationary, then variables are said to be co-integrated and hence interrelated with each other in the long run. This approach is based on conducting unit root test on residual obtained from the estimated regression equation. If the residual is found to be stationary at level, we conclude that the variables are co-integrated and as such as long-run relationship exists among them.

$$TA_t = w_O + \sum_{i=1}^{i} \vartheta_t TA_{t-i} + \sum_{i=1}^{j} \varpi_i TA_{jt-i} + \mu_{1t} \quad (3.28)$$

3.4.4 Granger Causality Test

One of the objectives of this study is to investigate the causality between the independent and the dependent variables. Granger causality test according Granger (1969) is used to examine direction of causality between two variables. Causality means the impact of one variable on another, in other-words; causality is when an independent variable causes changes in a dependent variable. The rationale for conducting this test is that it enables the researcher to know whether the independent variables can actually cause the variations in the dependent variable. Thus, Granger causality test helps in adequate specification of model. In Granger causality test, the null hypothesis is: no causality between two variables. The null hypotheses is rejected if the probability of F* statistic given in the Granger causality result is less than 0.05. Therefore, in this study, we will carry out a granger causality between an independent variables monetary policy transmission mechanism and the dependent variable Capital Market fundamentals in Nigeria from 1981 – 2015.

The pair-wise granger causality test is mathematically expressed as:

$$Y_t \pi_o + \sum_{i=1}^{n} x_1^{\ y}\ Y_{t-1} \sum_{i=1}^{n} \pi_1^{\ x}\ x_{t-1} + u_1 \qquad (3.29)$$

and

$$x_t dp_o + \sum_{i=1}^{n} dp_1^{y}\, Yt-1 \sum_{i=1}^{n} dp1^{x}\, x_{y-1} + V_1 \qquad (3.30)$$

Where x_t and y_t are the variables to be tested white u_t and v_t are the white noise disturbance terms. The null hypothesis $\pi_1^y = dp_1^y = 0$, for all I's is tested against the alternative hypothesis $\pi_1^x \neq 0$ and $dp_1^y \neq 0$. if the co-efficient of π_1^x are statistically significant but that of $dp1y$ are not, then x causes y. If the reverse is true then y causes x. however, where both co-efficient of π_1^x and dp_1^y are significant then causality is bi – directional.

3.4.5 Vector Error Correction (VEC) Technique

The presence of co-integrating relationship forms the basis of the use of Vector Error Correction Model. E-views econometric software used for data analysis, implement vector Auto-regression (VAR)- based co-integration tests using the methodology developed by Johansen (1991,1995). The non-standard critical values are taken from Osterward Lenun (1992).

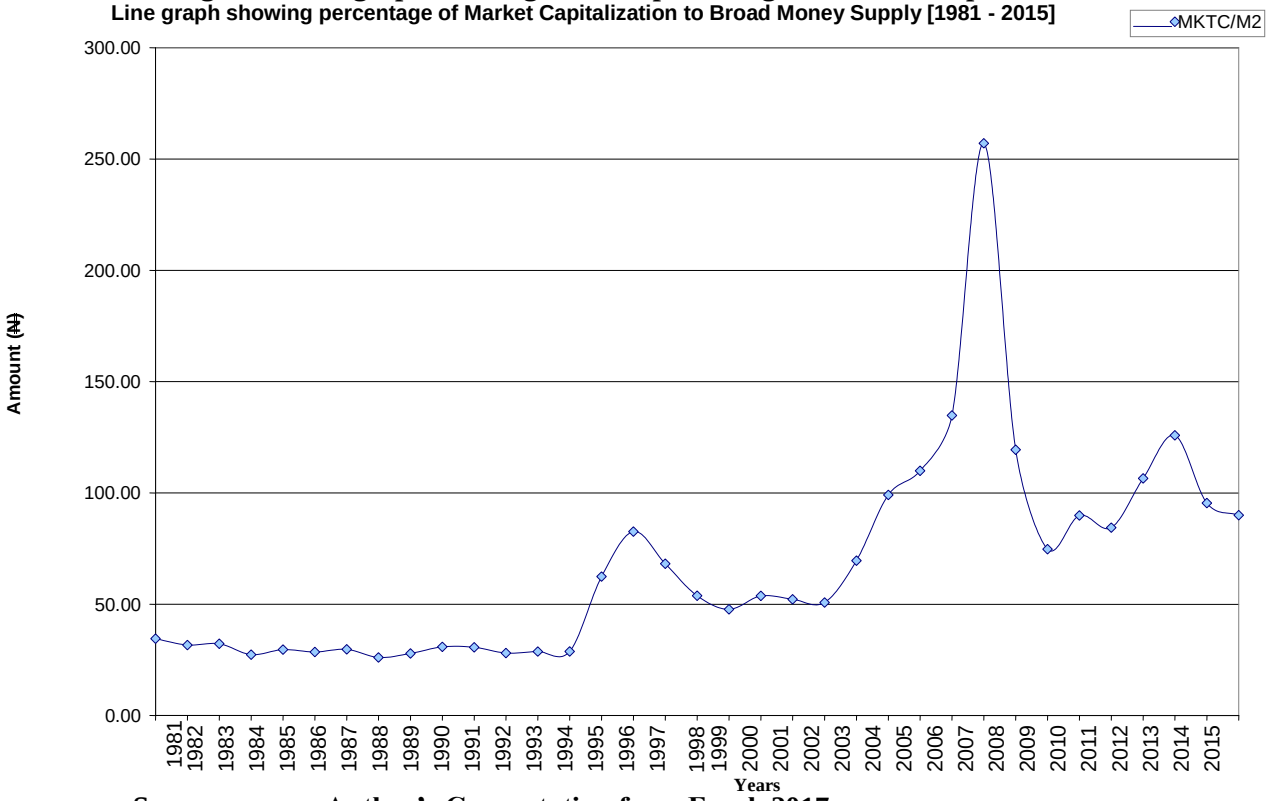
CHAPTER FOUR
DATA PRESENTATION AND ANALYSES

The estimates and results of the models and techniques as formulated in the chapter three of this work are presented in this chapter. The short run regression results of each of the monetary policy transmission channels, the unit roots test, the test of co-integration and normalized co-integration were present. The granger causality test was used to examine the causal relationship running from the independent variable to dependent variable and from dependent to independent variables. Vector Error correction estimated the long-run relationship between the variables of monetary policy transmission mechanisms. The Ordinary Least Square (OLS) estimates for the models and the discussion of hypotheses and findings were also presented.

4.1 Descriptive Analyses of the Variables

In this section, the descriptive analyses of the data in respect of Capital Market Capitalization was proxied by percentage of Capital Market Capitalization to Broad Money Supply (MKCT/M2), Stock Market Liquidity (SMLIQ), Prime Lending Rate (PLR), Savings Rate (SR), Maximum Lending Rate (MLR), Long Term Savings Rate (LSR), Credit to Real Sector to Total Credit (CDTC), Exchange Rate per US Dollar and Treasury Bill Rate (TBR) for the period understudy (1981 – 2015) using ling graphs.

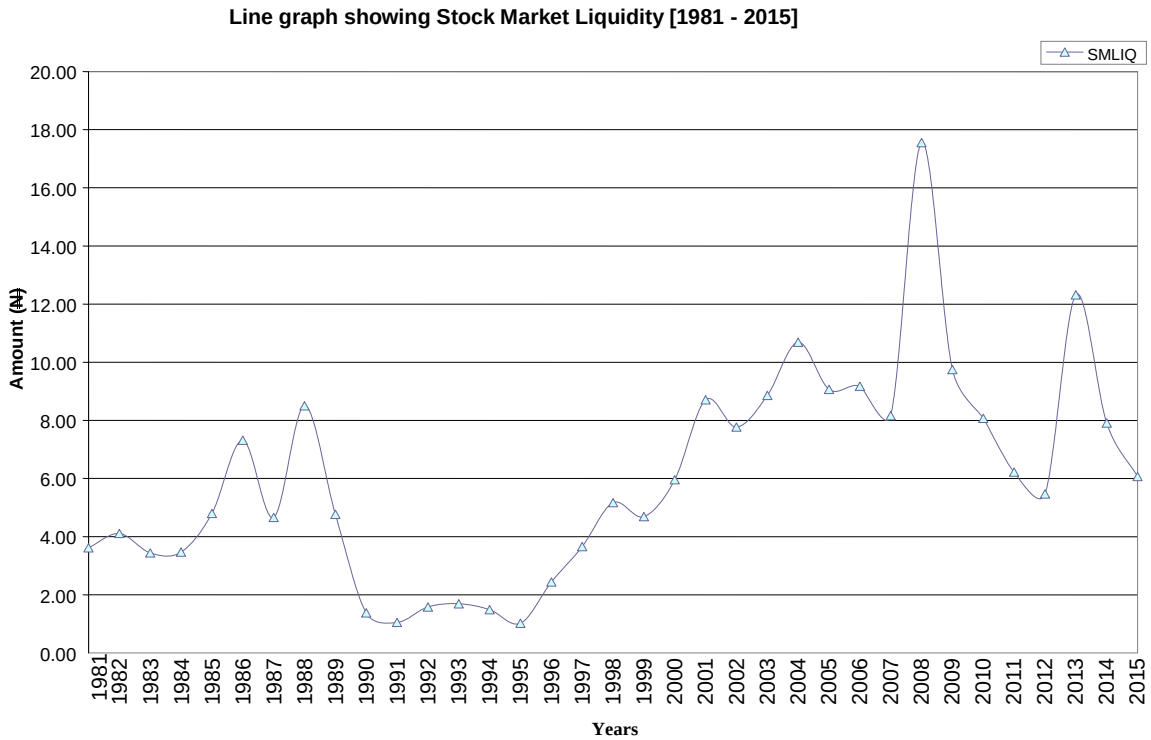
Fig. 4.1 Line graph showing trend of percentage of Market Capitalization



Source: Author's Computation from Excel, 2017

The figure 4.1 shows the fluctuations of Nigerian capital market capitalization. The trend portrays that Nigeria capital market capitalization was below 50% from 1981 – 1994 and increase slightly above that rate. Within the period covered in this study, the trend shows that Nigerian market capitalization to broad money supply was highest in 2007 which could be traced to the multiplier effects of Nigeria banking sector consolidation and other financial market reforms but fluctuates below 100% and slightly above 100 in 2009, which could be attributed to the multiplier effects of the global financial crises that led to the Nigeria capital market crash as a result of margin loans from the banking industry.

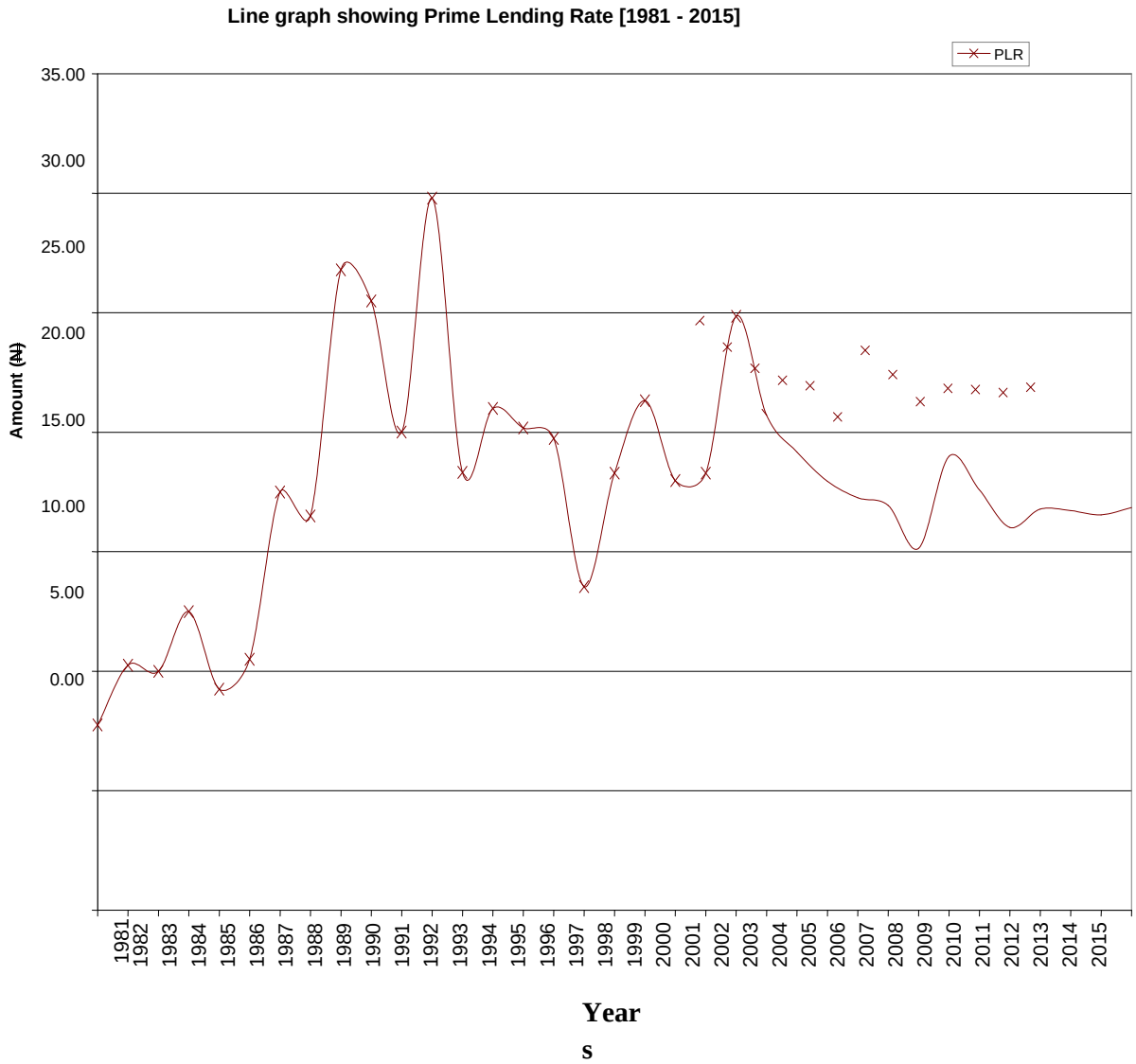
Fig. 4.2 Line graph showing trend of Stock Market Liquidity [1981 - 2015]



Source: Author's Computation from Excel, 2017

Figure 4.2 illustrates Nigeria stock market liquidity measured as total volume of transaction to market capitalization. It shows that the dependent variable fluctuates from 1981 to 2007 below 10% but fluctuate to the highest in 2009. This also can be traced to the monetary and macroeconomic policies aim to enhance the operational efficiency of the financial market institution such as the banking sector consolidation, the insurance sector recapitalization and monetary policy reforms.

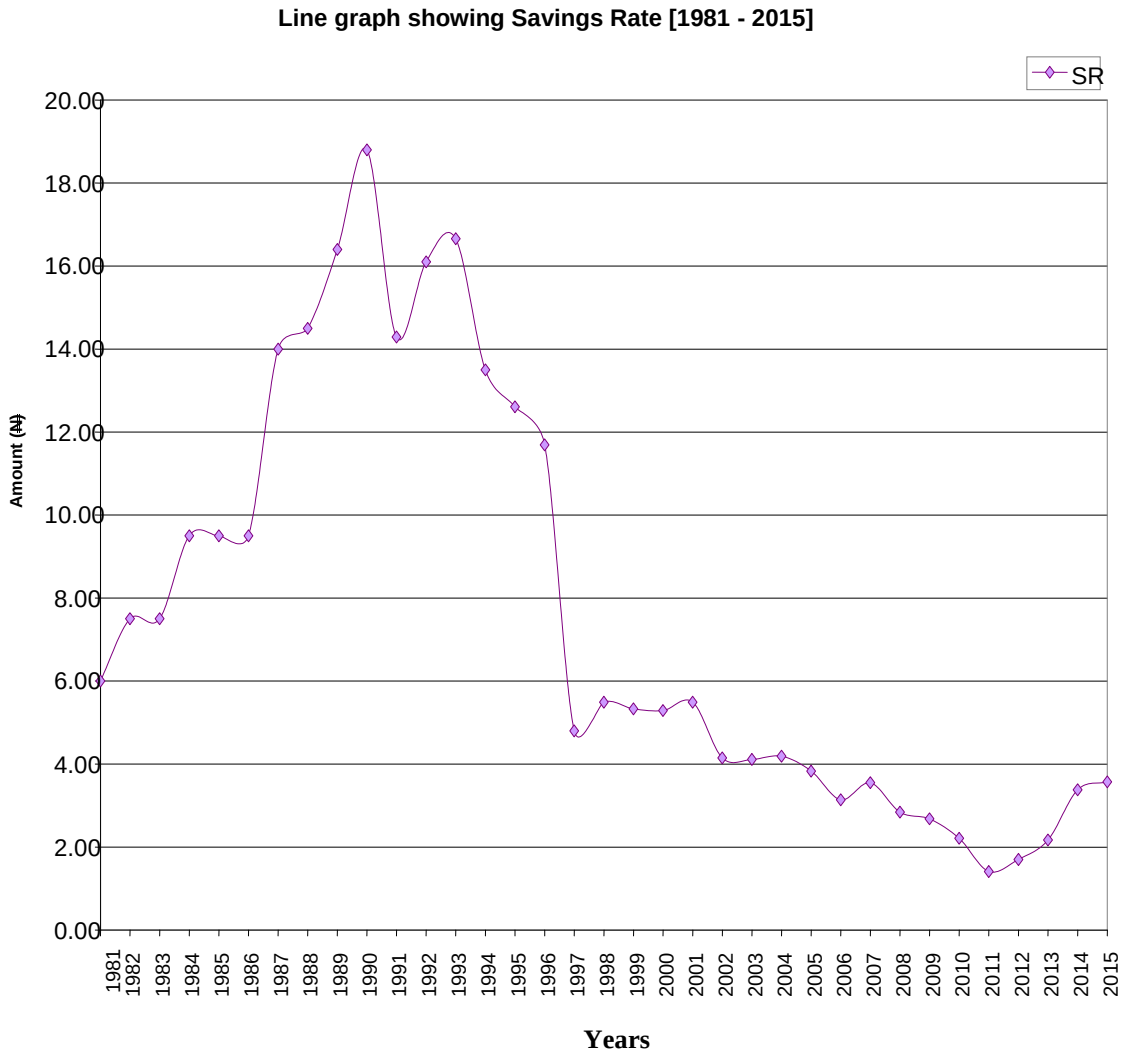
Fig. 4.3 Line graph showing trend of Prime Lending Rate [1981 - 2015]



Source: Author's Computation from Excel, 2017

Figure 4.3 shows movement in prime lending rate within the period covered in this study. The trend shows that prime lending rate fluctuates very high in 1992 to 1993 this could be traced to monetary policy regulations aim to achieve growth in investment and coupled with the bad goverenace as military dictatorship was evidence over the period, for instance, the deregulation of interest rate in the last quarter of 1986.

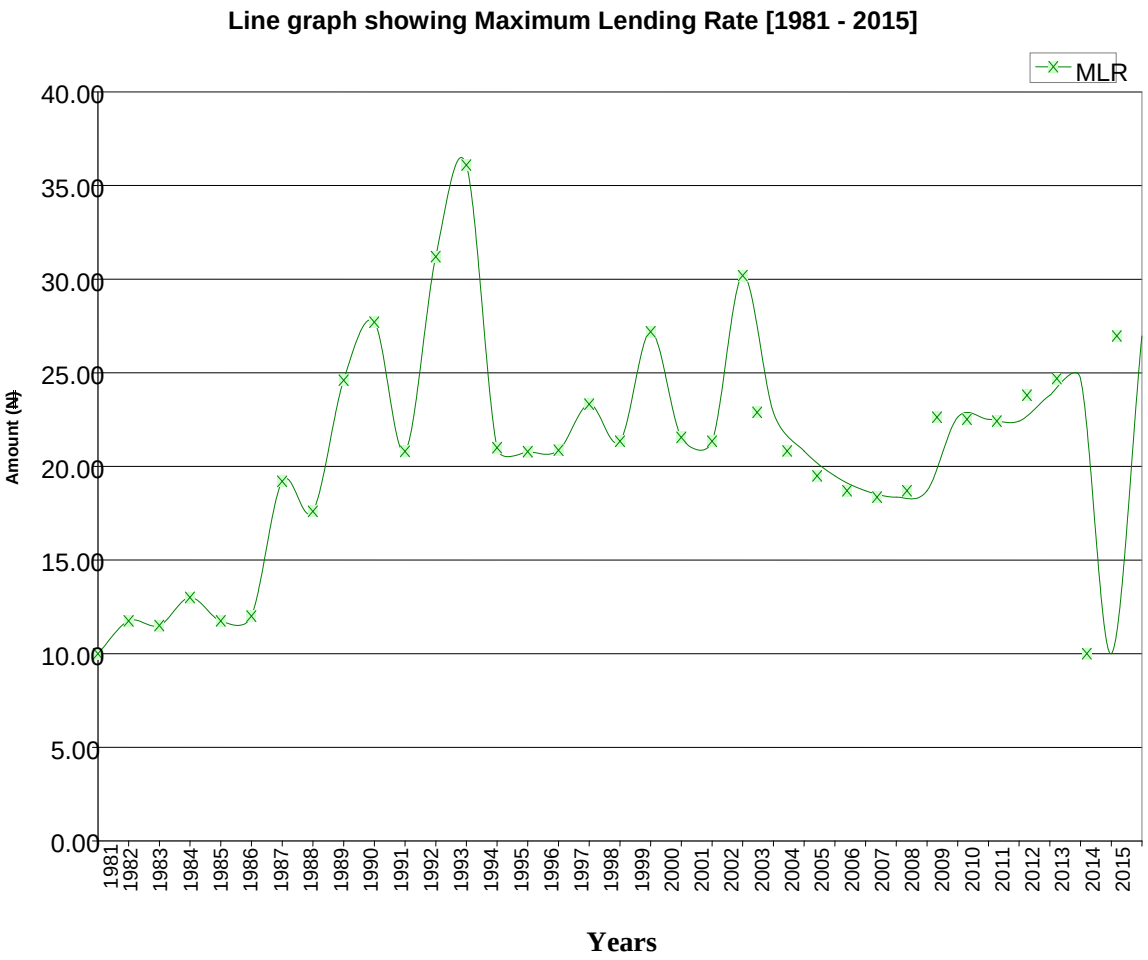
Fig. 4.4 Line graph showing trend of Savings Rate [1981 - 2015]



Source: Author's Computation from Excel, 2017

Figure 4.4 shows movement in short term savings rate within the period covered in this study. The trend shows that saving rate fluctuates very high in 1990, this could be traced to monetary policy regulations aim to achieve growth in investment over the period, for instance, the deregulation of interest rate in the last quarter of 1986.

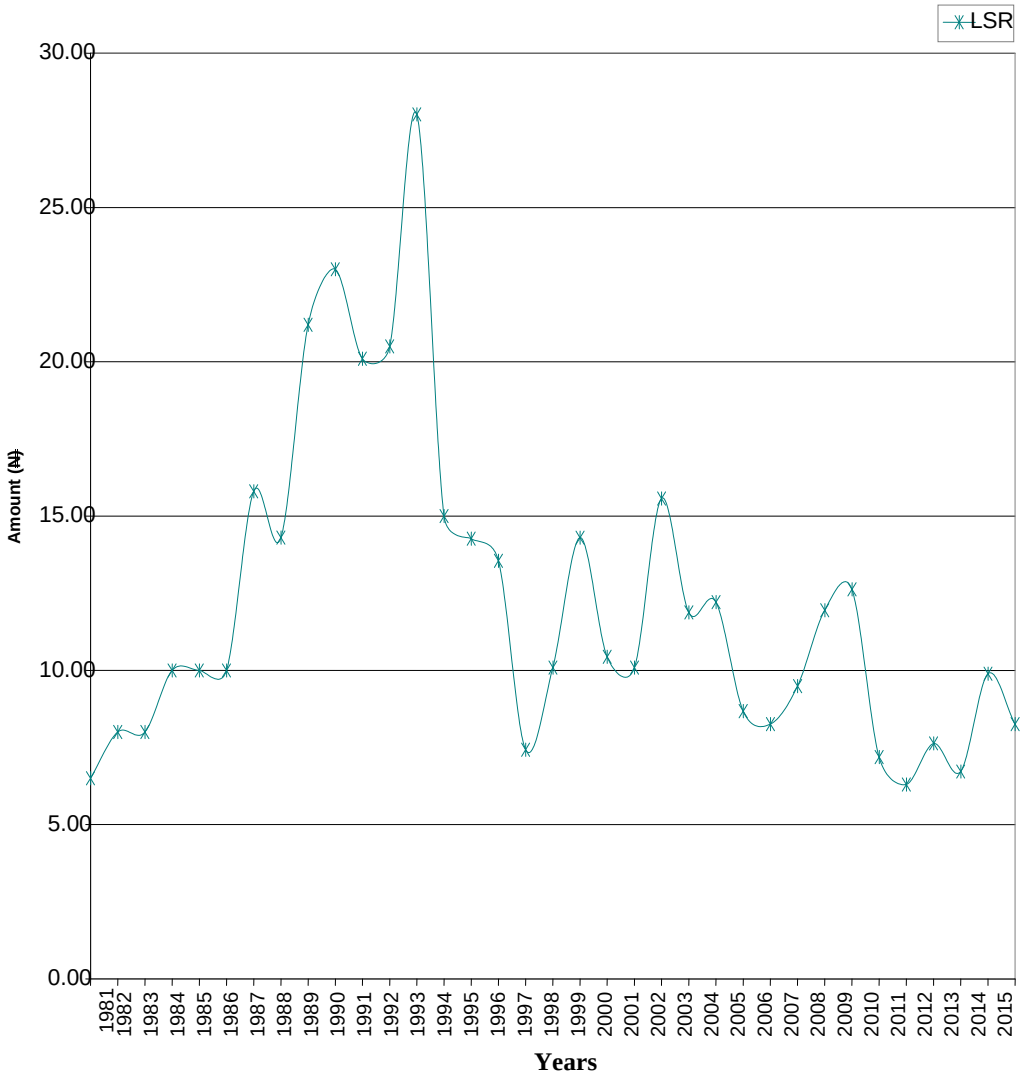
Fig. 4.5 Line graph showing trend of Maximum Lending Rate [1981 - 2015]



Source: Author's Computation from Excel, 2017

Figure 4.5 shows movement in maximum lending rate within the period covered in this study. The graph also depict an irregular pattern, rising to a peak in 1993 and falling sharply in 1994, 1995, 1996 and afterwards. The trend shows that prime lending rate fluctuates very high, this could be traced to monetary policy regulations aim to achieve growth in investment over the period, for instance, the deregulation of interest rate in the last quarter of 1986.

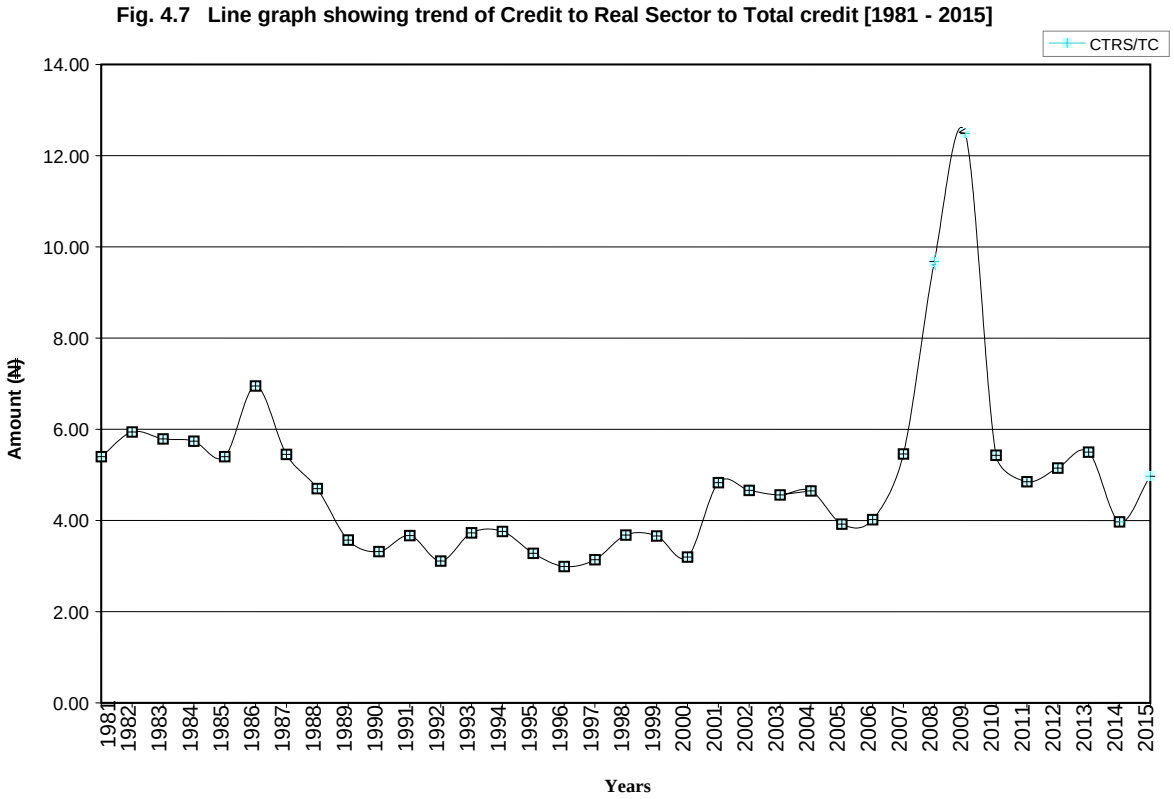
Fig. 4.6 Line graph showing trend of Long Term Savings Rate [1981 - 2015]



Source: Author's Computation from Excel, 2017

Figure 4.6 shows movement in long term savings rate within the period covered in this study. The trend shows that long term savings rate fluctuates very high in 1992, this could be attributed to monetary policy regulations aimed to achieve growth in investment over the period, for instance, the deregulation of interest rate in the last quarter of 1986.

Fig. 4.7 Line graph showing trend of Credit to Real Sector to Total credit [1981 – 2015]

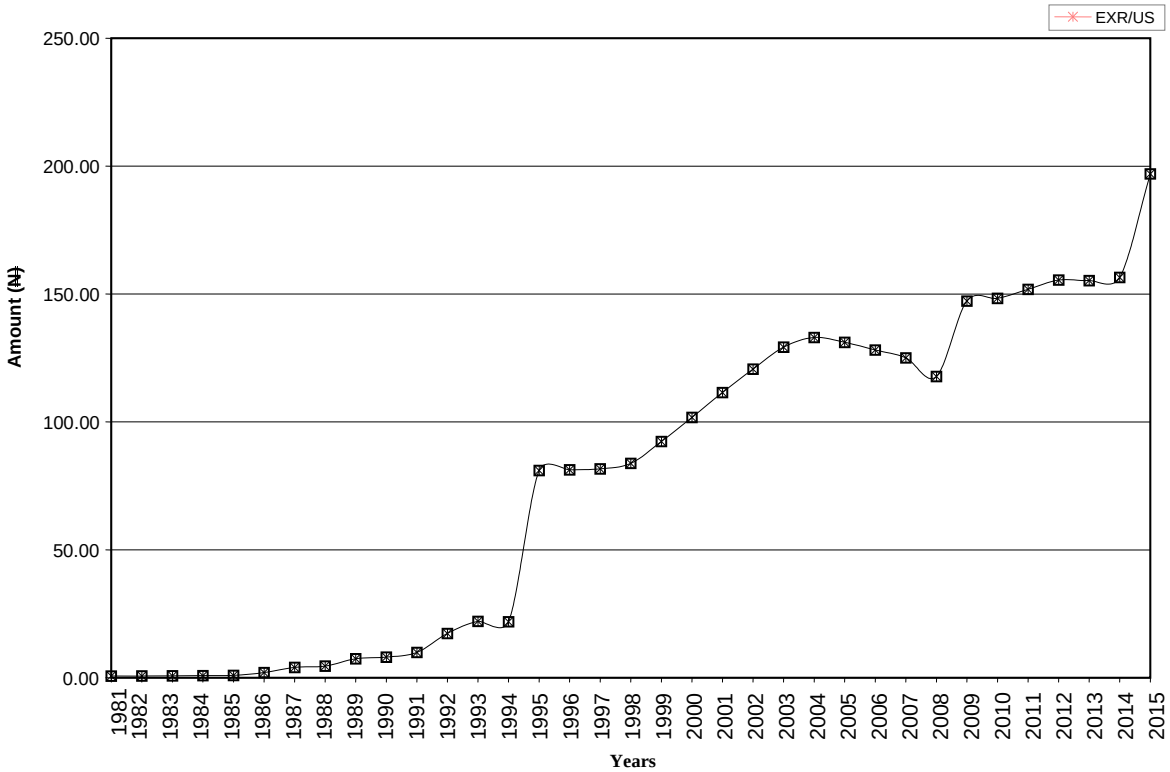


Source: Author's Computation from Excel, 2017

The line graph in fig.4.7 shows fluctations that occurs in credit to real sector which attributed to the monetary policy attention that illustrates the movement in credit to real sector of the economy over the period covered in this study. The trend shows that the variable fluctuates below 6% from 1983 – 2003 but fluctuate high in 2008 and of course that again could be traced to banks consolidation and recapitalization excerise that injection more funds to financial system.

Fig. 4.8 Line graph showing trend of Exchange Rate per US Dollar [1981 - 2015]

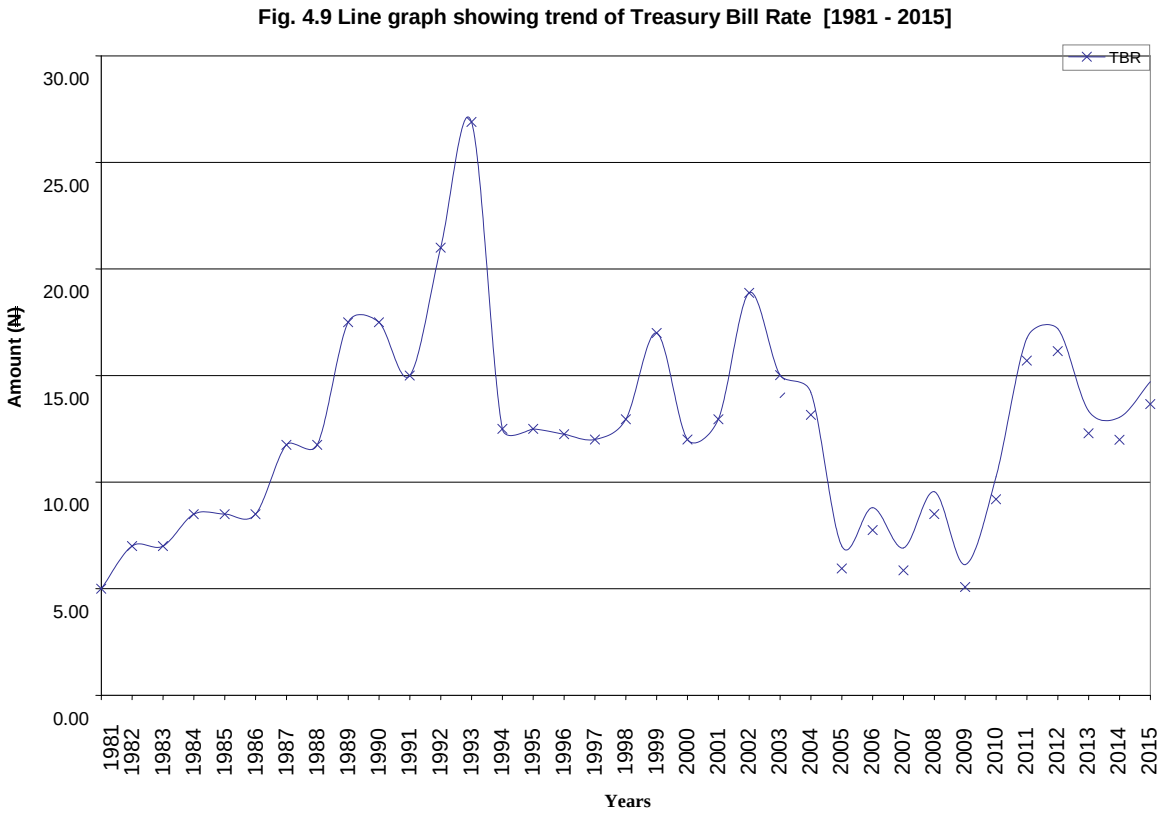
Fig. 4.8 Line graph showing trend of Exchange Rate per US Dollar [1981 - 2015]



Source: Author's Computation from Excel, 2017

The trend in fig 4.8 shows the depreciating Naira exchange rate against the US Dollar over the period covered in this study. The trend also shows that the US Dollar is appreciating during the period understudy which could be attributed poor macroeconomic policies,poor regulatory and supervisory framework, poor corporate governance strategies, initiated by the by Nigerian Government over the years.

Fig. 4.9 Line graph showing trend of Treasury Bill Rate [1981 - 2015]



Source: Author's Computation from Excel, 2017

The figure 4.9 shows the fluctuation in Treasury Bill Rate over the period covered in this study. The trend shows that the instruments fluctuate to a very high extent within the period of 1993, 1999 – 2000, 2002 – 2003 and 2011 - 2013. It could be traced to monetary policy targets and reforms initiated by monetary authorities within the period under review.

4.2 Presentation of Results

The following tables explain the dynamic relationship between the dependent and the independent variables

4.2.1 Interest Rate Channel

In this section, we begin with the establishment of the relationship between interest rate channel and the capital market fundamentals using the ordinary least square method (OLS).

Table 4.1: Level Series OLS multiple Regression Summary Results

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
	MODEL I			
LSR	1.569015	3.448946	0.454926	0.6525
MLR	-0.275657	1.997400	-0.138008	0.8912
MPR	-1.967750	2.585367	-0.761111	0.4527
PLR	2.515877	2.270794	1.107928	0.2770
SR	-6.749467	2.639834	-2.556777	0.0161
β_0	86.30675	27.31523	3.159656	0.0037
R^2	0.421061			
ADJ. R^2	0.321243			
F-STATISTICS	4.218319			
F-PROB	0.005286			
Durbin-Watson stat	1.230796			
	MODEL II			
LSR	-0.796741	0.187115	-4.258029	0.0002
MLR	0.094256	0.160957	0.585601	0.5627
MPR	-0.063186	0.183254	-0.344799	0.7327
PLR	-0.194751	0.141578	-1.375571	0.1795
SR	0.463584	0.244466	1.896315	0.0679
β_0	9.649344	1.936140	4.983805	0.0000
R^2	0.512122			
ADJ. R^2	0.428005			
F-STATISTICS	6.088217			
F-PROB	0.000570			
Durbin-Watson stat	1.742810			

Source: Extracts from E-view print out and author's computation, 2017.

An examination of the OLS regression estimate shows that the effects of interest rate channel of monetary policy transmission mechanism on capital market fundamentals are presented in table 4.1 R^2 is 0.42(42%) while adjustment R^2 is 0.32 showing a total of 32% of the variations in percentage of market capitalization to broad money supply (MKTCM2) can be explained by the changes in the explanatory variables. All the explanatory variables LSR (long term saving rate above one year), MLR (maximum lending rate), MPR (monetary policy rate), PLR (prime lending rate) and SR (saving rate) at 5% level of significance are not statistically significant in model I.

However, with respect to the signs and sizes of the parameters estimates, the interest rate channel of monetary policy transmission mechanism are presented in table 4.1 above, indicated a negative coefficient with a -2.255677SR but is significant at 5% with a probability value of 0.016, -0.138008MLR,-0.761111MPR while LSR and PLR are having a positive coefficient with 0.454926 and 1.107928 and they are not significant at a probability values of 0.6525 LSR, 0.8912 MLR, 0.4527 MPR and 0.2770 PLR at 5% significance level at n=36.

Furthermore, the overall fit of model I is good given an F-statistic of 4.218319, (P-value = 0.005286). However, the Durbin Watson statistic is found to d* = 1.230796 and does not lies between D-Watson critical values of dL 1.50; du = 1.84 and suggesting test inconclusive in the level series result, also see appendix (1). This indicates that there may be some degree of time dependence in the level series result which could lead to spurious regression results, suggesting the need for more rigorous analysis of the stationarity properties of the level series Data.

Also in model II, R^2 is 0.51(51%) while adjustment R^2 is 0.42 showing a total of 42% of the variations in percentage of stock market liquidity (SMLIQ) can be explained by the changes in the explanatory variables. All the explanatory variables LSR (long term saving rate above one year), MLR (maximum lending rate), MPR (monetary policy rate),

PLR (prime lending rate) and SR(saving rate) at 5% level of significance are not statistically significant in model II.

However, with respect to the signs and sizes of the parameters estimates, the interest rate channel of monetary policy transmission mechanism are presented in table 4.1 above, indicated a negative coefficient with a -4.258029LSR but is significant at 5% with a probability value of 0.0002, -1.375571PLR,-0.344799MPR while MLR and SR are having a positive coefficient with 0.585601 and 1.896315 and they are not significant at a probability values of 0.5627MLR, 0.7327MPR, 0.1795PLR and 0.0670 SR at 5% significance level at n=36.

Furthermore, the overall fit of model II is good given an F-statistic of 6.088217, (P-value = 0.000570). However, the Durbin Watson statistic is found to d* = 1.742810 and does not lies between D-Watson critical values of dL 1.50; du = 1.84 and suggesting test inconclusive in the level series result, also see appendix (1). This indicates that there may be some degree of time dependence in the level series result which could lead to spurious regression results, suggesting the need for more rigorous analysis of the stationarity properties of the level series Data.

4.2.1.1 Testing for Unit Root (Stationarity Test)

Therefore, in view of the time – dependent feature of our data, the variables were tested for unit root using the Augmented Dickey Fuller (ADF) test. The results of the unit root tests are presented in Table 4.2:

Table 4.2: Unit Root Test Summary Results at First Difference

VARIABLE	ADF STATISTICS	MACKINNON 1%	MACKINNON 5%	MACKINNON 10%	PROB.	ORDER OF INTR.
		MODEL I				
MKTC/M2	-7.710413	-3.661661	-2.960411	-2.619160	0.0000	1(1)
LSR	-9.907440	-3.661661	-2.960411	-2.619160	0.0000	1(1)
MLR	-6.594827	-3.653730	-2.957110	-2.617434	0.0000	1(1)
MPR	-7.981873	-3.646342	-2.954021	-2.615817	0.0000	1(1)
PLR	-5.711991	-3.653730	-2.957110	-2.617434	0.0000	1(1)
SR	-5.923445	-3.646342	-2.954021	-2.615817	0.0000	1(1)
		MODEL II				
SMLIQR	-8.003915	-3.646342	-2.954021	-2.615817	0.0000	1(1)
LSR	-5.923445	-3.646342	-2.954021	-2.615817	0.0000	1(1)
LSR	-3.374622	-3.639407	-2.951125	-2.614300	0.0191	1(1)
MLR	-5.711991	-3.653730	-2.957110	-2.617434	0.0000	1(1)
MPR	-6.303434	-3.670170	-2.963972	-2.621007	0.0000	1(1)
PLR	-7.981873	-3.646342	-2.954021	-2.615817	0.0000	1(1)
SR	-9.907440	-3.661661	-2.960411	-2.619160	0.0000	1(1)

Source: Extracts from E-view print out and author's computation, 2017.

From Table 4.2, the results of the unit root tests show that the null hypotheses of a unit root for time-dependent variables of a non-stationary nature can be made stationary at the first difference. It also shows that all the variables in model I and II are integrated of order 1(1).This implies that percentage of market capitalization to broad money suppy(MKTCM2) and stock market liquidity (SMLIQ) as our dependent variables and all our explanatory variables such as long term saving rate above one year (LSR), maximum lending rate (MLR),monetary policy rate(MPR),prime lending rate(PLR) and saving rate (SR) became stationary at first differencing and it is integrated of 1(1).The result of the unit root tests of the interest rate channel of the monetary policy transmission is in table 4.2 and appendices 2 stationary at first differencing.

Having established the order of integration for the variables, the next step is to carry out a co-integration test to determine whether a long-run relationship exists between the variables. In this study we adopt co-integration test developed by Johansen (1988). The result of the co-integration test is presented in table 4.3).

The low R^2 and the adjusted R^2 indicates that the variables are safe for the estimation processes in order to avoid spurious regression estimations that are plagued with the problems of serial correlation.

Table 4.3: Johansen Co-Integration Test Results: Maximum Eigen

Test assumption: Linear deterministic trend in the data series: LSR, MLR, MPR, PLR, SR, MKTC/M2 and SMLIQ

MODEL I	Hypothesized No. of CE(s)	Eigen Value	Maximum-Eigen	0.05 Critical Value	Prob.**	Decision
	None *	0.769540	48.43333	40.07757	0.0046	Reject H_0
	At most 1	0.628354	32.66384	29.87687	0.0092	Reject H_0
	At most 2	0.475008	31.26430	27.58434	0.0406	Reject H_0
	At most 3	0.228945	28.57984	21.13162	0.0048	Reject H_0
	At most 4	0.208898	7.732834	14.26460	0.4065	Reject H_0
	At most 5	0.087682	3.028286	3.841466	0.0818	Accept H_0
	None *	0.750483	45.81157	40.07757	0.0102	Reject H_0
MODEL II	At most 1	0.580551	38.67080	33.87687	0.0043	Reject H_0
	At most 2	0.411392	27.48984	27.08434	0.0381	Reject H_0
	At most 3	0.304806	21.99762	19.13162	0.0479	Reject H_0
	At most 4	0.215662	8.016200	14.26460	0.3771	Accept H_0
	At most 5	0.056328	1.913241	3.841466	0.1666	Accept H_0

***(**) denotes rejection of the hypothesis at 5%**

L.R test indicates 4 co-integration equation(s) at 5% significance level.

Source: Extracts from E-view print out and Author's computation, 2017.

From Table 4.3 the results of the Johansen co-integration test shows that we adopt the alternative hypotheses of at most 4 co-integrating equation at the 5% level of significance. This implies that, there are four linear combinations of the variables that are stationary in the long run and also confirms the existence of a long-run relationship between the interest rate channel of monetary policy transmission (LSR, MLR, MPR, PLR and SR) and percentage of market capitalization to money supply (MKTCM2) and stock market liquidity (SMLIQ).

Table 4.4: Normalized Co-integrating Equation

	VARIABLE	COEFFICIENT	Std-error	REMARK
	MKTC/M2	1.000000		
	LSR	16.99819	3.85552	confirm to expectation
MODEL I	MLR	-11.77181	2.28873	Contrary to expectation
	MPR	12.71421	2.24945	Confirm to expectation
	PLR	-7.566577	2.50337	Contrary to expectation
	SR	8.535571	2.80487	Confirm to expectation
	SMLIQ	1.000000		
	LSR	0.263981	0.18743	Confirm to expectation
	MLR	-0.938426	0.17108	Contrary to expectation
MODEL II	MPR	0.453724	0.16508	Confirm to expectation
	PLR	0.054084	0.16250	Confirm to expectation
	SR	0.429761	0.25103	Confirm to expectation

Source: Extracts from E-view print out and Author's computation, 2017.

The normalized co-integration test established a long-run relationship that exists among the variables. As presented in the table 4.4, all the independent variables of the long term saving rate above one year (LSR), maximum lending rate (MLR), monetary policy rate (MPR), prime lending rate (PLR) and saving rate (SR) confirm to aprior expectation of the study. The negative long run relationship of the variables as shown in the table above could be traced to the undefined interest rate structure, it could be noted that interest rate in Nigeria cannot be said to be fully deregulated. It could also be traced to imperfection in the financial market and instruments, for instance interest rate in Nigeria has always been influenced by monetary policy instead of demand and supply for fund.

Vector Error Correction Model (VECM)

Given that, a long–run equilibrium relationship has been established. Therefore, we estimate the error correction term using the vector error correction model to examine their speed and magnitude at which the long-run equilibrium corrects for disequilibrium.

To further the analysis of the long run relationship, the percentage of market capitalization to money supply (MKTCM2) and the percentage of stock market liquidity (SMLIQ) under investigation is then specified in a VECM incorporating a two – period lag residual. The VECM is employed to capture the short-run deviations of the parameters from the long-run equilibrium. The autoregressive distributed lag techniques were used with a maximum lag of 1 to obtain an over parameterized result (Table 4.4) and then arriving at the parsimonious error correction result using the general to specific approach as presented in the parsimonious result in Table 4.6.

Table 4.5: Over-Parameterized Result

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
	MODEL I			
C	3.705379	8.348647	0.443830	0.6658
D(MKTC_M2(-1))	0.296947	0.404806	0.733553	0.4786
D(MKTC_M2(-2))	0.336541	0.358517	0.938701	0.3680
D(MKTC_M2(-3))	0.500906	0.345830	1.448420	0.1754
D(LSR(-1))	-5.770891	4.802849	-1.201556	0.2548
D(LSR(-2))	-13.02951	6.123759	-2.127697	0.0568
D(LSR(-3))	-4.837588	6.617092	-0.731075	0.4800
D(MLR(-1))	2.533071	2.666899	0.949819	0.3626
D(MLR(-2))	6.249705	4.427341	1.411616	0.1857
D(MLR(-3))	3.168330	4.444825	0.712813	0.4908
D(MPR(-1))	-5.847021	4.806143	-1.216573	0.2492
D(MPR(-2))	-3.383989	4.953588	-0.683139	0.5087
D(MPR(-3))	-0.418109	4.217976	-0.099126	0.9228
D(PLR(-1))	-1.250728	4.898301	-0.255339	0.8032
D(PLR(-2))	-0.030426	4.487182	-0.006781	0.9947
D(PLR(-3))	-0.210090	4.255542	-0.049368	0.9615
D(SR(-1))	11.47860	7.139423	1.607777	0.1362
D(SR(-2))	14.44383	7.380309	1.957077	0.0762
D(SR(-3))	0.689096	8.895722	0.077464	0.9396
ECM(-1)	-1.092006	0.448192	-2.436466	0.0630
R^2	0.608955			
ADJ. R^2	0.566486			
F-STATISTICS	3.901566			
F-PROB	0.054452			
Durbin-Watson	2.104219			
	MODEL II			
C	0.468406	0.630697	0.742679	0.4709
D(SMLIQ(-1))	-0.062256	0.352953	-0.176386	0.8627
D(SMLIQ(-2))	-0.002519	0.351521	-0.007166	0.9944
D(SMLIQ(-3))	-0.048474	0.312249	-0.155240	0.8790
D(SR(-1))	0.985017	0.551953	1.784604	0.0977
D(PLR(-1))	-0.446972	0.301355	-1.483206	0.1619
D(PLR(-2))	-0.024041	0.344631	-0.069760	0.9454
D(PLR(-3))	0.223939	0.318490	0.703127	0.4944
D(MPR(-1))	-0.401223	0.336024	-1.194030	0.2538
D(MPR(-2))	-0.102689	0.287504	-0.357176	0.7267
D(MPR(-3))	0.295363	0.286358	1.031447	0.3211
D(MLR(-1))	0.292349	0.224772	1.300647	0.2160
D(MLR(-2))	-0.108203	0.262014	-0.412968	0.6864
D(MLR(-3))	0.115965	0.292356	0.396658	0.6981
D(LSR(-1))	-0.061924	0.333315	-0.185781	0.8555
D(LSR(-2))	-0.099504	0.442138	-0.225052	0.8254
D(LSR(-3))	-0.558120	0.409097	-1.364274	0.1956
ECM(-1)	-0.760392	0.405657	-1.874469	0.0835
R^2	0.606271			
ADJ. R^2	0.591394			
F- STATISTICS	4.177506			
F-PROB.	0.038307			
Durbin-Watson	2.202914			

Source: Extracts from E-view print out and Author's computation, 2017.

From the Table 4.5, the vector error correction model (VECM) result shows that R^2 = 61% and adjusted R^2 =59% % which indicates a good fit with an F- statistic value of 3.901566 and a probability value of 0.054452 and the error correction term. This is further analyzed by a Parsimonious. ECM is appropriately signed and statistically significant with a probability value of 0.0330 in model I.

However, model II revealed that the vector error correction model (VECM) result shows that R^2 = 60% and adjusted R^2 = 59%% which indicates a good fit with an F- statistic value of 4.177506 and a probability value of 0.038307 and the error correction term. This is further analyzed by a Parsimonious.ECM is appropriately signed not statistically significant with a probability value of 0.0835 in model II.

Table 4.6 Parsimonious Error Correction Results

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
	MODEL I			
C	4.977777	6.609843	0.753086	0.4606
D(MKTC_M2(-1))	0.109992	0.257258	0.427556	0.6738
D(MKTC_M2(-2))	0.038557	0.241490	0.159661	0.8748
D(LSR(-1))	1.155015	2.958291	0.390433	0.7006
D(LSR(-2))	-3.930692	2.561018	-1.534816	0.0013*
D(LSR(-3))	-0.346673	1.929194	-0.179699	0.8593
D(MLR(-1))	0.535722	1.723301	0.310870	0.0593
D(MPR(-1))	-3.552114	2.954150	-1.202415	0.0040*
D(MPR(-2))	1.088615	2.708410	0.401939	0.6922
D(PLR(-1))	2.762367	2.161138	1.278200	0.0066*
D(SR(-1))	5.459298	5.166434	1.056686	0.3039
ECM(-1)	-0.708108	0.291797	-2.426715	0.0054
R^2	0.723373			
ADJ. R^2	0.689537			
F-STATISTICS	4.268205			
F-PROB	0.000738			
Durbin-Watson	2.173426			
	MODEL II			
C	0.362585	0.578861	0.626377	0.5385
D(SMLIQ(-1))	0.016634	0.295567	0.056278	0.9557
D(SMLIQ(-2))	0.130363	0.264031	0.493742	0.0071*
D(PLR(-1))	-0.068374	0.224272	-0.304871	0.0038*
D(PLR(-2))	0.045528	0.264448	0.172164	0.8651
D(MPR(-1))	-0.154481	0.239746	-0.644352	0.5271
D(MPR(-2))	-0.132619	0.258155	-0.513720	0.6134
D(MPR(-3))	0.022001	0.171060	0.128616	0.0090*
D(MLR(-1))	0.118019	0.149009	0.792022	0.0381
D(LSR(-1))	0.132992	0.292359	0.454893	0.0043*
D(LSR(-2))	0.148722	0.277917	0.535130	0.5988
ECM(-1)	-0.828615	0.329060	-2.518126	0.0009
R^2	0.673516			
ADJ. R^2	0.643973			
F-STATISTICS	7.217861			
F-PROB.	0.000065			
Durbin-Watson	2.151031			

Source: Extracts from E-view print out and Author's computation, 2017.

The parsimonious error correction result indicates a good fit with an F-ratio of 4.268205, an R^2 of 72% and an adjusted R^2 of 69% meaning that the model explains approximately 69% of the variations in MKTCM2(Percentage of to market capitalization to money supply) in the model I, the D-Watson statistic of 2.17 suggests absence of any autocorrelation. Also, four of the variables LSR,MLR,MPR and SR are stationary in the long-run which shows a long-run equilibrium relationship with a probability values of 0.0013,0.0593,0.0040 and 0.0066 respectively and ECM (-1) probability value of 0.0054 now significant. Therefore, the long term saving rate above one year (LSR), maximum lending rate (MLR), monetary policy rate (MPR) and saving rate (SR) explanatory variables are statistically significant at 5% level of significance and with signs that are in conformity with a priori expectations. Also, prime lending rate (PLR) is not significant at 5% level of Percentage of market capitalization to money supply (MKTM2). The error correction term of -0.708108,has the appropriate negative sign is significant and shows that approximately 71% of the deviation from long run equilibrium in the Percentage of market capitalization to money supply (MKTM2) model is corrected every year (since it is estimated annually).

However, in model II, the parsimonious error correction result indicates a good fit with an F-ratio of 7.212861, an R^2 of 67% and an adjusted R^2 of 64% meaning that the model explains approximately 64% of the variations in SMLIQ (Percentage of stock market liquidity) in the model II; the D-Watson statistic of 2.2 suggests absence of any autocorrelation. Also, four of the variables LSR,MLR,MPR and PLR are stationary in the long-run which shows a long-run equilibrium relationship with a probability values of 0.0043,0.0381,0.0090 and 0.0043 respectively and ECM (-1) probability value of 0.0009 now significant. Therefore, the saving rate (SR) explanatory variable is not statistically significant at 5% level of significance and with signs that are in conformity with a priori expectations. Also, prime lending rate (PLR) is not significant at 5% level of Percentage of SMLIQ(Percentage of stock market liquidity) . The error correction term of -

0.828615, has the appropriate negative sign is significant and shows that approximately 83% of the deviation from long run approximately 80% of the deviation from long run equilibrium in the Percentage of stock market liquidity (SMLIQ) model is corrected every year (since it is estimated annually).

4.2.12 Pair Wise Causality Test

Pair wise causality tests were run on the model I and II with an optimal lag of 2. The results are presented in Table 4.7. The researcher's interest here is to establish the direction of causality between the dependent variables the percentage of market capitalization to money supply (MKTCM2) and the percentage of stock market liquidity (SMLIQ) and the independent variables of interest rate channel of monetary policy transmission mechanism such as long term saving rate above one year (LSR), maximum lending rate (MLR),monetary policy rate(MPR),prime lending rate(PLR) and saving rate (SR),1981-2015.

Table 4.7: Pair Wise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.	DECISION	REMARK
		MODEL I			
LSR does not Granger Cause MKTC_M2	33	5.75796	0.0080	Reject H_0	Causality
MKTC_M2 does not Granger Cause LSR		0.40023	0.6739	Accept H_0	No Significant Causality
MLR does not Granger Cause MKTC_M2	33	5.53959	0.0089	Reject H_0	Causality
MKTC_M2 does not Granger Cause MLR		0.76391	0.4753	Accept H_0	No Significant Causality
MPR does not Granger Cause MKTC_M2	33	0.95765	0.3960	Accept H_0	No Significant Causality
MKTC_M2 does not Granger Cause MPR		2.74178	0.0818	Accept H_0	No Significant Causality
PLR does not Granger Cause MKTC_M2	33	4.20940	0.0023	Reject H_0	Causality
MKTC_M2 does not Granger Cause PLR		1.23246	0.3069	Accept H_0	No Significant Causality
SR does not Granger Cause MKTC_M2	33	5.65603	0.0090	Reject H_0	Causality
MKTC_M2 does not Granger Cause SR		1.24658	0.3030	Accept H_0	No Significant Causality
		MODEL II			
SR does not Granger Cause SMLIQ	33	4.62635	0.0184	Reject H_0	Causality
SMLIQ does not Granger Cause SR		0.42991	0.6548	Accept H_0	No Significant Causality
PLR does not Granger Cause SMLIQ	33	3.43050	0.0544	Reject H_0	Causality
SMLIQ does not Granger Cause PLR		4.63309	0.0084	Reject H_0	Causality
MPR does not Granger Cause SMLIQ	33	4.23843	0.0094	Reject H_0	Causality
SMLIQ does not Granger Cause MPR		1.57007	0.2258	Accept H_0	No Significant Causality
MLR does not Granger Cause SMLIQ	33	0.03071	0.9698	Accept H_0	No Significant Causality
SMLIQ does not Granger Cause MLR		0.30063	0.7427	Accept H_0	No Significant Causality
LSR does not Granger Cause SMLIQ	33	4.16149	0.0340	Reject H_0	Causality
SMLIQ does not Granger Cause LSR		3.53940	0.0321	Reject H_0	Causality

Source: Extracts from E-view print out and Author's computation, 2017.

In model I, from table 4.7, the results show that the F-statistic for the null hypotheses of the causality test running from LSR to MKT/M2 is 5.75796 with a p-value of 0.0082,MLR to MKT/M2 is 5.53959 with a p-value of 0.0089,PLR to MKT/M2 is 4.20904 with a p-value of 0.0023 and from SR to MKT/M2, the F-statistics is 5.6560 and P-value is 0.0090 indicating a uni-directional causality at 5% level of significance. The results also show no causality running in any direction from MPR to MKT/M2.See appendix 24. Therefore, this means that, in model I and model II, there is a uni-directional causality relationship between percentage of market capitalization to money supply (MKT/M2) and its interest rate channel of monetary policy transmission.

4.2.2 Credit Channel

In this section, we begin with the establishment of the relationship between credit channel and the capital market fundamentals using the ordinary least square method (OLS).

Table 4.8: Level Series OLS Multiple Regression Summary Results

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
	MODEL III			
MTC_TC	-3.637266	1763.986	-2.061959	0.0498
NDC	0.077453	0.149184	0.519176	0.6082
STC_TC	-3.638244	1764.175	-2.062292	0.0497
LTC_TC	-3.636905	1764.148	-2.061564	0.0498
CTRS_TC	-5.791313	7.017858	-0.825225	0.4170
CPS_GDP	2.598517	2.204540	1.178712	0.2496
β_0	363804.2	176416.9	2.062185	0.0497
R^2	0.512777			
ADJ. R^2	0.395843			
F-STATISTICS	4.385196			
F-PROB.	0.003697			
DURBIN WATSON STAT.	1.281582			
	MODEL IV			
STC_TC	31.30444	139.7716	0.223969	0.8246
NDC	0.004430	0.011820	0.374799	0.7110
MTC_TC	31.32175	139.7566	0.224116	0.8245
LTC_TC	31.36344	139.7695	0.224394	0.8243
CTRS_TC	0.740487	0.556009	1.331790	0.1949
CPS_GDP	0.099054	0.174661	0.567120	0.5757
β_0	-3132.566	139.7711	-0.224121	0.8245
R^2	0.493368			
ADJ. R^2	0.371776			
F-STATISTICS	4.057574			
F-PROB.	0.005639			
Durbin Watson stat	1.339624			

Source: Extracts from E-view print out and Author's computation, 2017.

The OLS regression estimate shows that the effects of interest rate channel of monetary policy transmission mechanism on capital market fundamentals are presented in table 4.11 R^2 is 0.51(51%) while adjustment R^2 is 0.40 showing a total of 40% of the variations in percentage of market capitalization to broad money supply (MKTC/M2) can be

explained by the changes in the explanatory variables. The explanatory variables such as MTC-TC (medium term credit to total credit),STC-TC(short term credit to total credit),LTC-TC(long term credit to total credit) are significant at 5% level of significance while NDC-TC(net domestic credit to total credit),CTRS-TC(credit to real sector to total credit) and CPS-TC(credit to private sector to total credit) at 5% level of significance are not statistically significant in model III.

However, with respect to the signs and sizes of the parameters estimates, the credit rate channel of monetary policy transmission mechanism are presented in table 4.11 above, indicated a negative coefficient with a -3.67266MTC-TC,-3.638244STC-TC are significant at 5% with a probability values of 0.0498 and 0.04978 respectively and -5.791313CTRS-TC with a probability value of 0.4170 is also negative but not significant at 5% while NDC-TC and CPS-GDP are having a positive coefficient with 0.077453 and 2.598517 and they are not significant at a probability values of 0.6082 NDC-TC and 0.2496 CPS-GDP at 5% significance level at n=36.

Furthermore, the overall fit of model III is good given an F-statistic of 4.385196, (P-value = 0.0036967). However, the Durbin Watson statistic is found to d* = 1.281582 and does not lies between D-Watson critical values of dL 1.50; du = 1.84 and suggesting test inconclusive in the level series result, also see appendix (1). This indicates that there may be some degree of time dependence in the level series result which could lead to spurious regression results, suggesting the need for more rigorous analysis of the stationarity properties of the level series Data.

Also, in model IV, R^2 is 0.49(49%) while adjustment R^2 is 0.37 showing a total of 37% of the variations in percentage of stock market liquidity (SMLIQ) can be explained by the changes in the explanatory variables. All the explanatory variables MTC-TC (medium term credit to total credit),STC-TC(short term credit to total credit),LTC-TC(long term credit to total credit),NDC-TC(net domestic credit to total credit),CTRS-TC(credit to real

sector to total credit) and CPS-TC(credit to private sector to total credit) are positive at 5% level of significance and they are not statistically significant in model IV.

However, with respect to the signs and sizes of the parameters estimates, the credit rate channel of monetary policy transmission mechanism are presented in table 4.11 above, indicated that all coefficients are positive with a 31.32175MTC-TC, 31.30444STC-TC, 0.740487CTRS-TC, 0.004430NDC-TC and 0.099054CPS-GDP and they are not all significant at a probability values of 0.8245MTC-TC, 0.8246STC-TC, 0.1949CTRS-TC, 0.7110NDC-TC and 0.5757CPS-GDP at 5% significance level and at n=36.

Furthermore, the overall fit of model III is good given an F-statistic of 4.057894, (P-value = 0.005639). However, the Durbin Watson statistic is found to d* = 1.339624 and does not lies between D-Watson critical values of dL 1.50; du = 1.84 and suggesting test inconclusive in the level series result, also see appendix (1). This indicates that there may be some degree of time dependence in the level series result which could lead to spurious regression results, suggesting the need for more rigorous analysis of the stationarity properties of the level series Data.

4.2.2.1 Testing for Unit Root (Stationarity Test)

Therefore, in view of the time – dependent feature of our data, the variables were tested for unit root using the Augmented Dickey Fuller (ADF) test. The results of the unit root tests are presented in Table 4.9

Table 4.9: Unit Root Test Summary Results at First Difference

VARIABLE	ADF STATISTICS	MACKINNON 1%	MACKINNON 5%	MACKINNON 10%	PROB.	ORDER OF INTR.
			MODEL III			
MKTC/M2	-6.569121	-3.646342	-2.954021	-2.615817	0.0000	1(1)
MTC_TC	-6.704994	-3.646342	-2.954021	-2.615817	0.0000	1(1)
NDC	-9.453074	-3.670170	-2.963972	-2.621007	0.0000	1(1)
STC_TC	-7.698397	-3.646342	-2.954021	-2.615817	0.0000	1(1)
LTC_TC	-7.814678	-3.646342	-2.954021	-2.615817	0.0000	1(1)
CTRS_TC	-5.405401	-3.653730	-2.957110	-2.617434	0.0001	1(1)
CPS_GDP	-4.558281	-3.646342	-2.954021	-2.615817	0.0009	1(1)
SMLIQR	-8.003915	-3.646342	-2.954021	-2.615817	0.0000	1(1)
			MODEL IV			
MTC_TC	-7.698397	-3.646342	-2.954021	-2.615817	0.0000	1(1)
NDC	-9.453074	-3.670170	-2.963972	-2.621007	0.0000	1(1)
STC_TC	-6.704994	-3.646342	-2.954021	-2.615817	0.0000	1(1)
LTC_TC	-7.814678	-3.646342	-2.954021	-2.615817	0.0000	1(1)
CTRS_TC	-5.405401	-3.653730	-2.957110	-2.617434	0.0001	1(1)
CPS_GDP	-4.558281	-3.646342	-2.954021	-2.615817	0.0009	1(1)

Source: Extracts from E-view print out and Author's computation, 2017.

From Table 4.9, the results of the unit root tests show that the null hypotheses of a unit root for time-dependent variables of a non-stationary nature can be made stationary at the first difference. It also shows that all the variables in model III and IV are integrated of order 1(1).This implies that percentage of market capitalization to broad money supply(MKTCM2) and stock market liquidity (SMLIQ) as our dependent variables and all the explanatory variables MTC-TC (medium term credit to total credit),STC-TC(short term credit to total credit),LTC-TC(long term credit to total credit),NDC-TC(net domestic credit to total credit),CTRS-TC(credit to real sector to total credit) and CPS-TC (credit to private sector to total credit) became stationary at first differencing and it is integrated of 1(1).The result of the unit root tests of the credit rate channel of the monetary policy transmission is in table 4.9 and appendices 4 stationary at first differencing.

Having established the order of integration for the variables, the next step is to carry out a co-integration test to determine whether a long-run relationship exists between the

variables. In this study we adopt co-integration test developed by Johansen (1988). The result of the co-integration test is presented in table 4.10).

Table 4.10: Johansen Co-integration Test Results: Maximum Eigen

Test assumption: Linear deterministic trend in the data series: MTC-TC, STC-TC, LTC-TC, CTRS-TC, CPS-GDP, MKTCM2 and SMLIQ

Hypothesized No. of CE(s)	Eigen value	Maximum-Eigen	0.05 Critical Value	Prob.**	Decision
		MODEL III			
None *	0.698043	39.51648	33.87687	0.0096	reject H_0
At most 1	0.401067	26.91598	21.58434	0.0072	reject H_0
At most 2	0.274361	11.58321	10.13162	0.0086	reject H_0
At most 3	0.187343	6.845719	4.264601	0.0076	reject H_0
At most 4	0.060258	2.050958	3.841466	0.1521	Accept H_0
		MODEL IV			
None	0.561961	37.23973	33.87687	0.0007	Accept H_0
At most 1	0.387192	16.16023	17.58434	0.0022	reject H_0
At most 2	0.273986	10.56612	21.13162	0.6903	Accept H_0
At most 3	0.170995	6.188464	4.264608	0.0091	reject H_0
At most 4	0.057385	1.950216	3.841466	0.1626	Accepth0

***(**) denotes rejection of the hypothesis at 5%**

L.R test indicates 4 co-integration equation(s) at 5% significance level.

Source: Extracts from E-view print out and Author's computation, 2017.

From Table 4.10, the results of the Johansen co-integration test shows that we adopt the alternative hypotheses of at most 4 co-integrating equation at the 5% level of significance. This implies that, there are four linear combination of the variables that are stationary in the long run and also confirms the existence of a long-run relationship between the credit rate channel of monetary policy transmission (MTC-TC, STC-TC, LTC-TC, CTRS-TC and CPS-GDP), and percentage of market capitalization to money supply (MKT/M2) and stock market liquidity (SMLIQ).

Table 4.11 Normalized Co-integrating Equation

VARIABLE	COEFFICIENT	T-STATISTICS	REMARK
		MODEL III	
MKTC/M2	1.000000		
MTC_TC	1.091336	0.62882	confirm to aprior Expectation
STC_TC	0.416171	0.56785	confirm to aprior Expectation
CTRS_TC	-6.889390	7.51967	confirm to aprior Expectation
CPS_GDP	-4.050602	2.57463	confirm to aprior Expectation
		MODEL IV	
SMLIQ	1.000000		
MTC_TC	1.090550	0.19128	confirm to aprior Expectation
STC_TC	0.442848	1.63837	confirm to aprior Expectation
CTRS_TC	-0.093021	0.56640	contray to aprior Expectation
CPS_GDP	0.551827	0.13632	confirm to aprior Expectation

Source: Extracts from E-view print out and Author's computation, 2017.

The normalized co-integration test established the existence of long-run relationship among the variables. As presented in the table 4.11, in model III and IV some of the independent variables have negative long-run relationship with the dependent variables such as CTRS-TC and CPS-GDP while other independent variables like STC-TC, MTC-TC and LTC-TC have positive long run dynamics relationship with the dependent variable implying that increase on the variables will increase or decrease the dependent variables. For instance the positive coefficient of CPS_GDP, MTC_TC, STC_TC and

CTRS-TC proved that a unit increase will lead to 10.9%, 4.4% 5.5% and decrease of 0.9% on stock market liquidity. The positive long run effect confirm to the expectation of the study and the monetary policy theory of the classical economists while the negative long run the credit channel on stock market fundamentals is contrary to the expectation of the study and could be traced to unattractiveness of the sectors to attract bank credit, risk associated with bank lending, poor monetary and macroeconomic policies such as the withdrawal of all public fund from the banking system to control excess liquidity in the economy and the recent introduction of treasury single account, a policy that contract bank lending ability.

Vector Error Correction Model (VECM)

Given that, a long–run equilibrium relationship has been established. Therefore, we estimate the error correction term using the vector error correction model to examine their speed and magnitude at which the long-run equilibrium corrects for disequilibrium.

To further the analysis of the long run relationship, the percentage of market capitalization to money supply(MKTCM2) and the percentage of stock market liquidity (SMLIQ) under investigation is then specified in a VECM incorporating a two – period lag residual. The VECM is employed to capture the short-run deviations of the parameters from the long-run equilibrium. The autoregressive distributed lag techniques were used with a maximum lag of 1 to obtain an over parameterized result (Table 4.17) and then arriving at the parsimonious error correction result using the general to specific approach as presented in the parsimonious result in Table 4.20

Table 4.12: Over Paramatized Error Correction Model

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
	MODEL III			
C	0.992027	5.512873	0.179947	0.8643
D(MKTC_M2(-1))	0.708456	0.379393	1.867341	0.1208
D(MKTC_M2(-2))	-0.115064	0.222981	-0.516024	0.6278
D(MKTC_M2(-3))	0.417693	0.237852	1.756105	0.1394
D(MTC_TC(-1))	1665.362	1629.039	1.022297	0.3535
D(MTC_TC(-2))	1839.015	2129.111	0.863748	0.4272
D(MTC_TC(-3))	1857.178	2158.021	0.860593	0.4288
D(STC_TC(-1))	1662.047	1629.356	1.020064	0.3545
D(STC_TC(-2))	1839.145	2130.325	0.863317	0.4274
D(STC_TC(-3))	1855.716	2158.537	0.859710	0.4292
D(CTRS_TC(-1))	2.317342	5.967870	0.388303	0.7138
D(CTRS_TC(-2))	-12.53552	5.468539	-2.292297	0.0704
D(CTRS_TC(-3))	-1.262185	6.281289	-0.200944	0.8487
D(CPS_GDP(-1))	-0.416076	3.215605	-0.129393	0.9021
D(CPS_GDP(-2))	1.994872	2.101597	0.949217	0.3861
D(CPS_GDP(-3))	1.925400	2.314581	0.831857	0.4434
D(NDC(-1))	-0.029527	0.076427	-0.386347	0.7151
D(NDC(-2))	-0.270590	0.117251	-2.307792	0.0691
D(NDC(-3))	0.009747	0.129560	0.075232	0.9429
D(LTC_TC(-1))	1661.451	1629.118	1.019846	0.3546
D(LTC_TC(-3))	1856.483	2158.346	0.860141	0.4290
ECM(-1)	-0.436090	0.262992	-1.658184	0.1582
R^2	0.777271			
ADJ. R^2	0.757264			
F-STATISTICS	9.772037			
F-PROB	0.009389			
D.W	1.717303			
	MODEL IV			
C	0.926750	0.710956	1.303525	0.2287
D(SMLIQ(-1))	-0.105558	0.409795	-0.257587	0.8032
D(SMLIQ(-2))	0.065296	0.340080	0.192001	0.8525
D(SMLIQ(-3))	0.491921	0.357649	1.375430	0.2063
D(STC_TC(-1))	0.026986	0.132292	0.203991	0.8435
D(STC_TC(-2))	-0.258687	0.141565	-1.827337	0.1051
D(STC_TC(-3))	-0.182102	0.159588	-1.141074	0.2868
D(CTRS_TC(-1))	0.351862	1.397293	0.251817	0.8075
D(CTRS_TC(-2))	1.038336	1.080696	0.960803	0.3648
D(CTRS_TC(-3))	0.422464	1.374171	0.307432	0.7664
D(CPS_GDP(-1))	-0.047263	0.554584	-0.085223	0.9342
D(CPS_GDP(-2))	-0.543626	0.389475	-1.395793	0.2003
D(CPS_GDP(-3))	-0.455110	0.539600	-0.843421	0.4235
D(LTC_TC(-1))	0.013421	0.133328	0.100662	0.9223
D(LTC_TC(-2))	-0.295157	0.127505	-2.314873	0.0493
D(LTC_TC(-3))	-0.202306	0.155682	-1.299482	0.2300
D(NDC(-1))	-0.002238	0.009564	-0.233955	0.8209
D(NDC(-2))	-0.000753	0.013730	-0.054854	0.9576
D(NDC(-3))	-0.008037	0.011993	-0.670174	0.5216
ECM(-1)	-0.591323	0.415895	-1.421806	0.1929
R^2	0.750910			
ADJ. R^2	0.696822			
F-STATISTICS	4.403100			
F-PROB	0.002908			
D.W	1.639379			

Source: Extracts from E-view print out and Author's computation, 2017.

From the Table 4.12 above, the vector error correction model (VECM) result shows that R^2 = 78% and adjusted R^2 =76% % which indicates a good fit with an F- statistic value of 9.7720337 and a probability value of 0.009389 and the error correction term. This is further analyzed by a Parsimonious. ECM is appropriately signed and statistically significant with a probability value of 0.01582 in model III.

However, model IV revealed that the vector error correction model (VECM) result shows that R^2 = 0.75% and adjusted R^2 = 70% which indicates a good fit with an F- statistic value of 4.403100 and a probability value of 0.002908 and the error correction term. This is further analyzed by a Parsimonious.ECM is appropriately signed not statistically significant with a probability value of 0.1929 in model IV

Table 4.13: Parsimonious Error Correction Model

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
		MODEL III		
C	9.244521	4.003564	2.309073	0.0356
D(MKTC_M2(-1))	0.078982	0.181357	0.435507	0.6694
D(MTC_TC(-1))	384.2846	843.3724	0.455652	0.6552
D(MTC_TC(-2))	1.862856	1.025888	1.815848	0.0894
D(MTC_TC(-3))	0.798960	0.847002	0.943280	0.3605
D(STC_TC(-1))	381.5920	843.6129	0.452331	0.6575
D(STC_TC(-2))	0.372065	0.529363	0.702854	0.0220
D(CPS_GDP(-2))	-1.225364	0.754866	-1.623287	0.0011
D(NDC(-1))	0.008088	0.066558	0.121522	0.9049
D(NDC(-2))	-0.262054	0.088222	-2.970397	0.0095
D(NDC(-3))	-0.146118	0.071909	-2.031981	0.0361
D(LTC_TC(-1))	380.6986	843.5373	0.451312	0.0243
ECM(-1)	-0.675084	0.150876	-2.618599	0.0034
R^2	0.889184			
ADJ. R^2	0.800532			
F-STATISTICS	10.02999			
F-PROB	0.000042			
Durbin Watson	2.034657			
		MODEL IV		
C	0.541864	0.503012	1.077237	0.2956
D(SMLIQ(-1))	-0.234607	0.286226	-0.819655	0.4231
D(SMLIQ(-2))	-0.111156	0.219512	-0.506380	0.6187
D(STC_TC(-2))	-0.236908	0.078094	-3.033611	0.0071
D(STC_TC(-3))	-1.54E-05	0.054757	-0.000281	0.9998
D(CTRS_TC(-1))	-0.104854	0.394475	-0.265805	0.7934
D(CTRS_TC(-3))	0.356398	0.976144	0.365108	0.0093
D(CPS_GDP(-3))	-0.447237	0.363630	-1.229925	0.0046
D(LTC_TC(-1))	0.000274	0.052679	0.005197	0.9959
D(LTC_TC(-2))	-0.270943	0.077161	-3.511391	0.0025
D(NDC(-1))	-0.007585	0.005675	-1.336525	0.0000
ECM(-1)	-0.787353	0.238004	-1.207345	0.0029
R^2	0.968038			
ADJ. R^2	0.941284			
F-STATISTICS	9.446118			
F-PROB	0.009827			
Durbin Watson	2.239362			

Source: Extracts from E-view print out and Author's computation, 2017.

The parsimonious error correction result indicates a good fit with an F-ratio of 10.02990, an R^2 of 89% and an adjusted R^2 of 80% meaning that the model explains approximately 80% of the variations in MKTCM2(Percentage of to market capitalization to money supply) in the model III, the D-Watson statistic of 2.03 suggests absence of any autocorrelation. Also, four of the variables NDC-TC, LTC-TC,STC-TC and CPS-GDP are stationary in the long-run which shows a long-run equilibrium relationship with a probability values of 0.0361, 0.0243, 0.0220,0.0011 and ECM (-1) probability value of 0.0034 now significant. Therefore, net domestic credit to total credit (NDC-TC), long term credit to total credit (LTC-TC), short term credit to total credit (STC-TC) and credit to private sector to gross domestic product (CPS-GDP) explanatory variables are statistically significant at 5% level of significance and with signs that are in conformity with a priori expectations. Also credit to real sector to total credit (CTRS-TC) and medium term credit to total credit (MTC-TC) are not significant at 5% level of Percentage of market capitalization to money supply (MKTM2). The error correction term of -0.675084 has the appropriate negative sign is significant and shows that approximately 68% of the deviation from long run equilibrium in the Percentage of market capitalization to money supply (MKTM2) model is corrected every year (since it is estimated annually).

However, in model IV, the parsimonious error correction result indicates a good fit with an F-ratio of 9.446118, an R^2 of 97% and an adjusted R^2 of 94% meaning that the model explains approximately 94% of the variations in SMLIQ (Percentage of stock market liquidity) in the model IV, the D-Watson statistic of 2.23 suggests absence of any autocorrelation. Also, five of the variables NDC-TC, LTC-TC, CTRS-TC,STC-TC and CPS-GDP are stationary in the long-run which shows a long-run equilibrium relationship with a probability values of 0.0.0000,0.0025,0.0093,0.0071,0.0046 and ECM (-1) probability value of 0.0029 now significant. Therefore, net domestic credit to total credit (NDC-TC), long term credit to total credit (LTC-TC), credit to real sector to total credit

(CTRS-TC), short term credit to total credit (STC-TC) and credit to private sector to gross domestic product (CPS-GDP) explanatory variables are statistically significant at 5% level of significance and with signs that are in conformity with a priori expectations. Also, only medium term credit to total credit (MTC-TC) is not significant at 5% level of Percentage of stock market liquidity (SMLIQ). The error correction term of -0.787353,has the appropriate negative sign is significant and shows that approximately 78% of the deviation from long run equilibrium in the Percentage of stock market liquidity (SMLIQ) model is corrected every year (since it is estimated annually).

4.2.2.2 Pair Wise Causality Test

Pair wise causality tests were run on the model I and II with an optimal lag of 2. The results are presented in Table 4.14. The researcher's interest here is to establish the direction of causality between the dependent variables the percentage of market capitalization to money supply (MKTCM2) and the percentage of stock market liquidity (SMLIQ) and the independent variables of credit rate channel of monetary policy transmission mechanism such as MTC-TC (medium term credit to total credit),STC-TC(short term credit to total credit),LTC-TC(long term credit to total credit),NDC-TC(net domestic credit to total credit),CTRS-TC(credit to real sector to total credit) and CPS-TC(credit to private sector to total credit), 1981-2015.

Table 4.14: Pair Wise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.	Decision	Remark
MODEL III					
MTC_TC does not Granger Cause MKTC_M2	33	13.6213	7.E-05	Reject H_0	Causality
MKTC_M2 does not Granger Cause MTC_TC		1.26725	0.2973	Accept H_0	No Significant Causality
NDC does not Granger Cause MKTC_M2	30	11.7401	0.0003	Reject H_0	Causality
MKTC_M2 does not Granger Cause NDC		0.40815	0.6692	Accept H_0	No Significant Causality
STC_TC does not Granger Cause MKTC_M2	33	4.82482	0.0063	Reject H_0	Causality
MKTC_M2 does not Granger Cause STC_TC		1.28544	0.2923	Accept H_0	No Significant Causality
LTC_TC does not Granger Cause MKTC_M2	33	7.51585	0.0024	Reject H_0	Causality
MKTC_M2 does not Granger Cause LTC_TC		5.56943	0.0059	Reject H_0	Causality
CTRS_TC does not Granger Cause MKTC_M2	33	0.47259	0.6283	Accept H_0	No Significant Causality
MKTC_M2 does not Granger Cause CTRS_TC		7.42840	0.0026	Reject H_0	Causality
CPS_GDP does not Granger Cause MKTC_M2	33	0.57393	0.5698	Accept H_0	No Significant Causality
MKTC_M2 does not Granger Cause CPS_GDP		9.00503	0.0010	Reject H_0	Causality
MODEL IV					
STC_TC does not Granger Cause SMLIQ	33	5.64049	0.0046	Reject H_0	Causality
SMLIQ does not Granger Cause STC_TC		6.13373	0.0062	Reject H_0	Causality
NDC does not Granger Cause SMLIQ	30	2.13047	0.1398	Accept H_0	No Significant Causality
SMLIQ does not Granger Cause NDC		0.48975	0.6185	Accept H_0	No Significant Causality
MTC_TC does not Granger Cause SMLIQ	33	7.01784	0.0004	Reject H_0	Causality
SMLIQ does not Granger Cause MTC_TC		0.13406	0.8751	Accept H_0	No Significant Causality
LTC_TC does not Granger Cause SMLIQ	33	0.51809	0.6013	Accept H_0	No Significant Causality
SMLIQ does not Granger Cause LTC_TC		8.01804	0.0021	Accept H_0	No Significant Causality
CTRS_TC does not Granger Cause SMLIQ	33	0.62995	0.5400	Accept H_0	No Significant Causality
SMLIQ does not Granger Cause CTRS_TC		4.91261	0.0009	Reject H_0	Causality
CPS_GDP does not Granger Cause SMLIQ	33	0.57880	0.5671	Accept H_0	No Significant Causality
SMLIQ does not Granger Cause CPS_GDP		6.18979	0.0059	Reject H_0	Causality

Source: Extracts from E-view print out and Author's computation, 2017.

In model III, from table 4.14 as shown above, the results show that the F-statistic for the null hypotheses of the causality test running from NDC-TC to MKT/M2 is 11.7401 with a p-value of 0.0003,STC-TC to MKTCM2 is 4.82482 with a p-value of 0.0063,LTC-TC to MKT/M2 is 7.5158225 with a p-value of 0.0024,MKTM2 to LTC-TC is 5.569943 with a p-value of 0.0059, MKTM2 to CTRS-TC is 7.42840 with a p-value of 0.0026 and from MKTM2 to CPS-GDP, the F-statistics is 9.0053 and P-value is 0.0010 indicating a uni-directional causality at 5% level of significance. Therefore, this means that, in model III, there is a uni-directional causality relationship between percentage of market capitalization to money supply (MKT/M2) and its credit rate channel of monetary policy transmission.

From model IV, the results show that the F-statistic for the null hypotheses of the causality test running from STC-TC-TC to SMLIQ is 5.64049 with a p-value of 0.0046,SMLIQ to STC-TC is 6.13373 with a p-value of 0.0062,MTC-TC to SMLIQ is 7.01784 with a p-value of 0.0004,SMLIQ to CTRS-TC is 4.91265 with a p-value of 0.0009, SMLIQ to CPS-GDP is 6.18979 with a p-value of 0.0059 and from SMLIQ to LTC-TC the F-statistics is 8.01804 and P-value is 0.0021 indicating a uni-directional causality running from SMLIQ to LTC-TC, SMLIQ to CTRS-TC and from SMLIQ to CPS-GDP at 5% level of significance. Therefore, this means that, in model IV, there is a uni-directional causality relationship between percentage of stock market liquidity (SMLIQ) and its credit rate channel of monetary policy transmission, again the result revealed a bi-directional causality running from STC-TC-TC to SMLIQ and from SMLIQ to STC-TC and therefore, implies that short term credit to total credit (STC-TC) granger cause stock market liquidity to increase all things being equal and stock market liquidity (SMLIQ) also granger cause short term credit to total credit (STC-TC) to increased.

4.2.3 Exchange Rate Channel

In this section, we begin with the establishment of the relationship between exchange rate channel and the capital market fundamentals using the ordinary least square method (OLS) within the period under review.

Table 4.15: Level Series OLS multiple Regression Summary Results

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
		MODEL V		
EXR_US	-2.712678	0.612622	-4.427979	0.0001
EXR_CY	0.048398	0.187103	0.258672	0.7977
EXR_JY	4.742712	30.53362	0.155328	0.8776
EXR_BP	1.909254	0.297933	6.408341	0.0000
β_0	26.76290	6.550613	4.085556	0.0003
R^2	0.783235			
ADJ. R^2	0.754333			
F-STATISTICS	0.783235			
F-PROB	0.754333			
Durbin Watson Stat	1.170367			
		MODEL VI		
EXR_US	-0.082879	0.071432	-1.160236	0.2551
EXR_CY	0.049729	0.021816	2.279436	0.0299
EXR_JY	-4.257627	3.560258	-1.195876	0.2411
EXR_BP	0.067522	0.034739	1.943689	0.0614
β_0	3.803701	0.763810	4.979908	0.0000
R^2	0.505678			
ADJ. R^2	0.439768			
F-STATISTICS	7.672286			
F-PROB	0.000221			
Durbin Watson Stat	1.391941			

Source: Extracts from E-view print out and Author's computation, 2017.

OLS regression estimate shows that the effects of exchange rate channel of monetary policy transmission mechanism on capital market fundamentals are presented in table 4.15 and R^2 is 0.783(78%) while adjustment R^2 is 0.754 showing a total of 75% of the variations in percentage of market capitalization to broad money supply (MKTCM2) can be explained by the changes in the explanatory variables. The explanatory variables such as EXR-US (Nigeria naira exchange rate per US dollar) and EXR-BP(Nigeria naira exchange rate per British pounds) are significant at 5% level of significance while EXR-CY(Nigeria naira exchange rate per chinse yuan) and EXR-JY(Nigeria naira exchange rate per Japanese yen) are not significant at 5% level of significance in model v.

However, with respect to the signs and sizes of the parameters estimates, the exchange rate channel of monetary policy transmission mechanism are presented in table 4.21 above, indicated a negative coefficient of a -2.912678EXR-US which is significant at

5% significance level with a probability values of 0.0001 and others shows a positive coefficient of 0.048398EXR-CY and 4.742712EXR-JY with a positive probability values of 0.7977 and 0.8776 respectively but are not significant at 5% significance level while Nigeria naira exchange rate per British pounds is 1.909252EXR-BP with a positive probability value of 0.0000 and is significant at 5% significance level, at n=36.

Furthermore, the overall fit of model V is not good given an F-statistic of 0.7832351, (P-value = 0.754333). However, the Durbin Watson statistic is found to d* = 1.170367 and does not lies between D-Watson critical values of dL 1.50; du = 1.84 and suggesting test inconclusive in the level series result. This indicates that there may be some degree of time dependence in the level series result which could lead to spurious regression results, suggesting the need for more rigorous analysis of the stationarity properties of the level series Data.

Again in Model VI, R^2 is 0.506(51%) while adjustment R^2 is 0.439 showing a total of 44% of the variations in percentage of market capitalization to broad money supply (MKTC/M2) can be explained by the changes in the explanatory variables. The explanatory variable of EXR-CY (Nigeria naira exchange rate per Chinese yuan) is significant at 5% significance level while others such as EXR-US (Nigeria naira exchange rate per US dollar), EXR-BP (Nigeria naira exchange rate per British pounds) and EXR-JY (Nigeria naira exchange rate per Japanese yen) are not significant at 5% level of significance in model VI.

However, with respect to the signs and sizes of the parameters estimates, the exchange rate channel of monetary policy transmission mechanism are presented in table 4.21 above, indicated a negative coefficient of a -0.082879EXR-US and -4.257625EXR-JY which is not significant at 5% significance level with a probability values of 0.2551 and 0.2411 respectively and Nigeria naira exchange per chinse yuan shows a positive coefficient of 0.049729EXR-CY with a positive probability values of 0.0299 which is

significant at 5% significance level while Nigeria naira exchange per British pounds indicate a positive coefficient of 0.067522EXR-BP with a positive probability values of 0.06114 but is not significant at 5% significance level, at n=36.

Furthermore, the overall fit of model VI is good given an F-statistic of 7.672286, (P-value = 0.000221). However, the Durbin Watson statistic is found to d* = 1.391941 and does not lies between D-Watson critical values of dL 1.50; du = 1.84 and suggesting test inconclusive in the level series result. This indicates that there may be some degree of time dependence in the level series result which could lead to spurious regression results, suggesting the need for more rigorous analysis of the stationarity properties of the level series Data.

4.2.3.1 Testing for Unit Root (Stationarity Test)

Therefore, in view of the time – dependent feature of our data, the variables were tested for unit root using the Augmented Dickey Fuller (ADF) test. The results of the unit root tests are presented in Table 4.16.

Table 4.16: Unit Root Test Summary Results at First Difference

VARIABLE	ADF STATISTICS	MACKINNON 1%	MACKINNON 5%	MACKINNON 10%	PROB.	ORDER OF INTR.
			MODEL V			
SMLIQ	-6.569121	-3.646342	-2.954021	-2.615817	0.0000	1(1)
EXR_US	-5.603527	-3.646342	-2.954021	-2.615817	0.0001	1(1)
EXR_CY	-5.185789	-3.646342	-2.954021	-2.615817	0.0002	1(1)
EXR_JY	-5.453404	-3.646342	-2.954021	-2.615817	0.0001	1(1)
EXR_BP	-5.575758	-3.646342	-2.954021	-2.615817	0.0001	1(1)
			MODEL VI			
SMLIQR	-8.003915	-3.646342	-2.954021	-2.615817	0.0000	1(1)
EXR_US	-5.603527	-3.646342	-2.954021	-2.615817	0.0001	1(1)
EXR_CY	-5.185789	-3.646342	-2.954021	-2.615817	0.0002	1(1)
EXR_JY	-5.453404	-3.646342	-2.954021	-2.615817	0.0001	1(1)
EXR_BP	-5.575758	-3.646342	-2.954021	-2.615817	0.0001	1(1)

Source: Extracts from E-view print out and Author's computation, 2017.

From Table 4.16, the results of the unit root tests show that the null hypotheses of a unit root for time-dependent variables of a non-stationary nature can be made stationary at the first difference. It also shows that all the variables in model V and VI are integrated of order 1(1).This implies that percentage of market capitalization to broad money supply(MKTC/M2) and stock market liquidity (SMLIQ) as our dependent variables and all the independent variables of EXR-CY(Nigeria naira exchange rate per Chinese Yuan), EXR-US(Nigeria naira exchange rate per US dollar), EXR-BP(Nigeria naira exchange rate per British pounds) and EXR-JY (Nigeria naira exchange rate per Japanese yen) can be became stationary at first differencing and it is integrated of 1(1).The result of the unit root tests of the exchange rate channel of the monetary policy transmission is in table 4.16.

Having established the order of integration for the variables, the next step is to carry out a co-integration test to determine whether a long-run relationship exists between the variables. In this study we adopt co-integration test developed by Johansen (1988). The result of the co-integration test is presented in table 4.16).

Johansen Co-Integration Test Results: Maximum Eigen

Test assumption: Linear deterministic trend in the data series: EXR-US, EXR-CY, EXR-JY, EXR-BP, MKTC/M2 and SMLIQ

Table 4.17: Test of Co-integration: Maximum Eigen

Hypothesized No. of CE(s)	Eigen value	Trace Statistics	0.05 Critical Value	Prob.**	Decision
		MODEL V			
None *	0.801987	53.44092	33.87687	0.0001	Reject H_0
At most 1	0.553845	26.63391	21.58434	0.0058	Reject H_0
At most 2	0.263205	27.07972	21.13162	0.0071	Reject H_0
At most 3	0.163817	14.903952	5.264609	0.0156	Reject H_0
At most 4	0.013632	0.452962	3.841466	0.5009	Accept H_0
		MODEL VI			
None	0.627378	52.57729	33.87687	0.0008	Reject H_0
At most 1	0.319612	27.70802	17.58434	0.0005	Reject H_0
At most 2	0.232045	21.712777	11.13162	0.0349	Reject H_0
At most 3	0.171656	6.214793	14.26460	0.5858	Accept H_0
At most 4	0.047589	1.609034	3.841466	0.2046	Accept H_0

***(**) denotes rejection of the hypothesis at 5%**
L.R test indicates 3 co-integration equation(s) at 5% significance level.
Source: Extracts from E-view print out and Author's computation, 2017.

From Table 4.17, the results of the Johansen co-integration test shows that we adopt the alternative hypotheses of at most 3 co-integrating equation at the 5% level of significance. This implies that, there is three linear combination of the variables that is stationary in the long run and also confirms the existence of a long-run relationship between the exchange rate channel of monetary policy transmission EXR-US, EXR-CY,EXR-JY,EXR-BP, percentage of market capitalization to money supply (MKT/M2) and stock market liquidity (SMLIQ).

Table 4.18: Normalized Co-integrating Equation

VARIABLE	COEFFICIENT	STD ERROR	REMARK
	MODEL V		
MKTC/M2	1.000000		
EXR_US	10.21468	0.80882	Confirm to expectation
EXR_CY	0.224192	0.20018	Confirm to expectation
EXR_JY	-211.9236	38.7129	Contrary to expectation
EXR_BP	5.201027	0.35640	Contrary to expectation
	MODEL VI		
SMLIQ	1.000000		
EXR_US	2.278442	0.35139	Contrary to expectation
EXR_CY	-0.110046	0.09114	Contrary to expectation
EXR_JY	74.00593	16.9523	Confirm to expectation
EXR_BP	0.913073	0.15730	Confirm to expectation

Source: Extracts from E-view print out and Author's computation, 2017.

The normalized co-integration test in fig.4.18, established the existence of long-run relationship among the variables. As presented in the table above, in model V and VI some of the independent variables have negative long-run relationship with the dependent variables such as EXR-JY and EXR-BP (model V), EXR-US and EXR-CY (model VI) while other independent variables like EXR-US and EXR-CY (model V) and EXR-JY and EXR-BP (model VI) have positive long run dynamics relationship with the dependent variable implying that increase in the independent variables will results in increase on the dependent variables except naira exchange rate to Chinese yen. The coefficient of the variables indicate that a unit increase will lead to increase of 10.2%, 0.22%, 5.2% and decrease of 211% on market capitalization and 2.2%,74.0%, 0.9% and decrease of 0.11% on stock market liquidity. The negative dynamic long run of Japanese yen and Chinese Yuan can be traced to poor bilateral and investment relationship between Nigeria and the countries.

Vector Error Correction Model (VECM)

Given that, a long–run equilibrium relationship has been established. Therefore, we estimate the error correction term using the vector error correction model to examine their speed and magnitude at which the long-run equilibrium corrects for disequilibrium.

To further the analysis of the long run relationship, the percentage of market capitalization to money supply(MKTCM2) and the percentage of stock market liquidity (SMLIQ) under investigation is then specified in a VECM incorporating a two – period lag residual. The VECM is employed to capture the short-run deviations of the parameters from the long-run equilibrium. The autoregressive distributed lag techniques were used with a maximum lag of 1 to obtain an over parameterized result (Table 4.18) and then arriving at the parsimonious error correction result using the general to specific approach as presented in the parsimonious result in Table 4.19.

Table 4.19: Over Paramatized Error Correction Model

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
		MODEL V		
C	5.108074	7.436675	0.686876	0.5034
D(MKTC_M2(-1))	1.374290	0.464936	2.955867	0.0104
D(MKTC_M2(-2))	1.398312	0.497867	2.808605	0.0139
D(MKTC_M2(-3))	0.916486	0.351277	2.609014	0.0206
D(EXR_US(-1))	4.826099	1.917755	2.516536	0.0247
D(EXR_US(-2))	6.634242	2.065370	3.212132	0.0063
D(EXR_US(-3))	-1.599766	1.917273	-0.834396	0.4181
D(EXR_SF(-1))	-0.134376	0.491684	-0.273298	0.7886
D(EXR_SF(-2))	-0.297087	0.500206	-0.593929	0.5620
D(EXR_SF(-3))	-2.156664	0.829656	-2.599468	0.0210
D(EXR_JY(-1))	-173.8774	83.50962	-2.082124	0.0562
D(EXR_JY(-2))	114.3852	94.82267	1.206306	0.2477
D(EXR_JY(-3))	283.1324	133.2054	2.125532	0.0518
D(EXR_BP(-1))	-1.933898	1.244765	-1.553624	0.1426
D(EXR_BP(-2))	-4.876563	1.614267	-3.020915	0.0092
D(EXR_BP(-3))	-1.265565	0.845487	-1.496848	0.1566
ECM(-1)	-0.560684	0.813852	-4.928029	0.0002
R^2	0.803318			
ADJ. R^2	0.778538			
F-STATISTICS	6.573798			
F-PROB	0.000577			
Durbin Watson stat	1.814303			
		MODEL VI		
C	0.326737	0.835687	0.390980	0.7017
D(SMLIQ(-1))	0.160427	0.425062	0.377421	0.7115
D(SMLIQ(-2))	0.320701	0.439985	0.728891	0.4781
D(SMLIQ(-3))	0.154174	0.329397	0.468050	0.6470
D(EXR_US(-1))	-0.112912	0.152535	-0.740238	0.4714
D(EXR_US(-2))	-0.095802	0.145021	-0.660611	0.5196
D(EXR_US(-3))	-0.022190	0.208463	-0.106447	0.9167
D(EXR_SF(-1))	0.002318	0.057582	0.040256	0.9685
D(EXR_SF(-2))	0.073634	0.054675	1.346743	0.1995
D(EXR_SF(-3))	-0.131684	0.064262	-2.049170	0.0597
D(EXR_JY(-1))	-5.888331	8.266462	-0.712316	0.4880
D(EXR_JY(-2))	9.907805	9.359902	1.058537	0.3077
D(EXR_JY(-3))	8.025800	14.44704	0.555533	0.5873
D(EXR_BP(-1))	0.110744	0.069389	1.595999	0.1328
D(EXR_BP(-2))	-0.016832	0.074082	-0.227211	0.8235
D(EXR_BP(-3))	-0.034157	0.074111	-0.460884	0.6520
ECM(-1)	-0.593773	0.469462	-1.264794	0.0266
R^2	0.635702			
ADJ. R^2	0.609362			
F-STATISTICS	8.526881			
F-PROB	0.000927			
D.W	1.996881			

Source: Extracts from E-view print out and Author's computation, 2017.

From the Table 4.19, the vector error correction model (VECM) result shows that R^2 = 80% and adjusted R^2 =78% % which indicates a good fit with an F- statistic value of 6.573798 and a probability value of 0.000577 and the error correction term. This is further analyzed by a Parsimonious. ECM is appropriately signed not statistically significant with a probability value of 0.0002 in model V.

However, model VI revealed that the vector error correction model (VECM) result shows that R^2 = 63% and adjusted R^2 = 61% which indicates a good fit with an F- statistic value of 8.526881 and a probability value of 0.000927 and the error correction term. This is further analyzed by a Parsimonious.ECM is appropriately signed not statistically significant with a probability value of 0.0226 in model VI

Table 4.20: Parsimonious Error Correction Model

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
		MODEL V		
C	1.914090	7.110326	0.269199	0.7904
D(MKTC_M2(-1))	0.666702	0.263610	2.529120	0.0195
D(EXR_US(-1))	3.118992	1.109447	2.811304	0.0005
D(EXR_CY(-1))	-0.100383	0.485237	-0.206875	0.8381
D(EXR_CY(-2))	-1.114810	0.504861	-2.208151	0.0085
D(EXR_CY(-3))	0.269077	0.528664	0.508975	0.6161
D(EXR_JY(-2))	13.92029	35.94467	0.387270	0.0025
D(EXR_JY(-3))	44.02011	38.53681	1.142287	0.2662
D(EXR_BP(-1))	-1.930372	0.765538	-2.521588	0.0028
ECM(-1)	-0.544889	0.323681	-4.772870	0.0001
R^2	0.804541			
ADJ. R^2	0.785058			
F-STATISTICS	5.566976			
F-PROB	0.007810			
Durbin Watson Stat	2.173426			
		MODEL VI		
C	0.297672	0.744930	0.399597	0.6937
D(SMLIQ(-1))	-0.101825	0.236609	-0.430350	0.6715
D(SMLIQ(-3))	0.093379	0.224406	0.416118	0.6818
D(EXR_US(-1))	-0.038297	0.109732	-0.349009	0.7307
D(EXR_US(-2))	-0.105036	0.093570	-1.122536	0.0049
D(EXR_CY(-1))	0.010744	0.053557	0.200607	0.0130
D(EXR_JY(-1))	-6.362444	6.730485	-0.945317	0.3558
D(EXR_JY(-2))	7.939324	6.290685	1.262076	0.0214
D(EXR_JY(-3))	-1.477855	3.872102	-0.381667	0.7067
D(EXR_BP(-1))	0.071573	0.062220	1.150312	0.2636
ECM(-1)	-0.634904	0.314085	-2.021443	0.0018
R^2	0.729339			
ADJ. R^2	0.664009			
F-STATISTICS	11.504710			
F-PROB	0.000266			
Durbin Watson stat	2.404536			

Source: Extracts from E-view print out and Author's computation, 2017.

The parsimonious error correction result indicates a good fit with an F-ratio of 5.566976, an R^2 of 81% and an adjusted R^2 of 79% meaning that the model explains approximately 79% of the variations in MKTCM2(Percentage of to market capitalization to money

supply) in the model V, the D-Watson statistic of 2.17 suggests absence of any autocorrelation. Also, four of the variables EXR-US,EXR-CY,EXR-JY and EXR-BP are stationary in the long-run which shows a long-run equilibrium relationship with a probability values of 0.0005, 0.0085,0.0025,0.0028 and ECM(-1) probability value of 0.0001 now significant. Therefore, Nigeria naira exchange rate per US dollar (EXR-US), Nigeria naira exchange rate per Chinese Yuan (EXR-CY), Nigeria naira exchange rate per Japanese Yen (EXR-JY) and Nigeria naira exchange rate per British pound (EXR-BP) explanatory variables are statistically significant at 5% level of significance and with signs that are in conformity with a priori expectations and are significant at 5% significance level of Percentage of market capitalization to money supply (MKTM2). The error correction term of -0.54,has the appropriate negative sign is significant and shows that approximately 54% of the deviation from long run equilibrium in the Percentage of market capitalization to money supply (MKTM2) model is corrected every year (since it is estimated annually).

However, in model VI, the parsimonious error correction result indicates a good fit with an F-ratio of 11.504710, an R^2 of 73% and an adjusted R^2 of 66% meaning that the model explains approximately 66% of the variations in SMLIQ (Percentage of stock market liquidity) in the model VI; the D-Watson statistic of 2.04 suggests absence of any autocorrelation. Also, four of the variables of EXR-US,EXR-CY,EXR-JY and EXR-BP are stationary in the long-run which shows a long-run equilibrium relationship with a probability values of 0.0049,0.0130,0.0214,0.0018 and ECM (-1) probability value of -0.63 now significant. Therefore, Nigeria naira exchange rate per US dollar (EXR-US), Nigeria naira exchange rate per Chinese Yuan (EXR-CY), Nigeria naira exchange rate per Japanese Yen(EXR-JY) and Nigeria naira exchange rate per British pound (EXR-BP) explanatory variables are statistically significant at 5% level of significance and with signs that are in conformity with a priori expectations and are significant at 5% level significance of Percentage of stock market liquidity (SMLIQ). The error correction term

of -0.634904,has the appropriate negative sign is significant and shows that approximately 63% of the deviation from long run equilibrium in the Percentage of stock market liquidity (SMLIQ) model is corrected every year (since it is estimated annually).

4.2.3.2 Pair Wise Causality Test

Pair wise causality tests were run on the model I and II with an optimal lag of 2. The results are presented in Table 4.21. The researcher's interest here is to establish the direction of causality between the dependent variables the percentage of market capitalization to money supply (MKTCM2) and the percentage of stock market liquidity (SMLIQ) and the independent variables of exchange rate channel of monetary policy transmission mechanism such as Nigeria naira exchange rate per US dollar (EXR-US), Nigeria naira exchange rate per Chinese Yuan (EXR-CY), Nigeria naira exchange rate per Japanese Yen(EXR-JY) and Nigeria naira exchange rate per British pound (EXR-BP) 1981-2015.

Table 4.21: Pair Wise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.	Decision	Remark
MODEL V					
EXR_US does not Granger Cause MKTC_M2	33	3.73851	0.0364	Reject H_0	Causality
MKTC_M2 does not Granger Cause EXR_US		3.55856	0.0420	Reject H_0	Causality
EXR_SF does not Granger Cause MKTC_M2	33	2.81453	0.0769	Accept H_0	No Significant Causality
MKTC_M2 does not Granger Cause EXR_SF		1.53905	0.2322	Accept H_0	No Significant Causality
EXR_JY does not Granger Cause MKTC_M2	33	3.11303	0.0601	Accept H_0	No Significant Causality
MKTC_M2 does not Granger Cause EXR_JY		3.71562	0.0371	Reject H_0	Causality
EXR_BP does not Granger Cause MKTC_M2	33	4.96811	0.0142	Reject H_0	Causality
MKTC_M2 does not Granger Cause EXR_BP		2.77447	0.0796	Accept H_0	No Significant Causality
MODEL VI					
EXR_US does not Granger Cause SMLIQ	33	4.31136	0.0077	Reject H_0	Causality
SMLIQ does not Granger Cause EXR_US		0.07344	0.9294	Accept H_0	No Significant Causality
EXR_SF does not Granger Cause SMLIQ	33	1.12049	0.3403	Accept H_0	No Significant Causality
SMLIQ does not Granger Cause EXR_SF		0.28270	0.7559	Accept H_0	No Significant Causality
EXR_JY does not Granger Cause SMLIQ	33	5.63267	0.0005	Reject H_0	Causality
SMLIQ does not Granger Cause EXR_JY		1.27414	0.2954	Accept H_0	No Significant Causality
EXR_BP does not Granger Cause SMLIQ	33	4.72136	0.0232	Reject H_0	Causality
SMLIQ does not Granger Cause EXR_BP		0.13577	0.8736	Accept H_0	No Significant Causality

Source: Extracts from E-view print out and Author's computation, 2017.

In model V, from table 4.21, the results show that the F-statistic for the null hypotheses of the causality test running from EXR-US to MKTCM2 is 3.373851 with a p-value of 0.0364, MKTCM2 to EXR-US is 3.55856 with a p-value of 0.0420,MKTCM2 to EXR-JY is 3.71562 with a p-value of 0.0371,EXR-BP to MKTCM2 is 4.96811 with a p-value of 0.0142, MKTCM2 to EXR-BP is 2.77447 with a p-value of 0.0796 indicating a bi-directional causality at 5% level of significance. Therefore, this means that, in model V, there is a bi-directional causality relationship between percentage of market capitalization to money supply (MKTCM2) and its exchange rate channel of monetary policy transmission such as EXR-US running to MKTCM2 and MKTCM2 to EXR-US, also there is a bi- directional causal relationship between MKTCM2 to EXR-BP and EXR-BP to MKTCM2.

From model VI, the results show that the F-statistic for the null hypotheses of the causality test running from EXR-US to SMLIQ is 4.31136 with a p-value of 0.0077, EXR-JY to SMLIQ is 5.63267 with a p-value of 0.0005,EXR-BP to SMLIQ is 4.72136 with a p-value of 0.0232 indicating a uni-directional causality running from EXR-US to SMLIQ, EXR-JY to SMLIQ and from EXR-BP to SMLIQ at 5% level of significance. Therefore, this means that, in model VI, there is a uni-directional causality relationship between percentage of stock market liquidity (SMLIQ) and its exchange rate channel of monetary policy transmission such as EXR-US to SMLIQ, EXR-JY to SMLIQ and from EXR-BP to SMLIQ.

4.2.4 Asset Pricing Channel

In this section, we begin with the establishment of the relationship between asset pricing channel and the capital market fundamentals using the ordinary least square method (OLS) within the period under review.

Table 4.22: Level Series OLS multiple Regression Summary Results

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
		MODEL VI		
SPCMS_MKTC	-0.121117	5.941846	-0.020384	0.9839
TBR	-4.719420	1.666130	-2.832563	0.0083
ASPS_MKTC	-2.819779	4.358627	-0.646942	0.5228
ASPFI_MKTC	-0.192966	4.568627	-0.042237	0.9666
ASPCB_MKTC	-0.509137	4.809142	-0.105869	0.9164
β_0	153.9803	22.67251	6.791498	0.0000
R^2	0.555781			
ADJ. R^2	0.479191			
F-STATISTICS	0.555781			
F-PROB	0.479191			
Durbin Watson stat	1.414495			
SPCMS_MKTC	-0.751649	0.491828	-1.528278	0.1369
TBR	-0.263224	0.360271	-0.730629	0.4707
ASPS_MKTC	1.243803	0.308204	4.035653	0.0003
		MODEL VIII		
ASPFI_MKTC	-0.140890	0.360214	-0.391129	0.6985
ASPCB_MKTC	-0.751649	0.491828	-1.528278	0.1369
β_0	7.846821	0.633161	12.39310	0.0000
R^2	0.466341			
ADJ. R^2	0.395186			
F-STATISTICS	6.553913			
F-PROB	0.000648			
Durbin Watson	1.337746			

Source: Extracts from E-view print out and Author's computation, 2017.

The OLS regression estimate shows that the effects of asset pricing channel of monetary policy transmission mechanism on capital market fundamentals are presented in table 4.31 R^2 is 0.556(56%) while adjustment R^2 is 0.479 showing a total of 48% of the variations in percentage of market capitalization to broad money supply (MKTCM2) can be explained by the changes in the explanatory variables. The explanatory variable TBR (Treasury bill rate) is significant at 5% level of significance, ASPSS (aggregates stock prices of service sector), ASPCB (aggregate stock prices of commercial banks), ASPFI (aggregates stock prices of financial institutions) and SPCMS (stock prices of manufacturing sector) are not statistically significant at 5% level of significance in model VII.

However, with respect to the signs and sizes of the parameters estimates, the asset rate channel of monetary policy transmission mechanism are presented in table 4.31 above, all the explanatory variables indicated a negative coefficient with a -121117SPCMS,-

4.179420TBR,-28198779ASPSS,-0.192966ASPFI and -0.509137ASPCB and with a positive probability values of 0.9839,0.0083,0.5228,0.9666 and 0.9164 respectively and they are not significant at 5% significance level but TBR(treasury bill rate) is statistical significance at 5% significance level and n=36

Furthermore, the overall fit of model VII not is good given an F-statistic of 0.555781, (P-value = 0.499191). However, the Durbin Watson statistic is found to d* = 1.414495 and does not lies between D-Watson critical values of dL 1.50; du = 1.84 and suggesting test inconclusive in the level series result, also see appendix (1). This indicates that there may be some degree of time dependence in the level series result which could lead to spurious regression results, suggesting the need for more rigorous analysis of the stationarity properties of the level series.

Also, in model VIII, R^2 is 0.47(47%) while adjustment R^2 is 0.40 showing a total of 40% of the variations in percentage of stock market liquidity (SMLIQ) can be explained by the changes in the explanatory variables. The explanatory variable TBR (treasury bill rate) is significant at 5% level of significance while the other remaining variables of ASPSS(aggregates stock prices of service sector),ASPCB(aggregate stock prices of commercial banks),ASPFI(aggregates stock prices of financial institutions) and SPCMS(stock prices of manufacturing sector) are not statistically significant at 5% level of significance in model VIII.

However, with respect to the signs and sizes of the parameters estimates, the asset rate channel of monetary policy transmission mechanism are presented in table 4.31 above, indicated that some 0f the coefficients are positive with a 1.243803ASPSS and 0.140890ASPFI while the other variables have a negative coefficient with -0.751548SPCMS,-0.263224TBR and they are not all statistically significant at a probability values of 0.1369SPCMS,0.4707TBR,0.6985ASPFI and 0.1369ASPCB at 5% significance level and at n=36,however,aggregate stock prices of service sector (ASPSS)

has a positive probability value of 0.0003ASPSS and is statistically significant at 5% significance level and n=36.

Furthermore, the overall fit of model III is good given an F-statistic of 6.553913, (P-value = 0.000648). However, the Durbin Watson statistic is found to d* = 1.3377463 and does not lies between D-Watson critical values of dL 1.50; du = 1.84 and suggesting test inconclusive in the level series result, also see appendix (1). This indicates that there may be some degree of time dependence in the level series result which could lead to spurious regression results, suggesting the need for more rigorous analysis of the stationarity properties of the level series Data.

4.2.4.1 Testing for Unit Root (Stationarity Test)

Therefore, in view of the time – dependent feature of our data, the variables were tested for unit root using the Augmented Dickey Fuller (ADF) test. The results of the unit root tests are presented in Table 4.23:

Table 4.23: Unit Root Test Summary Results at First Difference

VARIABLE	ADF STATISTICS	MACKINNON			PROB.	ORDER OF INTR.
		1%	5%	10%		
MKTC/M2	-6.569121	-3.646342	-2.954021	-2.615817	0.0000	1 (1)
		MODEL VII				
SPCMS_MKTC	-4.592101	-3.689194	-2.971853	-2.625121	0.0011	1 (1)
TBR	-6.779855	-3.646342	-2.954021	-2.615817	0.0000	1 (1)
ASPS_MKTC	-13.40350	-3.653730	-2.957110	-2.617434	0.0000	1 (1)
ASPFI_MKTC	-3.915064	-3.646342	-2.954021	-2.615817	0.0051	1 (1)
ASPCB_MKTC	-4.033789	-3.639407	-2.951125	-2.614300	0.0036	1 (1)
		MODELVIII				
SMLIQR	-8.003915	-3.646342	-2.954021	-2.615817	0.0000	1 (1)
SPCMS_MKTC	-4.033789	-3.639407	-2.951125	-2.614300	0.0036	1 (1)
TBR	-6.779855	-3.646342	-2.954021	-2.615817	0.0000	1 (1)
ASPS_MKTC	-11.23946	-3.661661	-3.661661	2.619160	0.0000	1 (1)
ASPFI_MKTC	-3.915064	-3.646342	-2.954021	-2.615817	0.0000	1 (1)
ASPCB_MKTC	-4.592101	-3.689194	-2.971853	-2.625121	0.0011	1 (1)
SPCMS_MKTC	-13.40350	-3.653730	-2.957110	-2.617434	0.0000	1 (1)

Source: Extracts from E-view print out and Author's computation, 2017.

From Table 4.23, the results of the unit root tests show that the null hypotheses of a unit root for time-dependent variables of a non-stationary nature can be made stationary at the first difference. It also shows that all the variables in model VII and VII are integrated of

order 1(1).This implies that percentage of market capitalization to broad money supply (MKTC/M2) and stock market liquidity (SMLIQ) as our dependent variables and all the explanatory variable TBR (treasury bill rate),ASPSS(aggregates stock prices of service sector), ASPCB(aggregate stock prices of commercial banks),ASPFI(aggregates stock prices of financial institutions) and SPCMS(stock prices of manufacturing sector) became stationary at first differencing and it is integrated of 1(1).The result of the unit root tests of the asset rate channel of the monetary policy transmission is in table 4.23 and appendices 4 stationary at first differencing.

Having established the order of integration for the variables, the next step is to carry out a co-integration test to determine whether a long-run relationship exists between the variables. In this study we adopt co-integration test developed by Johansen (1988). The result of the co-integration test is presented in table 4.24.

Johansen co-integration test results: Maximum Eigen

Test assumption: Linear deterministic trend in the data series: TBR, ASPSS, ASPCB, ASPFI, SPCMS, MKTC/M2 and SMLIQ

Table 4.24: Test of Co-integration: Maximum Eigen

	Hypothesized No. of CE(s)	Eigen value	Maximum	0.05 Critical Value	Prob.**	Decision
			MODEL VII			
	None *	0.899079	75.68280	40.07757	0.0000	Reject H_0
	At most 1 *	0.796902	52.60415	33.87687	0.0001	Reject H_0
	At most 2 *	0.709368	40.77800	27.58434	0.0006	Reject H_0
	At most 3 *	0.593179	29.67960	21.13162	0.0025	Reject H_0
	At most 4 *	0.576778	28.37536	14.26460	0.0002	Reject H_0
	At most 5 *	0.233254	8.764793	3.841466	0.0031	Reject H_0
	None *	0.878085	69.44624	40.07757	0.0000	Reject H_0
MODEL VIII	At most 1 *	0.783610	50.51218	33.87687	0.0002	Reject H_0
	At most 2 *	0.714249	41.33695	27.58434	0.0005	Reject H_0
	At most 3 *	0.640780	33.78603	21.13162	0.0005	Reject H_0
	At most 4 *	0.426696	18.35917	14.26460	0.0107	Reject H_0
	At most 5 *	0.211022	7.821543	3.841466	0.0052	Reject H_0

Source: Extracts from E-view print out and Author's computation

***(**) denotes rejection of the hypothesis at 5%**
L.R test indicates 5 co-integration equation(s) at 5% significance level.

From Table 4.24 above the results of the Johansen co-integration test shows that we adopt the alternative hypotheses of at most 5 co-integrating equation at the 5% level of significance. This implies that, there is five linear combination of the variables that is stationary in the long run and also confirms the existence of a long-run relationship between the asset rate channel of monetary policy transmission variable of TBR (treasury bill rate),ASPSS(aggregates stock prices of service sector),ASPCB(aggregate stock prices of commercial banks),ASPFI(aggregates stock prices of financial institutions) and SPCMS(stock prices of manufacturing sector) and percentage of market capitalization to money supply (MKTCM2) and stock market liquidity (SMLIQ). This implies that the null hypothesized hypotheses are rejected and the alternate accepted.

Table 4.25: Normalized Co-integrating Equation

VARIABLE	COEFFICIENT	Std error	REMARK
MKTC/M2	1.000000		
	MODEL VII		
SPCMS_MKTC	66.78068	12.0034	Confirm to expectation
TBR	8.945349	1.75393	Confirm to expectation
ASPS_MKTC	-16.68082	9.14174	Contrary to expectation
ASPFI_MKTC	-6.982401	5.22650	Contrary to expectation
ASPCB_MKTC	-60.22176	5.68032	Contrary to expectation
	MODEL VIII		
SMLIQ	1.000000		
SPCMS_MKTC	13.29820	1.94414	Confirm to expectation
TBR	0.227493	0.28601	Confirm to expectation
ASPS_MKTC	4.902842	1.47514	Confirm to expectation
ASPFI_MKTC	-1.640551	0.84802	Contrary to expectation
ASPCB_MKTC	-7.730167	0.92047	Contrary to expectation

Source: Extracts from E-view print out and Author's computation, 2017.

The normalized co-integration test above, established the existence of long-run relationship among the variables. As presented in the table 4.25, in model VII and VIII some of the independent variables have negative long-run relationship with the dependent variables such as ASPFI and ASPCB while other independent variables like SPCMS, TBR and ASPSS have positive long run dynamics relationship with the dependent variable implying that increase on the independent variables will lead increase on the dependent variables. This confirms to the a-piriori expectation of the results and validates

the asset pricing channel as formulated by the classical monetary policy theory. However the negative effect of the independent variables is contrary to the expectation and could be traced to imperfection in the Nigeria capital market, sensitivity of the capital market to external shocks such the capital market crash of 2007/2008 caused by the global financial crisis. It could also be traced to poor corporate governance and insider dealings in the financial market.

Vector Error Correction Model (VECM)

From co-intrgration test, having established a long–run equilibrium relationship, therefore, we estimate the error correction term using the vector error correction model to examine their speed and magnitude at which the long-run equilibrium corrects for disequilibrium.

To further the analysis of the long run relationship, the percentage of market capitalization to money supply(MKTCM2) and the percentage of stock market liquidity (SMLIQ) under investigation is then specified in a VECM incorporating a two – period lag residual. The VECM is employed to capture the short-run deviations of the parameters from the long-run equilibrium. The autoregressive distributed lag techniques were used with a maximum lag of 1 to obtain an over parameterized result (Table 4.26) and then arriving at the parsimonious error correction result using the general to specific approach as presented in the parsimonious result in Table 4.27

Table 4.26 Over-paramatized Error Correction Model

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
		MODELVII		
C	143.5966	23.17103	6.197248	0.0000
SPCMS_MKTC	-0.812927	5.889464	-0.138031	0.8912
TBR	-3.870735	1.720330	-2.249995	0.0328
ASPS_MKTC	-3.107684	4.506303	-0.689630	0.4963
ASPFI_MKTC	1.263480	4.595355	0.274947	0.7854
ASPCB_MKTC	-0.681521	5.040642	-0.135205	0.8935
ECM(-1)	-0.618074	0.190211	1.672222	0.0679
R^2	0.872871			
ADJ. R^2	0.852398			
F-STATISTICS	6.553017			
F-PROB	0.000234			
Durbin Watson stat	1.896594			
		MODEL VIII		
C	9.632912	1.888189	5.101667	0.0000
SPCMS_MKTC	-0.756822	0.480736	-1.574299	0.1271
TBR	-0.137285	0.139675	-0.982889	0.3344
ASPS_MKTC	-0.413479	0.367612	-1.124770	0.2706
ASPFI_MKTC	1.039873	0.374615	2.775845	0.0099
ASPCB_MKTC	0.199869	0.409891	0.487615	0.6298
ECM(-1)	-0.582439	0.184308	1.532429	0.0826
R^2	0.686101			
ADJ. R^2	0.655235			
F-STATISTICS	5.414105			
F-PROB	0.000878			
Durbin Watson stat	2.082389			

Source: Extracts from E-view print out and Author's computation, 2017

From the Table 4.26 , the vector error correction model (VECM) result shows that R^2 = 87% and adjusted R^2 =85% % which indicates a good fit with an F- statistic value of 6.553017 and a probability value of 0.000023 and the error correction term. This is further analyzed by a Parsimonious. ECM is appropriately signed and not statistically significant with a probability value of 0.0679 in model VII.

However, model VIII revealed that the vector error correction model (VECM) result shows that R^2 = 69% and adjusted R^2 = 66% which indicates a good fit with an F-statistic value of 5.414105 and a probability value of 0.000878 and the error correction term. This is further analyzed by a Parsimonious. ECM is appropriately signed and not statistically significant with a probability value of 0.0826 in model VI

Table 4.27: Parsimonious Error Correction Model

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
		MODEL VII		
C	4.168986	9.796116	0.425575	0.6752
D(MKTC_M2(-1))	0.309641	0.259342	1.193948	0.2472
D(MKTC_M2(-3))	0.198026	0.220205	0.899280	0.3798
D(SPCMS_MKTC(-1))	0.826657	8.382266	0.098620	0.0025
D(TBR(-1))	2.267472	2.114269	1.072461	0.2969
D(TBR(-2))	-0.276307	1.749928	-0.157896	0.8762
D(TBR(-3))	1.615429	1.917452	0.842487	0.0000
D(ASPS_MKTC(-1))	2.088761	6.041190	0.345753	0.0033
D(ASPS_MKTC(-3))	2.937155	5.954507	0.493266	0.6275
D(ASPFI_MKTC(-1))	-1.136245	8.824234	-0.128764	0.0029
ECM(-1)	-0.779719	0.277027	-2.814591	0.0001
R^2	0.948782			
ADJ. R^2	0.918239			
F-STATISTICS	11.925099			
F-PROB	0.000542			
Durbin Watson stat	2.042772			
		MODEL VIII		
C	0.117329	0.604789	0.193999	0.8477
D(SMLIQ(-1))	-0.066118	0.177734	-0.372004	0.0000
D(SMLIQ(-3))	-0.065514	0.175624	-0.373035	0.0023
D(SPCMS_MKTC(-3))	-0.131377	0.283110	-0.464048	0.6466
D(ASPS_MKTC(-1))	0.195461	0.371464	0.526192	0.0034
ECM(-1)	-0.685463	0.208229	-3.291877	0.0030
R^2	0.899077			
ADJ. R^2	0.880893			
F-STATISTICS	9.461343			
F-PROB.	0.000330			
Durbin Watson stat	2.058314			

Source: Extracts from E-view print out and Author's computation, 2017.

The parsimonious error correction result indicates a good fit with an F-ratio of 11.925099, an R^2 of 95% and an adjusted R^2 of 92% meaning that the model explains approximately 92% of the variations in MKTCM2(Percentage of to market capitalization to money supply) in the model VII, the D-Watson statistic of 2.04 suggests absence of any autocorrelation. Also, ASPFI, SPCMS, TBR and ASPSS are stationary in the long-run which shows a long-run equilibrium relationship with a probability values of 0.0029, 0.0025, 0.0000, 0.0033 and ECM (-1) probability value of 0.0001 now significant. Therefore, The explanatory variable of TBR (treasury bill rate), ASPSS(aggregates stock prices of service sector),ASPCB(aggregate stock prices of commercial banks),ASPFI(aggregates stock prices of financial institutions) and SPCMS

(stock prices of manufacturing sector) are statistically significant at 5% level of significance and with signs that are in conformity with a priori expectations and are significant at 5% significance level of Percentage of market capitalization to money supply (MKTM2). The error correction term of -0.779719,has the appropriate negative sign is significant and shows that approximately 78% of the deviation from long run equilibrium in the Percentage of market capitalization to money supply (MKTCM2) model is corrected every year (since it is estimated annually).

However, in model VIII, the parsimonious error correction result indicates a good fit with an F-ratio of 9.461343, an R^2 of 90% and an adjusted R^2 of 88% meaning that the model explains approximately 88% of the variations in SMLIQ (Percentage of stock market liquidity) in the model VIII; the D-Watson statistic of 2.06 suggests absence of any autocorrelation. Also, ASPSS is stationary in the long-run which shows a long-run equilibrium relationship with a probability value of 0.0034 and ECM (-1) probability value of -0.685463 now significant. Therefore, SPCMS (stock prices of manufacturing sector) explanatory variable is statistically insignificant at 5% level of significance and with signs that is in conformity with a priori expectations and is significant at 5% level significance of Percentage of stock market liquidity (SMLIQ). The error correction term of -0.685463,has the appropriate negative sign is significant and shows that approximately 69% of the deviation from long run equilibrium in the Percentage of stock market liquidity (SMLIQ) model is corrected every year (since it is estimated annually).

4.2.4.2 Pair Wise Causality Test

Pair wise causality tests were run on the model I and II with an optimal lag of 2. The results are presented in Table 4.28. The researcher's interest here is to establish the direction of causality between the dependent variables the percentage of market capitalization to money supply (MKTCM2) and the percentage of stock market liquidity

(SMLIQ) and the independent variables of asset pricing channel of monetary policy transmission mechanism such TBR (treasury bill rate), ASPSS(aggregates stock prices of service sector),ASPCB(aggregate stock prices of commercial banks),ASPFI(aggregates stock prices of financial institutions) and SPCMS(stock prices of manufacturing sector), 1981-2015.

Table.4.28: Pair Wise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.	Decision	Remark
MODEL VI1					
MKTC_M2 does not Granger Cause TBR		0.77045	0.4724	Accept H_0	No Significant Causality
SPCMS_MKTC does not Granger Cause MKTC_M2	33	4.00177	0.0340	Reject H_0	Causality
MKTC_M2 does not Granger Cause SPCMS_MKTC		1.33175	0.2802	Accept H_0	No Significant Causality
ASPS_MKTC does not Granger Cause MKTC_M2	33	5.03834	0.0191	Reject H_0	Causality
MKTC_M2 does not Granger Cause ASPS_MKTC		0.82126	0.4502	Reject H_0	No Significant Causality
ASPFI_MKTC does not Granger Cause MKTC_M2	33	1.68950	0.2029	Reject H_0	No Significant Causality
MKTC_M2 does not Granger Cause ASPFI_MKTC		0.28433	0.7547	Reject H_0	No Significant Causality
ASPCB_MKTC does not Granger Cause MKTC_M2	33	4.25753	0.0433	Reject H_0	Causality
MKTC_M2 does not Granger Cause ASPCB_MKTC		0.75162	0.4809	Accept H_0	No Significant Causality
MODEL VIII					
SPCMS_ does not Granger Cause SMLIQ	33	0.81964	0.4509	Accept H_0	No Significant Causality
SMLIQ does not Granger Cause SPCMS_MKTC		3.50068	0.0404	Reject H_0	Causality
TBR does not Granger Cause SMLIQ	33	0.35523	0.7041	Reject H_0	No Significant Causality
SMLIQ does not Granger Cause TBR		0.52001	0.6001	Reject H_0	No Significant Causality
ASPS_does not Granger Cause SMLIQ	33	0.81447	0.4531	Reject H_0	No Significant Causality
SMLIQ does not Granger Cause ASPS_MKTC		0.93871	0.4031	Reject H_0	No Significant Causality
ASPFI_ does not Granger Cause SMLIQ	33	5.73990	0.0003	Reject H_0	Causality
SMLIQ does not Granger Cause ASPFI_MKTC		0.10977	0.8964	Reject H_0	No Significant Causality
ASPCB_ does not Granger Cause SMLIQ	33	7.75941	0.0000	Reject H_0	Causality
SMLIQ does not Granger Cause ASPCB_MKTC		0.89240	0.4210	Reject H_0	No Significant Causality

Source: Extracts from E-view print out and Author's computation, 2017.

In model VII, from table 4.28, the results show that the F-statistic for the null hypotheses of the causality test running from SPCMS to MKTCM2 is 4.0017 with a p-value of 0.0340, ASPCSS to MKTCM2 is 5.03834 with a p-value of 0.0191, ASPCB to MKTCM2 is 4.25753 with a p-value of 0.0433 indicating a uni-directional causality at 5% level of significance. Therefore, this means that, in model VII, there is a uni-directional causality relationship between percentage of market capitalization to money supply (MKTCM2) and its asset pricing channel of monetary policy transmission such as

SPCMS running to MKTCM2 and ASPCSS to MKTCM2 and ASPCB running to MKTCM2.

From model VIII, the results show that the F-statistic for the null hypotheses of the causality test running from SMLIQ to SPCMS is 3.50068 with a p-value of 0.0404, ASPFI to SMLIQ is 5.73990 with a p-value of 0.0003 and from ASPCB to SMLIQ is 7.75941 with a p-value of 0.0000 indicating a uni-directional c/ausality running from SMLIQ to SPCMS, ASPFI to SMLIQ and from ASPCB to SMLIQ at 5% level of significance. Therefore, this means that, in model VIII, there is a uni-directional causality relationship between percentage of stock market liquidity (SMLIQ) and its asset pricing channel of monetary policy transmission such as SMLIQ to SPCMS, APSPFI to SMLIQ and from ASPCB to SMLIQ.

4.2.5.1 Hypotheses Testing (T-Test)

H_0: $\hat{b}_0$, $\hat{b}_1$ = O

H_1: $\hat{b}_0, \hat{b}_1 \neq 0$

Hypothesis One

H_{01}: There is no significant relationship between interest rate channel of monetary policy transmission mechanism and capital market fundamentals.

Under Model I

From the result of the parsimonious error correction in table 4.6, the F*- cal =4.268205 > F*- tab = 2.64 at 5% n=33 is statistically significant which is supported with a probability value of 0.000734 < 0.05 at 5% is significant, we therefore reject the null hypothesis,

that is β_0-β_5 (interest rate channel) is statistically significant with capital market capitalization at n=33 and 5% level of significance.

Under Model II

There is no significant relationship between interest rate channel of monetary policy transmission mechanism and stock market liquidity.

From the result of the parsimonious error correction in table 4.6, the F*- cal =7.217861 > F* - tab = 2.64 at 5% n=33 is statistically significant which is supported with a probability value of 0.000065 < 0.05 at 5% is significant, we therefore reject the null hypothesis, that is X_1 - X_2 (credit channel) is statistically significant with stock market liquidity at n=33 and 5% level of significance.

Hypothesis Two

H_{02}: There is no significant relationship between credit channels of monetary policy transmission mechanism and market capitalization.

Under Model III

From the result of the parsimonious error correction table 4.13, the F*- cal =10.02999 > F*- tab = 2.64 at 5% n=33 is statistically significant which is supported with a probability value of 0.000042 < 0.05 at 5% is significant, we therefore reject the null hypothesis, that is S_1-S_5 (credit channel) is statistically significant with capital market capitalization at n=33 and 5% level of significance.

Under Model IV

From the result of the parsimonious error correction in table 4.13, the F* - cal =34461118 > F* - tab = 2.64 at 5% n=33 is statistically significant which is supported with a probability value of 0.009825 < 0.05 at 5% is significant, we therefore reject the null hypothesis, that is α_1-α_5 (credit channel) is statistically significant with stock market liquidity at n=33 and 5% level of significance.

Hypothesis Three

H_{03}: There is no significant relationship between exchange rate channel of monetary policy transmission mechanism and capital market capitalization.

Under Model V

From the result of the parsimonious error correction table 4.20, the F* - cal =5.526881 > F* - tab = 2.64 at 5% n=33 is statistically significant which is supported with a probability value of 0.005925 < 0.05 at 5% is significant, we therefore reject the null hypothesis, that is T_1-T_5 (exchange rate channel) is statistically significant with capital market capitalization at n=33 and 5% level of significance.

Under Model VI

From the result of the parsimonious error correction table 4.20, the F*- cal =11.50471 > F*- tab = 2.64 at 5% n=33 is statistically significant which is supported with a probability value of 0.0000266 < 0.05 at 5% is significant, we therefore reject the null

hypothesis, that is P_1-P_5 (exchange rate channel) is statistically significant with stock market liquidity at n=33 and 5% level of significance.

Hypothesis Four

H_{04}: There is no significant relationship between asset price channel of monetary policy transmission mechanism and market capitalization.

Under Model VII

From the result of the parsimonious error correction table 4.27, the F* - cal =11.925099 > F* - tab = 2.64 at 5% n=33 is statistically significant which is supported with a probability value of 0.000542 < 0.05 at 5% is significant, we therefore reject the null hypothesis, that is Y_1-Y_2 (asset pricing channel) is statistically significant with capital market capitalization at n=33 and 5% level of significance.

Under Model VIII

From the result of the parsimonious error correction table 4.27, the F* - cal =9.461343 > F* - tab = 2.64 at 5% n=33 is statistically significant which is supported with a probability value of 0.000330 < 0.05 at 5% is significant, we therefore reject the null hypotheses, that is Z_1-Z_2 (asset pricing channel) is statistically significant with stock market liquidity at n=33 and 5% level of significance.

4.3 Summary of Hypotheses Testing

Table 4.29 : Test of Hypothesis 1 -4

	Hypothesized	F-Statistics	Probability	Decision	Remark
H_{01}	Interest Rate and Market Capitalization	4.268205	0.000734	Significant	Reject H_0
	Interest Rate and Stock Market Liquidity	7.217861	0.000065	Significant	Reject H_0
H_{02}	Credit Channel and Market Capitalization	10.02999	0.000042	Significant	Reject H_0
	Credit Channel and Stock Market Liquidity	3.446118	0.009825	Significant	Reject H_0
H_{03}	Exchange Rate Channel and Stock Market Capitalization	5.526881	0.005927	Significant	Reject H_0
	Exchange Rate and Stock Market Liquidity	11.50471	0.000266	Significant	Reject H_0
H_{04}	Asset Pricing Channel and Market Capitalization	11.92509	0.000542	Significant	Reject H_0
	Asset Pricing Channel and Market Liquidity	9.461343	0.000330	Significant	Reject H_0

Source: Extracts from E-view print out and Author's computation, 2017

4.4 Discussion of Findings

4.4.1 Interest Rate Channel (See Table 4.6 and appendix I and II)

From the result of our parsimonious vector error correction result in table 4.6, the relationship between percentage of market capitalization to broad money supply (MKTM2) and interest rate channel is high. This is because of an adjusted R^2 of 0.6895 meaning that the model explains approximately 69% of the total variations in the percentage of market capitalization to broad money supply (MKTM2); the error correction model shows a negative value of -0.7081 which is appropriate and is significant. This means that 71% of the deviation from long run equilibrium relationship in the percentage of market capitalization to broad money supply (MKTM2) is corrected every year since aggregates market capitalization is estimated annually. Some of the values of the coefficient of independent variables, that is interest rate channel are positive except long term saving rate(LSR),maximum lending rate (MLR) and monetary policy rate (MPR), and with also a negative t-statistic values but with monetary policy rate (MPR),maximum lending rate(MLR) and prime lending rate (PLR) having a probability values of 0.0040*,0.0013* and 0.00066* respectively and less than 0.05 and

are significant at n=36, 5% level of significant while saving rate (SR) and long term saving rate(LSR) are not significant with a probability values of 0.30939,and 0.8593 and less than 0.05 and are not significant at n = 36, 5% level of significant in model I.

Also model II result shows that the relationship between percentage of stock market liquidity (SMLIQ) and interest rate channel is high. This is because of an adjusted R^2 of 0.6439 meaning that the model explains approximately 64% of the total variations in the percentage stock market liquidity (SMLIQ); the error correction model shows a negative value of -0.828615 which is appropriate and is significant. This means that 82% of the deviation from long run equilibrium relationship in the percentage of stock market liquidity (SMLIQ) is corrected every year since aggregates stock market liquidity can be estimated annually. Some of the values of the coefficient of independent variables, that is, interest rate channel are positive except saving rate(SR) and with a positive t-statistics value of 0.5988.However,maximum lending rate (MLR), monetary policy rate (MPR) and long term saving rate(LSR) a negative t-statistic values of -0.304671PLR and -0.644352MPR and prime lending rate (PLR),monetary policy rate, maximum lending rate and long term saving rate having a probability values of 0.0071*,0.0038*,0.0090 and 0.0381* respectively and less than 0.05 and are significant at n=36, 5% level of significant while saving rate (SR) and saving rate(SR) is not significant with a probability value of 0.5988 less than 0.05 and is not significant at n = 36, 5% level of significant.

Therefore, this means that from the results, there is a long run equilibrium relationship between percentage of market capitalization (MKTCM2), percentage of stock market liquidity (SMLIQ) and maximum lending rate (MLR), monetary policy rate (MPR) and prime lending rate (PLR) within the period under study. This suggests that our independent variables of interest rate channel can be stationary at long run. Furthermore, the overall fit of the model is good given an F* -statistic table value of 7.217861 and a p-value of 0.000065. However, the Durbin – Watson statistic value is 2.151031 and now lies above the Durbin – Watson critical values of $d_L = 1.05$; du = 1.84 suggests absence of

any auto correlation. This means that the variables are stationary in the long run. However, the study also revealed that the independent variable LSR, PLR and SR granger cause changes in MKTCM2 in model I while LSR and PLR granger cause changes in SMLIQ and there is granger causality test between MKTCM2, SMLIQ and interest rate channel of monetary policy transmission mechanism within the period understudy. The implication is that there a uni-directional causality running from our dependent variables to some of our independent variables.

The implication is that banks cannot always set high interest rates, for instance, trying to earn maximum interest income, banks should consider the problems of adverse selection and moral hazard since it is very difficult to forecast the borrower type at the start of the banking relationship (Oputu, 2010). If banks set interest rates too high, they may induce adverse selection problems because high-risk borrowers are willing to accept these high rates. Once these borrowers receive the loans, they may develop moral hazard behaviour or so called borrower moral hazard since they are likely to take on highly risky projects or investments although the Keynesian liquidity preference theory could be used to determines the interest rate by the demand for and supply of money which is a stock theory. It emphasizes that the rate of interest is purely a monetary phenomenon. It is a stock analysis because it takes the supply of money as given during the short run and determines the interest rate by liquidity preference or demand for money. On the other hand, the loanable funds theory is a flow theory that determines the interest rate by the demand for and supply of loanable funds. It involves the linking of interest rates with savings, dishoarding and bank money on the supply side. However, this work is anchored on the Keynesian theory.

The results from the interest rate channel indicate that the Keynesian liquidity preference theory and the interest rate theory of investment as formulated by the classical monetary policy is important in the fundamentals of the Nigerian capital market. The need for a stable interest to determine investors return in the capital market becomes necessary to

stop capital flight out of the Nigerian financial market. The interest rate channel intends to examine the relationship between interest rate structure and the performance of Nigeria capital market. The models formulated to market capitalization and stock market liquidity found that the models are statistically significant from the parsimonious error correction result which is considered most preferred results. It is arguable that the significant effect of the variables can be traced frequent interest rate variations such as the deregulation of exchange rate in the last quarter of 1986, monetary policy and macroeconomic policies that affect the economy and results in the regulation of interest rates. For instance the present macroeconomic challenges results in frequent variations of interest that affect the capital market fundamentals. The conclusion from the interest rate channels is that the null hypothesis is rejected and the alternate accepted.

4.4.2 The Credit Channel (See Table 4.13 and appendix III and IV)

From the result of our parsimonious vector error correction result in table 4.13, the relationship between percentage of market capitalization to broad money supply (MKTM2) and interest rate channel is high. This is because of an adjusted R^2 of 0.8005 meaning that the model explains approximately 80% of the total variations in the percentage of market capitalization to broad money supply (MKTM2); the error correction model shows a negative value of -0.675084 which is appropriate and is significant. This means that 68% of the deviation from long run equilibrium relationship in the percentage of market capitalization to broad money supply (MKTM2) is corrected every year since aggregates market capitalization is estimated annually. All the values of the coefficient of independent variables, that is credit channel are positive except credit private sector- to gross domestic product(CPS-GDP) and net domestic credit (NDC) and with also a negative t-statistic values but short term credit (STC-TC),credit to private sector to gross domestic product (CPS-GDP),net domestic credit (NDC),long term credit (LTC-TC) and credit to real sector (CRS-TC) are having a probability values of

0.0220*,0.0011* 0.0095*0.0361* and 0.0243* respectively and less than 0.05 and are significant at n=36, 5% level of significant while medium term credit to total credit (MTC-TC) is not significant with a probability value of 0.6552 and less than 0.05 and are not significant at n = 36, 5% level of significant in model III.

Also model IV result shows that the relationship between percentage of stock market liquidity (SMLIQ) and interest rate channel is high. This is because of an adjusted R^2 of 0.9413 meaning that the model explains approximately 94% of the total variations in the percentage stock market liquidity (SMLIQ); the error correction model shows a negative value of -0.787353 which is appropriate and is significant. This means that 79% of the deviation from long run equilibrium relationship in the percentage of stock market liquidity (SMLIQ) is corrected every year since aggregates stock market liquidity can be estimated annually.

All the values of the coefficient of independent variables, that is credit channel are negative except credit to real sector to total credit (CRS-TC) with also a positive t-statistic value but short term credit (STC-TC),credit to private sector to gross domestic product (CPS-GDP),net domestic credit (NDC),long term credit (LTC-TC) and medium term credit to total credit (MTC-TC) are having a probability values of 0.0071*,0.0093* 0.0046*0.0361* and 0.0025* respectively and less than 0.05 and are significant at n=36, 5% level of significance.

Therefore, this means that from the results, there is a long run equilibrium relationship between percentage of market capitalization (MKTCM2), percentage of stock market liquidity (SMLIQ) and short term credit (STC-TC), credit to private sector to gross domestic product (CPS-GDP), net domestic credit (NDC), long term credit (LTC-TC) and medium term credit to total credit (MTC-TC) within the period under study. This

suggests that our independent variables of credit rate channel can be stationary at long run.

Furthermore, the overall fit of the model is good given an F* -statistic table value of 9.446118 and a p-value of 0.009827. However, the Durbin – Watson statistic value is 2.239362 and now lies above the Durbin – Watson critical values of $d_L = 1.05$; du = 1.84 suggests absence of any auto correlation. This means that the variables are stationary in the long run. However, the study also revealed that the independent variables NDC-TC,STC-TC,LTC-TC granger cause MKTCM2 and dependent variables MKTCM2 also granger cause CPS-GDP,LTC-TC and CTRS-TC .This means that there is a un-directional causality running from NDC-TC,STC-TC to MKTM2 and bi-directional causality running from LTC-TC to MKTCM2 in model III while in model IV, MTC-TC granger cause SMLIQ and our dependent variable SMLIQ granger cause CPS-GDP and CTRS-TC which means that there is a uni-directional causality running from MTC-TC ,CTRS-TC,CPS-GDP to SMLIQ and there is also a bi-directional causality running from STC-TC to SMLIQ and from SMLIQ to STC-TC in model IV.

The implication is that monetary policy stance through credit channels can be explicitly pro- or anti-domestic credit, which affects private investment and in addition to the usual interest rate effect, monetary policy affects investment through the quantity of credit and its overall effects on financial intermediation and by reducing overall financial intermediation, credit contraction depresses business investment and overall economic activity.

However, the fact that some of our independent variables are negatively signed shows that increase in the variables will reduces the market capitalization and the liquidity of the capital market which is contrary to the expectation of the results and theoretical cornerstone of the classical monetary policy theory, the monetary policy function of Central Bank of Nigeria as contain in Central Bank of Nigeria Act 1959 as amended and

monetary policy objective. The findings confirm the opinion of Jiliji (2004) on the relationship between credit expansions on financial sector crises.

The negative effect of the variables could be traced to tightening monetary policy that contract credit with the objective of controlling excess liquidity in the financial system and the economy, conflicting monetary policy objectives with macroeconomic policy and monetary policy mismatch such as the withdrawal of all public fund from the financial system in 1993 and the present Treasury Single Account that have threatened the liquidity of the financial market.

The positive effect of the variables confirm the a-piriori expectation, agrees the Keynesian monetarists opinion on the effect of monetary policy on financial market. Expansionary monetary policy increase money supply via the credit channel reduces interest rate and expands investment borrowings. From the parsimonious error correction model which is considered most preferred and the study conclude that there is significant relationship between the credit channel and market capitalization, stock market liquidity.

4.4.3 The Exchange Rate Channel (See Table 4.20 and appendix V and VI)

From the result of our parsimonious vector error correction result in table 4.20, the relationship between percentage of market capitalization to broad money supply (MKTM2) and exchange rate channel is high. The results of the exchange rate channel confirm that the depreciating naira exchange rate channel attracts foreign portfolio investment as the β coefficient of the variables found positive relationship with the dependent variable proxy by percentage of market capitalization to money supply (MKTCM2). The finding reveals that all the independent variables have positive relationship with market capitalization except Nigerian exchange rate with the Swiss Franc which can be attributed to low bilateral trade relationship between Nigeria and France. The probabilities of the independent variables found that naira exchange rate against US Dollar, Swiss Franc and British Pound Sterling have significant relationship

with market capitalization. The significant effects of the independent variable confirm the error correction model. The R^2 and the adjusted R^2 of 80% and 79% explained variation further justify the effect of the exchange rate channel on the capital market fundamentals proxy by the market capitalization. This finding confirms the portfolio theory of exchange rate against the traditional theory and also agrees with the findings of Nnanna (2001). From the model result, the study concludes in favor of alternate hypotheses which mean that we reject the null and accept the alternate in model V.

However, in model VI, the relationship between the independent variables on capital market fundamentals was further investigated by using the capital market liquidity. The result found that the independent variables have negative but insignificant relationship with the stock market liquidity. Though the vector error correction model is significant -0.634904 and a p-value of 0.0018 which is appropriate. This also means 63% of the deviation from the long run equilibrium relationship can be corrected every year since aggregate stock market liquidity is estimated annually. Also, the R^2 and the adjusted R^2 proved that the independent variables can only explain 73% and 67% variation on stock market liquidity. The findings of this model justify the traditional theory as against the portfolio theory. The findings proved that there is significant relationship between the exchange rate channel and the Nigerian capital market liquidity in model VI.

Theoretically, there are two schools of thought on the relationship between exchange rate pattern and international trade. The traditional view holds that volatility increase risk of trade and therefore depresses trade flows; this therefore reduces international trade level lower than exchange rate volatility thus coupled with the fact that Nigerian capital market was internationalized and the stock price deregulated to attract foreign portfolio investors. Trading across Nigerian boarder was enhanced with the introduction of Central Securities Clearing System while interest rate equilibrates the international financial market. The depreciating Naira Exchange rate is expected to attract foreign portfolio investment according to the portfolio theory.

4.4.4 Asset Pricing Channel (See Table 4.22 and appendix VII and VIII)

From the result of our parsimonious vector error correction result in table 4.27, the relationship between percentage in market capitalization to broad money supply (MKTM2) and asset price channel is high. This is because of an adjusted R^2 of 0.91% meaning that the model explains approximately 91% of the total variations in the percentage of market capitalization to broad money supply (MKTM2); the error correction model shows a negative value of -0.779719 which is appropriate and is significant. This means that 78% of the deviation from long run equilibrium relationship in the percentage of market capitalization to broad money supply (MKTM2) is corrected every year since aggregates market capitalization is estimated annually.

All the values of the coefficient of independent variables, that is asset pricing channel are positive except treasury bill rate (TBR),aggregate stock prices of financial institution (ASPFI) and with also a negative t-statistic values but aggregate stock prices of commercial banks (ASPCB), Stock prices of manufacturing sector(SPMS) and aggregate stock prices of service sector (ASPS),are having a probability values of 0.0025*, 0.0033* and 0.0029* respectively and less than 0.05 and are significant at n=36, 5% level of significant while treasury bill rate is not significant with a probability value of 0.8762 and less than 0.05 and are not significant at n = 36, 5% level of significant in model VII.

Also model VII result shows that the relationship between percentage of stock market liquidity (SMLIQ) and asset pricing channel is high. This is because of an adjusted R^2 of 0.880893 meaning that the model explains approximately 88% of the total variations in the percentage stock market liquidity (SMLIQ); the error correction model shows a negative value of -0.685463 which is appropriate and is significant. This means that 69% of the deviation from long run equilibrium relationship in the percentage of stock market liquidity (SMLIQ) is corrected every year since aggregates stock market liquidity can be estimated annually.

Furthermore, the overall fit of the model is good given an F* -statistic value of 9.641343 and a p-value of 0.000330. However, the Durbin – Watson statistic value is 2.058314 and now lies above the Durbin – Watson critical values of d_L = 1.05; du = 1.84 suggests absence of any auto correlation. This means that the variables are stationary in the long run and there is a strong relationship between our independent variables (asset pricing channel of monetary policy) and dependent variables of percentage market capitalization (MKTCM2) and percentage of stock market liquidity (SMLIQ).

However, this study also revealed that the independent variables SPCMS, ASPSS, ASPCB granger cause MKTCM2.This means that there is a un-directional causality running from SPCMS,ASPSS,ASPCB to MKTCM2 in model VII while in model VIII, ASPFI, ASPCB, granger cause SMLIQ and our dependent variable SMLIQ granger cause SPCMS which means that there is a uni-directional causality running from ASPFI,ASPCB to SMLIQ and there is also a uni-directional causality running from SMLIQ to SPCMS in model VIII.

The implication is that it is therefore necessary to study on how monetary policy affects the world of real wealth and asset prices. According to Tobin's q theory of investment and wealth effects on consumption, Tobin (1969) a link exists between Tobin q and investment spending in that when money supply falls, the public finds it has less money at its disposal and so cuts down on spending and the one place the public can spend less is in the securities market. Therefore, a rise in interest rates because of a tight monetary policy makes the bond more attractive to equities therefore causing the price of equities to fall. The fact that lower equity prices will lead to lower q (market value of a firm) which causes lower investment spending since a firm cannot acquire new capital and machinery. Also, when stock prices fall, the value of shareholders wealth decreases which leads to decreasing the lifetime resource of consumers and consumption falls. Findings from the asset pricing channel reveal that the models is statistically significant from the parsimonious error correction model results which confirm our expectation and validates the Keynesian theory of interest rate and assets price and also confirm the

finding of Olulu-Briggs (2015). This means that there is a strong relationship between our independent variables (asset pricing channel of monetary policy) and our dependent variables percentage of market capitalization and stock market liquidity within the period under study.

4.5 Analysis of Major Highlights on Dicussion of Findings

Interest Rate Model

1. That there is a long – run equilibrium relationship between interest rate channel of monetary policy transmission mechanisms of maximum lending rate (MLR),monetary policy rate (MPR), prime lending rate (PLR), long term saving rate (LSR) and market capitalization and stock market liquidity (MKTCM2, SMLIQ) within the period under study.

2. That maximum lending rate (MLR),saving rate (SR),prime lending rate (PLR),long term saving rate (LSR) have a positive coefficient and significant relationship with market capitalization (MKTCM2),stock market liquidity (SMLIQ) within the period under study.

3. The study shows that Monetary Policy Rate (MPR) has a negative coefficient and insignificantly relationship with market capitalization (MKTCM2) while prime lending rate and monetary policy rate also have a negative and insignificant relationship with the level stock market liquidity (SMLIQ).

4. That with respect to the level series regression the results show that the interest rate channel of monetary policy transmission mechanisms and the level market capitalization (MKTCM2) in model I, also in model II, level stock market liquidity (SMLIQ) are positively correlated but insignificantly related. The level

series result also show a non-stationary features which indicates there is some degree of time independence (see appendix 1 and table 4.1).

5. The results of the parsimonious vector error correction model (VECM) shows that the error correction term (ECM) is appropriately signed, are significant and demonstrates that approximately 71% (Model I) and 83% (Model II) of disequilibrium in the models are corrected annual in changes in the explanatory variables in Model I and Model II respectively.

6. The study also revealed that the independent variable LSR, PLR and SR granger cause changes in MKTCM2 in model I while LSR and PLR granger cause changes in SMLIQ and there is granger causality test between MKTCM2, SMLIQ and interest rate channel of monetary policy transmission mechanism within the period understudy. The implication is that there a uni-directional causality running from our dependent variables to some of our independent variables.

Credit Channel Model

1. That there is a long – run equilibrium relationship between interest rate channel of monetary policy transmission mechanisms of short term credit to total credit (STC-TC), credit to private to gross domestic product (CPS-GDP), net domestic credit to total credit (NDC-TC), long term credit to total credit (LTC-TC) and market capitalization (MKTCM2), stock market liquidity (SMLIQ) within the period under study.

2. That credit to private to gross domestic product (CPS-GDP) and net domestic credit to total credit (NDC-TC) have a negative coefficient but statistical significant relationship with market capitalization (MKTCM2) in model III while short term credit to total credit (STC-TC), long term credit to total credit (LTC-TC) and net domestic credit to total credit (NDC-TC),are negatively signed but

statistically significant and credit to private to gross domestic product(CPS-GDP) is positively signed and statistically significantly related to stock market liquidity (SMLIQ) in model IV within the period under study.

3. The study shows medium term credit to total credit (MTC-TC) has a positive sign and statistically insignificant related with market capitalization (MKTCM2) and with the level stock market liquidity (SMLIQ).

4. That with respect to the level series regression the results show that the credit channel of monetary policy transmission mechanisms and the level market capitalization (MKTCM2) in model III, also in model IV, level stock market liquidity (SMLIQ) are positively correlated but insignificantly related. The level series result also show a non-stationary features which indicates there is some degree of time independence (see appendix III & IV and table 4.4).

5. The results of the parsimonious vector error correction model (VECM) shows that the error correction term (ECM) is appropriately signed, are significant and demonstrates that approximately 68% (Model I) and 79% (Model II) of disequilibrium in the models are corrected annual in changes in the explanatory variables in Model III and Model IV respectively (see appendix III & IV and table 4.13).

6. The study revealed that the independent variables Net Domestic Credit to Total Credit (NDC-TC), Short Term Credit to Total Credit (STC-TC) and Long Term Credit to Total Credit (LTC-TC) granger cause Market Capitalization (MKTCM2) and dependent variables Market Capitalization (MKTCM2) also granger cause Credit Private Sector to Gross Domestic Product (CPS-GDP), Long Term Credit to Total Credit (LTC-TC) and Credit to Real Sector to Total Credit (CTRS-TC) .This means that there is a un-directional causality running from Net

Domestic Credit to Total Credit (NDC-TC), Short Term Credit to Total Credit (STC-TC) to Market Capitalization (MKTM2) and bi-directional causality running from and Long Term Credit to Total Credit (LTC-TC) to Market Capitalization (MKTCM2) in model III while in model IV, Medium Term Credit to Total Credit (MTC-TC) granger cause Stock Market Liquidity (SMLIQ) and our dependent variable Stock Market Liquidity (SMLIQ) granger cause Credit Private Sector to Gross Domestic Product (CPS-GDP) and Credit to Real Sector to Total Credit (CTRS-TC) which means that there is a uni-directional causality running from Medium Term Credit to Total Credit (MTC-TC) , Credit to Real Sector to Total Credit (CTRS-TC), Credit Private Sector to Gross Domestic Product (CPS-GDP) to Stock Market Liqudity (SMLIQ) and there is also a bi-directional causality running from Short Term Credit to Total Credit (STC-TC) to Stock Market Liqudity (SMLIQ) and from Stock Market Liqudity (SMLIQ) to Short Term Credit to Total Credit (STC-TC) in model IV.

Exchange Rate Channel Model

1. That there is a long – run equilibrium relationship between exchange rate channel of monetary policy transmission mechanisms of Nigeria Naira exchange rate per US dollar (EXR-US),Nigeria Naira exchange rate per Chinese Yuan (EXR-CY),Nigeria Naira exchange per Japanese Yen (EXR-JY),Nigeria Naira exchange rate per British Pounds sterling(EXR-BP) and MKTCM2,SMLIQ within the period under study.

2. That the Nigeria Naira exchange rate per US dollar (EXR-US), Nigeria Naira exchange per Japanese Yen (EXR-JY), have a positive coefficient and significant relationship with market capitalization (MKTCM2),stock market liquidity (SMLIQ) within the period under study.

3. The study shows that Nigeria Naira exchange rate per Chinese Yuan (EXR-CY) and Nigeria Naira exchange rate per British Pounds sterling (EXR-BP) have a negative coefficient and insignificant relationship with market capitalization (MKTCM2) in model V while Nigeria Naira exchange rate per US dollar (EXR-US) and Nigeria Naira exchange per Japanese Yen (EXR-JY) also have a negative coefficient but a significant relationship with the stock market liquidity (SMLIQ) in model VI,(see table 4.20,appendix V & VI).

4. That with respect to the level series regression the results show that the exchange rate channel of monetary policy transmission mechanisms and the market capitalization (MKTCM2) in model V, also in model VI, stock market liquidity (SMLIQ) are positively correlated but insignificantly related. The level series result also show a non-stationary features which indicates there is some degree of time independence (see appendix V & VI and table 4.15).

5. The results of the parsimonious vector error correction model (VECM) shows that the error correction term (ECM) is appropriately signed, are significant and demonstrates that approximately 54 %(Model V) and 63% (Model VI) of disequilibrium in the models are corrected annual in changes in the explanatory variables in Model V and Model VI respectively.

6. The study shows that there is a bi-directional causality relationship between percentage of market capitalization to money supply (MKTCM2) and its exchange rate channel of monetary policy transmission such as EXR-US running to MKTCM2 and MKTCM2 to EXR-US, also there is a bi- directional causal relationship between MKTCM2 to EXR-BP and EXR-BP to MKTCM2 while in model VI the results shows that there is a uni-directional causality relationship between percentage of stock market liquidity (SMLIQ) and its exchange rate

channel of monetary policy transmission such as EXR-US to SMLIQ, EXR-JY to SMLIQ and from EXR-BP to SMLIQ.

Asset Pricing Channel Model

1. That there is a long – run equilibrium relationship between asset pricing channel of monetary policy transmission mechanisms of Treasury bill rate (TBR), Aggregate stock prices of commercial banks (ASPCB), Aggregate stock prices of financial institution (ASPFI), Stock prices of manufacturing sector (SPCMS) Aggregate stock prices of service sector (ASPSS) and market capitalization (MKTCM2), Stock market liquidity (SMLIQ) within the period under study.

2. That the Treasury bill rate (TBR) has a negative coefficient which is contrary to aprior expectation and not statistically significant while Aggregate stock prices of financial institution (ASPFI) also has a negative coefficient which is contrary to the aprior expectation but statistically significantly related with market capitalization (MKTCM2), stock market liquidity (SMLIQ) within the period under study.

3. The study shows that Treasury bill rate (TBR) and Aggregate stock prices of financial institution (ASPFI) have a positive coefficient and are statistically significant in model VII while Aggregate stock prices of commercial banks (ASPCB), Stock prices of manufacturing sector (SPCMS) Aggregate stock prices of service sector (ASPSS) also have a negative coefficient but a significant relationship with the stock market liquidity (SMLIQ)in model VIII,(see table 4.27, appendix VII & VIII).

4. That with respect to the level series regression the results show that the asset pricing channel of monetary policy transmission mechanisms and the market capitalization (MKTCM2) in model VII, also in model VIII, stock market

liquidity (SMLIQ) are positively correlated but insignificantly related. The level series result also show a non-stationary features which indicates there is some degree of time independence (see appendix VII & VIII and table 4.22).

5. The results of the parsimonious vector error correction model (VECM) shows that the error correction term (ECM) is appropriately signed, are significant and demonstrates that approximately 78%(Model VII) and 69% (Model VIII) of disequilibrium in the models are corrected annual in changes in the explanatory variables in Model VII and Model VIII respectively.

6. The study also revealed that the independent variables such as Stock Prices of Manufacturing Sector (SPCMS), Aggregate Stock Prices of Service Sector (ASPSS), Aggregate Stock Prices of Commercial Banks (ASPCB) granger cause MKTCM2.This means that there is a un-directional causality running from Stock Prices of Manufacturing Sector (SPCMS), Aggregate Stock Prices of Service Sector (ASPSS), Aggregate Stock Prices of Commercial Banks (ASPCB) to MKTCM2 in model VII while in model VIII, Aggregate Stock Prices of Non Bank Financial Institutions (ASPFIs), Aggregate Stock Prices of Commercial Banks (ASPCB), granger cause Stock Market Liquity (SMLIQ) and our dependent variable Stock Market Liquity (SMLIQ) granger cause Stock Prices of Manufacturing Sector (SPCMS) which means that there is a uni-directional causality running from Aggregate Stock Prices of Non Bank Financial Institutions (ASPFIs), Aggregate Stock Prices of Commercial Banks (ASPCB) to Stock Market Liquity (SMLIQ) and there is also a uni-directional causality running from Stock Market Liquity (SMLIQ) to Stock Prices of Manufacturing Sector (SPCMS) in model VIII.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

This study has investigated effects of monetary policy transmission mechanism and capital market fundamentals in Nigerian with data from 1981 – 2015. There are four different channels of monetary policy transmission mechanism (interest rate channel, credit channel, exchange rate channel and asset pricing channel) which the study investigated with two capital market indices which are market capitalization and capital market liquidity.

From the results of test of hypotheses and the findings of the research, we summarize as follows:

Interest Rate Model

1. That there is a long – run equilibrium dynamic relationship between interest rate channel of monetary policy transmission mechanisms of maximum lending rate (MLR),monetary policy rate (MPR), prime lending rate (PLR), long term saving rate (LSR) and market capitalization and stock market liquidity (MKTCM2, SMLIQ) within the period under study. Also the study shows that Monetary Policy Rate (MPR) has a negative coefficient and insignificantly relationship with market capitalization (MKTCM2) while prime lending rate and monetary policy rate also have a negative and insignificant relationship with the level stock market liquidity (SMLIQ).
2. The study also revealed that the independent variable LSR, PLR and SR granger cause changes in MKTCM2 in model I while LSR and PLR granger cause changes in SMLIQ and there is granger causality test between MKTCM2, SMLIQ

and interest rate channel of monetary policy transmission mechanism within the period understudy. The implication is that there a uni-directional causality running from our dependent variables to some of our independent variables.

Credit Channel Model

1. Empirical results revealed that there is a strong and long – run equilibrium relationship between credit channel of monetary policy transmission mechanisms of short term credit to total credit (STC-TC), credit to private to gross domestic product (CPS-GDP), net domestic credit to total credit (NDC-TC), long term credit to total credit (LTC-TC) and market capitalization (MKTCM2), stock market liquidity (SMLIQ) within the period under study. Furthermore, the study shows medium term credit to total credit (MTC-TC) has a positive sign and statistically insignificant related with market capitalization (MKTCM2) and with the level stock market liquidity (SMLIQ).

2. The study revealed that there is mixed directional granger causality running from independent variables and dependent variables within the period understudy. The implication is that there is uni and bi directional granger causality among the variables

Exchange Rate Channel Model

1. That there is a strong and positive significant relationship between exchange rate channel of monetary policy transmission mechanisms of Nigeria Naira exchange rate per US dollar (EXR-US),Nigeria Naira exchange rate per Chinese Yuan (EXR-CY),Nigeria Naira exchange per Japanese Yen (EXR-JY),Nigeria Naira exchange rate per British Pounds sterling(EXR-BP) and MKTCM2,SMLIQ within the period under study.

The study also shows that Nigeria Naira exchange rate per Chinese Yuan (EXR-CY) and Nigeria Naira exchange rate per British Pounds sterling (EXR-BP) have a negative coefficient and insignificant relationship with market capitalization (MKTCM2) in model V while Nigeria Naira exchange rate per US dollar (EXR-US) and Nigeria Naira exchange per Japanese Yen (EXR-JY) also have a negative coefficient but a significant relationship with the stock market liquidity (SMLIQ) in model VI.

2. The study shows that there is a bi-directional causality relationship between market capitalization (MKTCM2), stock market liqudity and its exchange rate channel of monetary policy transmission

Asset Pricing Channel Model

1. That there is a long – run equilibrium relationship between asset pricing channel of monetary policy transmission mechanisms of Treasury bill rate (TBR), Aggregate stock prices of commercial banks (ASPCB), Aggregate stock prices of financial institution (ASPFI), Stock prices of manufacturing sector (SPCMS) Aggregate stock prices of service sector (ASPSS) and market capitalization (MKTCM2), Stock market liquidity (SMLIQ) within the period under study.

   That the Treasury bill rate (TBR) has a negative coefficient which is contrary to aprior expectation and not statistically significant while Aggregate stock prices of financial institution (ASPFI) also has a negative coefficient which is contrary to the aprior expectation but statistically significantly related with market capitalization (MKTCM2), stock market liquidity (SMLIQ) within the period under study.

2. The granger causality test results revealed that there is a un-directional causality running independent to dependent variables within the period understudy.

5.2 Conclusion

The study has the link between monetary policy transmission mechanism and the capital market fundamentals in Nigeria. The statistical results offer well explained evidence that monetary policy transmission mechanism (interest rate channel, credit rate channel, exchange rate channel on assets pricing channel) is an important instrument of economic and sound financial system stabilization. It was established in this study that the monetary policy transmission channels affect the capital market fundamentals positively. The implication is that if those variables of monetary policy tranmussion channels are neglected by the monetary policy authorities in their quest to enhance economic growth and financial system stability, it might be difficult for the government through monetary authorities to achieve its major macroeconomic objectives of sound financial system stability, operational efficiency of the financial market and economic growth.

5.3 Recommendations

Based on our findings, we therefore proffer the following recommendations in line with our four channels of monetary policy examined in this study.

Interest Rate Channel

1. The government should allow the interplay of interest rate channel of monetary policy for the purpose of achieving sound economic and financial system stability in the view of the observed nexus between interest rate transmission mechanism and capital market fundamentals.

2. There is need to redefine Nigeria interest rate structure to lower cost of capital that will attract both domestic and foreign investors in order to enhance capital market liquidity considering the positive strong relationship that exist between interest rate channel and stock market liquidity.

Credit Channel

1. The study establishes empirically that credit channel affect significantly the performance of Nigeria capital market. This calls for attention and redirection of monetary policy towards expansionary monetary policy that will increase the volume of credit to the economy and long term credit to infrastructure in order to enhance capital formation. This will further induce investment and reduce market fragility to external sector.

2. There is need to re-introduce the mandatory sectoral credit allocation that was abolish years ago in order to enhance domestic credit to the various sectors of the economy for better capital formation and liquidity of the stock market in the view of its exerted relationship between real and private sectors credit to the financial system.

Exchange Rate Channel

1. The study empirically proves that the exchange rate channel has significant relationship with the Nigeria capital market performance. This call for consistent exchange rate policy became of its variations in the model.

2. Government should diversify the Nigeria economy for stable exchange rate policy will enhance macroeconomic stability, increase real and portfolio investment for better liquidity of the stock market in order to achieve financial system stability.

Asset Pricing Channel

1. Asset pricing policy should be targeted towards achieving the deregulation of stock prices. This will help encourage inflows of foreign portfolio investment and the listing of new securities considering the positive and strong telationship between asset pricing channel and capital market fundamentals.

2. Government should through the regulatory cum supervisory authorities in Nigeria intensify effort towards installing a conducive and enabling envrioment, inclusive of more reforms, international best practices and corporate governance for sustained growth and liquidty of the stock market.

5.4 Contribution to Knowledge

This study has brought to the fore the relationship existing between the four channels of monetary policy transmission mechanisms and Nigeria capital market fundamentals. The following is a summary of the contributions the study has added to existing body of knowledge on the topic.

1. This work agrees the findings of other researchers such as Ogbulu and Uruakpa (2011) and Ibenta, Okonkwo and Akani (2016) that monetary policy significantly affects capital market fundamentals namely Capital Market capitalization and stock market liquidity.
2. This research work has further proved that monetary policy transmission mechanisms are good instrument of capital market efficiency and financial system stability .This validates the Keynesian monetary policy theory.
3. This work contributes to current literature on subject by extending the number of years used by other scholars from 20years to 36years (1981-2015).
4. Most work reviewed used Market capitalization, Total Volume of transactions traded, All share price index and Aggregates stock prices but this work modified the variables and added a new variable, stock market liquidity which showed a positive and significant relationship with monetary policy transmission channels, justifying the call for its adoption as stock market measurement parameter.

5. The study shows that the asset pricing channel of monetary policy significantly affects the Nigeria capital market fundamentals. This validates the Arbitrage pricing theory (APT) as formulated in the study. This means that policies as recommended in this study concerning the asset pricing channel will enhance Nigeria capital market fundamentals.

5.4.1 Areas for Future Studies

The financial sector is one of the most studied areas in research. From the objectives, the study recommends the following area for further studies:

This study examined the relationship between monetary policy transmission mechanism and the capital market fundamentals. The study suggests that studies should be sector specific such as the relationship between monetary policy transmission mechanism and the performance of the banking sector and the non- banks financial sector.

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Appendix I:

Relationship between Interest Rate Channel and Market Capitalization from 1981 - 2015

$MKTC/M2 = \beta_0 + \beta_1 PLR + \beta_2 MPR + \beta_3 SR + \beta_4 MLR + \beta_5 LSR + et_1$

Year	MKTC/M2 %	PLR %	MPR %	SR %	MLR %	LSR %
1981	34.55	7.75	6.00	6.00	10.00	6.50
1982	31.67	10.25	8.00	7.50	11.75	8.00
1983	32.23	10.00	8.00	7.50	11.50	8.00
1984	27.36	12.50	10.00	9.50	13.00	10.00
1985	29.60	9.25	10.00	9.50	11.75	10.00
1986	28.56	10.50	10.00	9.50	12.00	10.00
1987	29.74	17.50	12.75	14.00	19.20	15.80
1988	26.07	16.50	12.75	14.50	17.60	14.30
1989	27.88	26.80	18.50	16.40	24.60	21.20
1990	30.84	25.50	18.50	18.80	27.70	23.00
1991	30.64	20.01	15.50	14.29	20.80	20.10
1992	28.08	29.80	17.50	16.10	31.20	20.50
1993	28.73	18.32	26.00	16.66	36.09	28.02
1994	28.79	21.00	13.50	13.50	21.00	15.00
1995	62.40	20.18	13.50	12.61	20.79	14.27
1996	82.64	19.74	13.50	11.69	20.86	13.55
1997	68.21	13.54	13.50	4.80	23.32	7.43
1998	53.80	18.29	13.50	5.49	21.34	10.09
1999	47.70	21.32	18.00	5.33	27.19	14.30
2000	53.76	17.98	14.00	5.29	21.55	10.44
2001	52.19	18.29	20.50	5.49	21.34	10.09
2002	50.79	24.85	16.50	4.15	30.19	15.57
2003	69.60	20.71	15.00	4.11	22.88	11.88
2004	99.09	19.18	15.00	4.19	20.82	12.21
2005	109.94	17.95	13.00	3.83	19.49	8.68
2006	134.83	17.26	10.00	3.14	18.70	8.26
2007	257.08	16.94	9.50	3.55	18.36	9.49
2008	119.41	15.14	9.75	2.84	18.70	11.95
2009	74.71	18.99	6.00	2.68	22.62	12.63
2010	89.88	17.59	6.25	2.21	22.51	7.19
2011	84.41	16.02	12.00	1.41	22.42	6.30
2012	106.52	16.79	12.00	1.70	23.79	7.63
2013	125.84	16.72	12.00	2.17	24.69	6.72
2014	95.45	16.55	13.00	3.38	10.00	9.89
2015	89.96	16.85	11.00	3.57	26.96	8.26

Keynotes:

MKTC/M2	=	Percentage of Market Capitalization to Broad Money Supply
PLR	=	Prime Lending Rate
MPR	=	Monetary Policy Rate
SR	=	Savings Rate
MLR	=	Maximum Lending Rate
LSR	=	Long Term Savings Rate Defined as Savings Rate of Deposit above 1 year

Dependent Variable: MKTC_M2
Method: Least Squares
Date: 10/06/16 Time: 09:48
Sample: 1981 2015
Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LSR	1.569015	3.448946	0.454926	0.6525
MLR	-0.275657	1.997400	-0.138008	0.8912
MPR	-1.967750	2.585367	-0.761111	0.4527
PLR	2.515877	2.270794	1.107928	0.2770
SR	-6.749467	2.639834	-2.556777	0.0161
C	86.30675	27.31523	3.159656	0.0037

R-squared	0.421061	Mean dependent var	66.94143
Adjusted R-squared	0.321243	S.D. dependent var	46.87189
S.E. of regression	38.61620	Akaike info criterion	10.30003
Sum squared resid	43245.11	Schwarz criterion	10.56666
Log likelihood	-174.2504	Hannan-Quinn criter.	10.39207
F-statistic	4.218319	Durbin-Watson stat	1.230796
Prob(F-statistic)	0.005286		

Null Hypothesis: D(MKTC_M2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.710413	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

Null Hypothesis: D(LSR,2) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.907440	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(MLR) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.594827	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(MPR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.981873	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(PLR) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.711991	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.
Null Hypothesis: D(SR) has a unit root

Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.923445	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Pairwise Granger Causality Tests
Date: 10/06/16 Time: 09:57
Sample: 1981 2015
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LSR does not Granger Cause MKTC_M2	33	5.75796	0.0080
MKTC_M2 does not Granger Cause LSR		0.40023	0.6739
MLR does not Granger Cause MKTC_M2	33	5.53959	0.0089
MKTC_M2 does not Granger Cause MLR		0.76391	0.4753
MPR does not Granger Cause MKTC_M2	33	0.95765	0.3960
MKTC_M2 does not Granger Cause MPR		2.74178	0.0818
PLR does not Granger Cause MKTC_M2	33	4.20940	00023
MKTC_M2 does not Granger Cause PLR		1.23246	0.3069
SR does not Granger Cause MKTC_M2	33	5.65603	0.0090
MKTC_M2 does not Granger Cause SR		1.24658	0.3030

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.769540	48.43333	40.07757	0.0046
At most 1*	0.628354	32.66384	29.87687	0.0092
At most 2*	0.475008	31.26430	27.58434	0.0406
At most 3*	0.228945	2 8.57984	21.13162	0.0048
At most 4	0.208898	7.732834	14.26460	0.4065
At most 5	0.087682	3.028286	3.841466	0.0818

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

Normalized cointegrating coefficients (standard error in parentheses)

MKTC_M2	LSR	MLR	MPR	PLR	SR
1.000000	16.99819	-11.77181	12.71421	-7.566577	8.535571
	(3.85552)	(2.28873)	(2.24945)	(2.50337)	(2.80487)

Dependent Variable: D(MKTC_M2)
Method: Least Squares
Date: 10/06/16 Time: 10:03
Sample (adjusted): 1985 2015
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.705379	8.348647	0.443830	0.6658
D(MKTC_M2(-1))	0.296947	0.404806	0.733553	0.4786
D(MKTC_M2(-2))	0.336541	0.358517	0.938701	0.3680
D(MKTC_M2(-3))	0.500906	0.345830	1.448420	0.1754
D(LSR(-1))	-5.770891	4.802849	-1.201556	0.2548
D(LSR(-2))	-13.02951	6.123759	-2.127697	0.0568
D(LSR(-3))	-4.837588	6.617092	-0.731075	0.4800
D(MLR(-1))	2.533071	2.666899	0.949819	0.3626
D(MLR(-2))	6.249705	4.427341	1.411616	0.1857
D(MLR(-3))	3.168330	4.444825	0.712813	0.4908
D(MPR(-1))	-5.847021	4.806143	-1.216573	0.2492
D(MPR(-2))	-3.383989	4.953588	-0.683139	0.5087
D(MPR(-3))	-0.418109	4.217976	-0.099126	0.9228
D(PLR(-1))	-1.250728	4.898301	-0.255339	0.8032
D(PLR(-2))	-0.030426	4.487182	-0.006781	0.9947
D(PLR(-3))	-0.210090	4.255542	-0.049368	0.9615
D(SR(-1))	11.47860	7.139423	1.607777	0.1362
D(SR(-2))	14.44383	7.380309	1.957077	0.0762
D(SR(-3))	0.689096	8.895722	0.077464	0.9396
ECM(-1)	-0.479206	0.448192	-2.436466	0.0330

R-squared	0.608955	Mean dependent var	2.019355
Adjusted R-squared	0.566486	S.D. dependent var	37.36303
S.E. of regression	38.58510	Akaike info criterion	10.39784
Sum squared resid	16376.91	Schwarz criterion	11.32299
Log likelihood	-141.1665	Hannan-Quinn criter.	10.69942
F-statistic	3.901566	Durbin-Watson stat	2.104219
Prob(F-statistic)	0. 054452		

Dependent Variable: D(MKTC_M2)
Method: Least Squares
Date: 10/06/16 Time: 10:04
Sample (adjusted): 1985 2015
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.977777	6.609843	0.753086	0.4606
D(MKTC_M2(-1))	0.109992	0.257258	0.427556	0.6738
D(MKTC_M2(-2))	0.038557	0.241490	0.159661	0.8748
D(LSR(-1))	1.155015	2.958291	0.390433	0.7006
D(LSR(-2))	-3.930692	2.561018	-1.534816	0.0013
D(LSR(-3))	-0.346673	1.929194	-0.179699	0.0593
D(MLR(-1))	0.535722	1.723301	0.310870	0.7593
D(MPR(-1))	-3.552114	2.954150	-1.202415	0.0040
D(MPR(-2))	1.088615	2.708410	0.401939	0.6922
D(PLR(-1))	2.762367	2.161138	-1.278200	0.0066
D(SR(-1))	5.459298	5.166434	1.056686	0.3039
ECM(-1)	-0.708108	0.291797	-2.426715	0.0054

R-squared	0.723373	Mean dependent var	2.019355
Adjusted R-squared	0.689537	S.D. dependent var	37.36303
S.E. of regression	35.65113	Akaike info criterion	10.27008
Sum squared resid	24149.06	Schwarz criterion	10.82518
Log likelihood	-147.1863	Hannan-Quinn criter.	10.45103
F-statistic	4.268205	Durbin-Watson stat	2.173426
Prob(F-statistic)	0.000738		

Appendix II:

Relationship between Interest Rate Channel and Stock Market Liquidity from 1981 - 2015

$SMLIQ = X_0 + X_1PLR + X_2MPR + X_3SR + X_4MLR + X_5LSR + et_2$

Year	SMLIQ %	PLR %	MPR %	SR %	MLR %	LSR %
1981	3.62	7.75	6.00	6.00	10.00	6.50
1982	4.11	10.25	8.00	7.50	11.75	8.00
1983	3.44	10.00	8.00	7.50	11.50	8.00
1984	3.47	12.50	10.00	9.50	13.00	10.00
1985	4.80	9.25	10.00	9.50	11.75	10.00
1986	7.32	10.50	10.00	9.50	12.00	10.00
1987	4.66	17.50	12.75	14.00	19.20	15.80
1988	8.50	16.50	12.75	14.50	17.60	14.30
1989	4.77	26.80	18.50	16.40	24.60	21.20
1990	1.38	25.50	18.50	18.80	27.70	23.00
1991	1.05	20.01	15.50	14.29	20.80	20.10
1992	1.58	29.80	17.50	16.10	31.20	20.50
1993	1.69	18.32	26.00	16.66	36.09	28.02
1994	1.49	21.00	13.50	13.50	21.00	15.00
1995	1.02	20.18	13.50	12.61	20.79	14.27
1996	2.44	19.74	13.50	11.69	20.86	13.55
1997	3.66	13.54	13.50	4.80	23.32	7.43
1998	5.17	18.29	13.50	5.49	21.34	10.09
1999	4.69	21.32	18.00	5.33	27.19	14.30
2000	5.96	17.98	14.00	5.29	21.55	10.44
2001	8.71	18.29	20.50	5.49	21.34	10.09
2002	7.77	24.85	16.50	4.15	30.19	15.57
2003	8.86	20.71	15.00	4.11	22.88	11.88
2004	10.69	19.18	15.00	4.19	20.82	12.21
2005	9.07	17.95	13.00	3.83	19.49	8.68
2006	9.18	17.26	10.00	3.14	18.70	8.26
2007	8.16	16.94	9.50	3.55	18.36	9.49
2008	17.56	15.14	9.75	2.84	18.70	11.95
2009	9.75	18.99	6.00	2.68	22.62	12.63
2010	8.07	17.59	6.25	2.21	22.51	7.19
2011	6.22	16.02	12.00	1.41	22.42	6.30
2012	5.47	16.79	12.00	1.70	23.79	7.63
2013	12.32	16.72	12.00	2.17	24.69	6.72
2014	7.91	16.55	13.00	3.38	10.00	9.89
2015	6.07	16.85	11.00	3.57	26.96	8.26

Keynotes:

SMLIQ	=	Stock Market Liquidity
PLR	=	Prime Lending Rate
MPR	=	Monetary Policy Rate
SR	=	Savings Rate
MLR	=	Maximum Lending Rate
LSR	=	Long Term Savings Rate Defined as Savings Rate of Deposit above 1 year

Dependent Variable: SMLIQ
Method: Least Squares
Date: 10/06/16 Time: 10:07
Sample: 1981 2015
Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SR	-0.796741	0.187115	-4.258029	0.0002
PLR	0.094256	0.160957	0.585601	0.5627
MPR	-0.063186	0.183254	-0.344799	0.7327
MLR	-0.194751	0.141578	-1.375571	0.1795
LSR	0.463584	0.244466	1.896315	0.0679
C	9.649344	1.936140	4.983805	0.0000

R-squared	0.512122	Mean dependent var	6.018000
Adjusted R-squared	0.428005	S.D. dependent var	3.619139
S.E. of regression	2.737167	Akaike info criterion	5.006529
Sum squared resid	217.2704	Schwarz criterion	5.273160
Log likelihood	-81.61425	Hannan-Quinn criter.	5.098570
F-statistic	6.088217	Durbin-Watson stat	1.742810
Prob(F-statistic)	0.000570		

Null Hypothesis: D(SMLIQ) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.003915	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(SR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.923445	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(PLR) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.711991	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(MPR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.981873	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(MLR) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.594827	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LSR) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.324954	0.0001
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Pairwise Granger Causality Tests
Date: 10/06/16 Time: 10:29
Sample: 1981 2015
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
SR does not Granger Cause SMLIQ	33	4.62635	0.0184
SMLIQ does not Granger Cause SR		0.42991	0.6548
PLR does not Granger Cause SMLIQ	33	3.43050	0.0044
SMLIQ does not Granger Cause PLR		4.63309	0.0084
MPR does not Granger Cause SMLIQ	33	4.23843	0.0094
SMLIQ does not Granger Cause MPR		1.57007	0.2258
MLR does not Granger Cause SMLIQ	33	0.03071	0.9698
SMLIQ does not Granger Cause MLR		0.30063	0.7427
LSR does not Granger Cause SMLIQ	33	4.16149	0.0340
SMLIQ does not Granger Cause LSR		3.53940	0.0321

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.750483	45.81157	40.07757	0.0102
At most 1	0.580551	28.67080	33.87687	0.1843
At most 2*	0.411392	27.48984	27.08434	0.0381
At most 3*	0.304806	21.99762	19.13162	0.0479
At most 4	0.215662	8.016200	14.26460	0.3771
At most 5	0.056328	1.913241	3.841466	0.1666

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

1 Cointegrating Equation(s): Log likelihood -430.1643

Normalized cointegrating coefficients (standard error in parentheses)

SMLIQ	SR	PLR	MPR	MLR	LSR
1.000000	0.263981	0.938426	0.453724	- 0.054084	0.429761
	(0.18743)	(0.17108)	(0.16508)	(0.16250)	(0.25103)

Dependent Variable: D(SMLIQ)
Method: Least Squares
Date: 10/06/16 Time: 17:25
Sample (adjusted): 1985 2015
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.468406	0.630697	0.742679	0.4709
D(SMLIQ(-1))	-0.062256	0.352953	-0.176386	0.8627
D(SMLIQ(-2))	-0.002519	0.351521	-0.007166	0.9944
D(SMLIQ(-3))	-0.048474	0.312249	-0.155240	0.8790
D(SR(-1))	0.985017	0.551953	1.784604	0.0977
D(PLR(-1))	-0.446972	0.301355	-1.483206	0.1619
D(PLR(-2))	-0.024041	0.344631	-0.069760	0.9454
D(PLR(-3))	0.223939	0.318490	0.703127	0.4944
D(MPR(-1))	-0.401223	0.336024	-1.194030	0.2538
D(MPR(-2))	-0.102689	0.287504	-0.357176	0.7267
D(MPR(-3))	0.295363	0.286358	1.031447	0.3211
D(MLR(-1))	0.292349	0.224772	1.300647	0.2160
D(MLR(-2))	-0.108203	0.262014	-0.412968	0.6864
D(MLR(-3))	0.115965	0.292356	0.396658	0.6981
D(LSR(-1))	-0.061924	0.333315	-0.185781	0.8555
D(LSR(-2))	-0.099504	0.442138	-0.225052	0.8254
D(LSR(-3))	-0.558120	0.409097	-1.364274	0.1956
ECM(-1)	-0.760392	0.405657	-1.874469	0.0835

R-squared	0.606271	Mean dependent var	0.083871
Adjusted R-squared	0.591394	S.D. dependent var	3.193734
S.E. of regression	3.044294	Akaike info criterion	5.356668
Sum squared resid	120.4804	Schwarz criterion	6.189305
Log likelihood	-65.02835	Hannan-Quinn criter.	5.628087
F-statistic	4.177506	Durbin-Watson stat	2.202914
Prob(F-statistic)	0.038307		

Dependent Variable: D(SMLIQ)
Method: Least Squares
Date: 10/06/16 Time: 17:29
Sample (adjusted): 1985 2015
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.362585	0.578861	0.626377	0.5385
D(SMLIQ(-1))	0.016634	0.295567	0.056278	0.9557
D(SMLIQ(-2))	-0.130363	0.264031	-0.493742	0.0071
D(PLR(-1))	-0.068374	0.224272	-0.304871	0.0038
D(PLR(-2))	0.045528	0.264448	0.172164	0.8651
D(MPR(-1))	-0.154481	0.239746	-0.644352	0.5271
D(MPR(-2))	-0.132619	0.258155	-0.513720	0.6134
D(MPR(-3))	0.022001	0.171060	0.128616	0.0090
D(MLR(-1))	0.118019	0.149009	0.792022	0.0081
D(LSR(-1))	0.132992	0.292359	0.454893	0.0043
D(LSR(-2))	0.148722	0.277917	0.535130	0.5988
ECM(-1)	-0.828615	0.329060	-2.518126	0.0009

R-squared	0.673516	Mean dependent var	0.083871
Adjusted R-squared	0.643973	S.D. dependent var	3.193734
S.E. of regression	3.073339	Akaike info criterion	5.368052
Sum squared resid	179.4629	Schwarz criterion	5.923144
Log likelihood	-71.20480	Hannan-Quinn criter.	5.548998
F-statistic	7.217861	Durbin-Watson stat	2.151031
Prob(F-statistic)	0.000065		

Appendix III:

Relationship between Credit Channel and Market Capitalization from 1981 - 2015

$$MKTC/M2 = S_0 + S_1NDC + S_2CPS/GDP + S_3LTC/TC + S_4STC/TC + S_5MTC/TC + S_6\%\Delta CTRS + et_3$$

Year	MKTC/M2 %	NDC %	CPS/GDP %`	LTC/TC %	STC/TC %	MTC/TC %	CTRS/TC %
1981	34.55	-	9.1	20.22	47.26	32.52	5.40
1982	31.67	-	10.6	19.78	55.75	24.47	5.94
1983	32.23	-	10.6	20.27	52.15	27.58	5.79
1984	27.36	7.63	10.7	17.97	54.33	27.70	5.74
1985	29.60	9.83	9.7	16.29	54.74	28.97	5.40
1986	28.56	16.62	11.3	18.13	49.79	32.08	6.95
1987	29.74	24.18	10.9	17.95	45.39	36.67	5.45
1988	26.07	-32.49	10.4	16.86	52.05	31.09	4.70
1989	27.88	57.30	8.0	16.72	57.47	25.81	3.57
1990	30.84	40.36	7.1	35.80	29.25	34.96	3.32
1991	30.64	109.38	7.6	37.67	32.44	29.89	3.67
1992	28.08	64.08	6.6	44.31	33.18	22.51	3.11
1993	28.73	56.44	11.7	52.46	29.13	18.41	3.73
1994	28.79	8.03	10.2	50.01	30.18	19.81	3.76
1995	62.40	-21.77	6.2	45.08	41.55	13.37	3.28
1996	82.64	-1.40	5.9	50.34	38.06	11.60	2.99
1997	68.21	40.07	7.5	52.73	35.47	11.80	3.14
1998	53.80	23.32	8.8	51.17	39.10	9.74	3.68
1999	47.70	-25.32	9.2	53.20	37.63	9.17	3.66
2000	53.76	79.87	7.9	80.57	14.10	5.33	3.20
2001	52.19	56.59	11.1	62.02	27.71	10.27	4.83
2002	50.79	35.70	11.9	58.40	28.76	12.84	4.66
2003	69.60	11.99	11.1	55.77	29.44	14.79	4.56
2004	99.09	14.51	12.5	62.56	27.86	9.58	4.65
2005	109.94	-69.13	12.6	69.04	14.44	16.52	3.92
2006	134.83	279.57	12.3	51.10	13.60	35.30	4.02
2007	257.08	84.20	17.8	68.81	16.44	14.74	5.46
2008	119.41	58.55	28.6	75.40	14.98	9.62	9.68
2009	74.71	10.00	36.9	81.11	12.65	6.24	12.49
2010	89.88	57.16	18.6	78.92	14.31	6.77	5.43
2011	84.41	-7.22	16.9	76.73	21.21	2.06	4.85
2012	106.52	7.63	20.4	62.73	35.97	1.30	5.15
2013	125.84	14.47	19.7	79.13	18.25	2.63	5.50
2014	95.45	29.84	19.2	71.61	23.81	4.58	3.97
2015	89.96	12.13	3.29	70.35	23.29	6.36	4.97

Keynotes:

MKTC/M2	=	Percentage of Market Capitalization to Broad Money Supply
NDC	=	Net Domestic Credit
CPS/GDP	=	Credit to Core Private Sector
LTC/TC	=	Percentage of Long Term Credit to Total Credit
STC/TC	=	Percentage of Short Term Credit to Total Credit
MTC/TC	=	Percentage of Medium Term Credit to Total Credit
CTRS/TC	=	Credit to Real Sector to Total Credit

Dependent Variable: MKTC_M2

Method: Least Squares

Date: 10/06/16 Time: 17:32

Sample (adjusted): 1984 2015

Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MTC_TC	-3637.266	1763.986	-2.061959	0.0498
NDC	0.077453	0.149184	0.519176	0.6082
STC_TC	-3638.244	1764.175	-2.062292	0.0497
LTC_TC	-3636.905	1764.148	-2.061564	0.0498
CTRS_TC	-5.791313	7.017858	-0.825225	0.4170
CPS_GDP	2.598517	2.204540	1.178712	0.2496
C	363804.2	176416.9	2.062185	0.0497

R-squared	0.512777	Mean dependent var	70.14063
Adjusted R-squared	0.395843	S.D. dependent var	47.81397
S.E. of regression	37.16462	Akaike info criterion	10.25923
Sum squared resid	34530.22	Schwarz criterion	10.57986
Log likelihood	-157.1477	Hannan-Quinn criter.	10.36551
F-statistic	4.385196	Durbin-Watson stat	1.281582
Prob(F-statistic)	0.003697		

Scaled Coefficients

Null Hypothesis: D(MKTC_M2) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.569121	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(MTC_TC) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.704994	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(NDC) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.453074	0.0000
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(STC_TC) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.698397	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LTC_TC) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.814678	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(CTRS_TC) has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.405401	0.0001
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(CPS_GDP,2) has a unit root

Exogenous: Constant

Lag Length: 3 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.558281	0.0000
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Pairwise Granger Causality Tests

Date: 10/06/16 Time: 17:41

Sample: 1981 2015

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
MTC_TC does not Granger Cause MKTC_M2	33	13.6213	7.E-05
MKTC_M2 does not Granger Cause MTC_TC		1.26725	0.2973
NDC does not Granger Cause MKTC_M2	30	11.7401	0.0003
MKTC_M2 does not Granger Cause NDC		0.40815	0.6692
STC_TC does not Granger Cause MKTC_M2	33	4.82482	0.0063
MKTC_M2 does not Granger Cause STC_TC		1.28544	0.2923
LTC_TC does not Granger Cause MKTC_M2	33	7.51585	0.0024
MKTC_M2 does not Granger Cause LTC_TC		1.56943	0.2259
CTRS_TC does not Granger Cause MKTC_M2	33	0.47259	0.6283
MKTC_M2 does not Granger Cause CTRS_TC		7.42840	0.0026
CPS_GDP does not Granger Cause MKTC_M2	33	0.57393	0.5698
MKTC_M2 does not Granger Cause CPS_GDP		9.00503	0.0010

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.698043	39.51648	33.87687	0.0096
At most 1*	0.401067	26.91598	21.58434	0.0072
At most 2*	0.274361	11.58321	10.13162	0.0086
At most 3	0.187343	6.845719	4.264601	0.0076
At most 4	0.060258	2.050958	3.841466	0.1521

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

1 Cointegrating Equation(s):	Log likelihood	-494.1459

Normalized cointegrating coefficients (standard error in parentheses)

MKTC_M2	MTC_TC	STC_TC	CTRS_TC	CPS_GDP
1.000000	1.091336	0.416171	-6.889390	-4.050602
	(0.62882)	(0.56785)	(7.51967)	(2.57463)

Dependent Variable: D(MKTC_M2)

Method: Least Squares

Date: 10/06/16 Time: 17:50

Sample (adjusted): 1988 2015

Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.992027	5.512873	0.179947	0.8643
D(MKTC_M2(-1))	0.708456	0.379393	1.867341	0.1208
D(MKTC_M2(-2))	-0.115064	0.222981	-0.516024	0.6278
D(MKTC_M2(-3))	0.417693	0.237852	1.756105	0.1394
D(MTC_TC(-1))	1665.362	1629.039	1.022297	0.3535
D(MTC_TC(-2))	1839.015	2129.111	0.863748	0.4272
D(MTC_TC(-3))	1857.178	2158.021	0.860593	0.4288
D(STC_TC(-1))	1662.047	1629.356	1.020064	0.3545
D(STC_TC(-2))	1839.145	2130.325	0.863317	0.4274
D(STC_TC(-3))	1855.716	2158.537	0.859710	0.4292
D(CTRS_TC(-1))	2.317342	5.967870	0.388303	0.7138
D(CTRS_TC(-2))	-12.53552	5.468539	-2.292297	0.0704
D(CTRS_TC(-3))	-1.262185	6.281289	-0.200944	0.8487
D(CPS_GDP(-1))	-0.416076	3.215605	-0.129393	0.9021
D(CPS_GDP(-2))	1.994872	2.101597	0.949217	0.3861
D(CPS_GDP(-3))	1.925400	2.314581	0.831857	0.4434
D(NDC(-1))	-0.029527	0.076427	-0.386347	0.7151
D(NDC(-2))	-0.270590	0.117251	-2.307792	0.0691
D(NDC(-3))	0.009747	0.129560	0.075232	0.9429
D(LTC_TC(-1))	1661.451	1629.118	1.019846	0.3546
D(LTC_TC(-2))	1839.554	2130.210	0.863555	0.4273
D(LTC_TC(-3))	1856.483	2158.346	0.860141	0.4290
ECM(-1)	-0.436090	0.262992	-1.658184	0.1582

R-squared	0.777271	Mean dependent var	2.150714
Adjusted R-squared	0.757264	S.D. dependent var	39.37911
S.E. of regression	13.79594	Akaike info criterion	8.006717
Sum squared resid	951.6402	Schwarz criterion	9.101028
Log likelihood	-89.09403	Hannan-Quinn criter.	8.341258
F-statistic	9.772037	Durbin-Watson stat	1.717303
Prob(F-statistic)	0.009389		

Dependent Variable: D(MKTC_M2)

Method: Least Squares

Date: 10/06/16 Time: 17:52

Sample (adjusted): 1988 2015

Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.244521	4.003564	2.309073	0.0356
D(MKTC_M2(-1))	0.078982	0.181357	0.435507	0.6694
D(MTC_TC(-1))	384.2846	843.3724	0.455652	0.6552
D(MTC_TC(-2))	1.862856	1.025888	1.815848	0.0894
D(MTC_TC(-3))	0.798960	0.847002	0.943280	0.3605
D(STC_TC(-1))	381.5920	843.6129	0.452331	0.6575
D(STC_TC(-2))	0.372065	0.529363	0.702854	0.0020
D(CPS_GDP(-2))	-1.225364	0.754866	-1.623287	0.0001
D(NDC(-1))	0.008088	0.066558	0.121522	0.9049
D(NDC(-2))	-0.262054	0.088222	-2.970397	0.0095
D(NDC(-3))	-0.146118	0.071909	-2.031981	0.0361
D(LTC_TC(-1))	380.6986	843.5373	0.451312	0.0243
ECM(-1)	-0.675084	0.150876	-2.618599	0.0034

R-squared	0.889184	Mean dependent var	2.150714
Adjusted R-squared	0.800532	S.D. dependent var	39.37911
S.E. of regression	17.58744	Akaike info criterion	8.876664
Sum squared resid	4639.772	Schwarz criterion	9.495188
Log likelihood	-111.2733	Hannan-Quinn criter.	9.065753
F-statistic	10.02999	Durbin-Watson stat	2.034657
Prob(F-statistic)	0.000042		

Appendix IV:

Relationship between Credit Channel and Stock Market Liquidity from 1981 - 2015

$SMLIQ = a_0 + a_1NDC + a_2CPS/GDP + a_3LTC/TC + a_4STC/TC + a_5MTC/TC + a_6\%\Delta CTRS + et_4$

Year	SMLIQ %	NDC %	CPS/GDP %	LTC/TC %	STC/TC %	MTC/TC %	CTRS/TC %
1981	3.62	-	9.1	20.22	47.26	32.52	5.40
1982	4.11	-	10.6	19.78	55.75	24.47	5.94
1983	3.44	-	10.6	20.27	52.15	27.58	5.79
1984	3.47	7.63	10.7	17.97	54.33	27.70	5.74
1985	4.80	9.83	9.7	16.29	54.74	28.97	5.40
1986	7.32	16.62	11.3	18.13	49.79	32.08	6.95
1987	4.66	24.18	10.9	17.95	45.39	36.67	5.45
1988	8.50	-32.49	10.4	16.86	52.05	31.09	4.70
1989	4.77	57.30	8.0	16.72	57.47	25.81	3.57
1990	1.38	40.36	7.1	35.80	29.25	34.96	3.32
1991	1.05	109.38	7.6	37.67	32.44	29.89	3.67
1992	1.58	64.08	6.6	44.31	33.18	22.51	3.11
1993	1.69	56.44	11.7	52.46	29.13	18.41	3.73
1994	1.49	8.03	10.2	50.01	30.18	19.81	3.76
1995	1.02	-21.77	6.2	45.08	41.55	13.37	3.28
1996	2.44	-1.40	5.9	50.34	38.06	11.60	2.99
1997	3.66	40.07	7.5	52.73	35.47	11.80	3.14
1998	5.17	23.32	8.8	51.17	39.10	9.74	3.68
1999	4.69	-25.32	9.2	53.20	37.63	9.17	3.66
2000	5.96	79.87	7.9	80.57	14.10	5.33	3.20
2001	8.71	56.59	11.1	62.02	27.71	10.27	4.83
2002	7.77	35.70	11.9	58.40	28.76	12.84	4.66
2003	8.86	11.99	11.1	55.77	29.44	14.79	4.56
2004	10.69	14.51	12.5	62.56	27.86	9.58	4.65
2005	9.07	-69.13	12.6	69.04	14.44	16.52	3.92
2006	9.18	279.57	12.3	51.10	13.60	35.30	4.02
2007	8.16	84.20	17.8	68.81	16.44	14.74	5.46
2008	17.56	58.55	28.6	75.40	14.98	9.62	9.68
2009	9.75	10.00	36.9	81.11	12.65	6.24	12.49
2010	8.07	57.16	18.6	78.92	14.31	6.77	5.43
2011	6.22	-7.22	16.9	76.73	21.21	2.06	4.85
2012	5.47	7.63	20.4	62.73	35.97	1.30	5.15
2013	12.32	14.47	19.7	79.13	18.25	2.63	5.50
2014	7.91	29.84	19.2	71.61	23.81	4.58	3.97
2015	6.07	12.13	3.29	70.35	23.29	6.36	4.97

Keynotes:

SMLIQ	=	Stock Market Liquidity
NDC	=	Net Domestic Credit
CPS/GDP	=	Credit to Core Private Sector
LTC/TC	=	Percentage of Long Term Credit to Total Credit
STC/TC	=	Percentage of Short Term Credit to Total Credit
MTC/TC	=	Percentage of Medium Term Credit to Total Credit
CTRS/TC	=	Credit to Real Sector to Total Credit

Dependent Variable: SMLIQ
Method: Least Squares
Date: 10/06/16 Time: 18:00
Sample (adjusted): 1984 2015
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
STC_TC	31.30444	139.7716	0.223969	0.8246
NDC	0.004430	0.011820	0.374799	0.7110
MTC_TC	31.32175	139.7566	0.224116	0.8245
LTC_TC	31.36344	139.7695	0.224394	0.8243
CTRS_TC	0.740487	0.556009	1.331790	0.1949
CPS_GDP	0.099054	0.174661	0.567120	0.5757
C	-3132.566	13977.11	-0.224121	0.8245

R-squared	0.493368	Mean dependent var	6.233125
Adjusted R-squared	0.371776	S.D. dependent var	3.714921
S.E. of regression	2.944468	Akaike info criterion	5.188373
Sum squared resid	216.7473	Schwarz criterion	5.509003
Log likelihood	-76.01397	Hannan-Quinn criter.	5.294653
F-statistic	4.057574	Durbin-Watson stat	1.339624
Prob(F-statistic)	0.005639		

Null Hypothesis: D(SMLIQ) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.003915	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(STC_TC) has a unit root

Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.704994	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(NDC) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.453074	0.0000
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LTC_TC) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.814678	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(CTRS_TC) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.405401	0.0001
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(CPS_GDP,2) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.558281	0.0000
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Pairwise Granger Causality Tests
Date: 10/06/16 Time: 18:09
Sample: 1981 2015
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
STC_TC does not Granger Cause SMLIQ	33	5.64049	0.0046
SMLIQ does not Granger Cause STC_TC		6.13373	0.0062
NDC does not Granger Cause SMLIQ	30	2.13047	0.1398
SMLIQ does not Granger Cause NDC		0.48975	0.6185
MTC_TC does not Granger Cause SMLIQ	33	7.01784	0.0044
SMLIQ does not Granger Cause MTC_TC		0.13406	0.8751
LTC_TC does not Granger Cause SMLIQ	33	0.51809	0.6013
SMLIQ does not Granger Cause LTC_TC		8.01804	0.0021
CTRS_TC does not Granger Cause SMLIQ	33	0.62995	0.5400
SMLIQ does not Granger Cause CTRS_TC		4.91261	0.0009
CPS_GDP does not Granger Cause SMLIQ	33	0.57880	0.5671
SMLIQ does not Granger Cause CPS_GDP		6.18979	0.0059

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**

None*	0.561961	37.23973	33.87687	0.0007
At most 1*	0.387192	16.16023	13.58434	0.0022
At most 2	0.273986	10.56612	21.13162	0.6903
At most 3*	0.170995	6.188464	4.264601	0.0091
At most 4	0.057385	1.950216	3.841466	0.1626

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

1 Cointegrating Equation(s): Log likelihood -421.7605

Normalized cointegrating coefficients (standard error in parentheses)

SMLIQ	STC_TC	CTRS_TC	CPS_GDP	LTC_TC
1.000000	1.090550	-0.442848	0.093021	0.551827
	(0.19128)	(1.63837)	(0.56640)	(0.13632)

Dependent Variable: D(SMLIQ)
Method: Least Squares
Date: 10/06/16 Time: 18:23
Sample (adjusted): 1988 2015
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.926750	0.710956	1.303525	0.2287
D(SMLIQ(-1))	-0.105558	0.409795	-0.257587	0.8032
D(SMLIQ(-2))	0.065296	0.340080	0.192001	0.8525
D(SMLIQ(-3))	0.491921	0.357649	1.375430	0.2063
D(STC_TC(-1))	0.026986	0.132292	0.203991	0.8435
D(STC_TC(-2))	-0.258687	0.141565	-1.827337	0.1051
D(STC_TC(-3))	-0.182102	0.159588	-1.141074	0.2868
D(CTRS_TC(-1))	0.351862	1.397293	0.251817	0.8075
D(CTRS_TC(-2))	1.038336	1.080696	0.960803	0.3648
D(CTRS_TC(-3))	0.422464	1.374171	0.307432	0.7664
D(CPS_GDP(-1))	-0.047263	0.554584	-0.085223	0.9342
D(CPS_GDP(-2))	-0.543626	0.389475	-1.395793	0.2003
D(CPS_GDP(-3))	-0.455110	0.539600	-0.843421	0.4235
D(LTC_TC(-1))	0.013421	0.133328	0.100662	0.9223
D(LTC_TC(-2))	-0.295157	0.127505	-2.314873	0.0493
D(LTC_TC(-3))	-0.202306	0.155682	-1.299482	0.2300
D(NDC(-1))	-0.002238	0.009564	-0.233955	0.8209
D(NDC(-2))	-0.000753	0.013730	-0.054854	0.9576
D(NDC(-3))	-0.008037	0.011993	-0.670174	0.5216
ECM(-1)	-0.591323	0.415895	-1.421806	0.1929

R-squared	0.750910	Mean dependent var	0.050357
Adjusted R-squared	0.696822	S.D. dependent var	3.282672
S.E. of regression	2.328566	Akaike info criterion	4.704190
Sum squared resid	43.37774	Schwarz criterion	5.655765
Log likelihood	-45.85867	Hannan-Quinn criter.	4.995096
F-statistic	4.403100	Durbin-Watson stat	1.639379
Prob(F-statistic)	0.002908		

Dependent Variable: D(SMLIQ)
Method: Least Squares
Date: 10/06/16 Time: 18:24
Sample (adjusted): 1986 2015
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.541864	0.503012	1.077237	0.2956
D(SMLIQ(-1))	-0.234607	0.286226	-0.819655	0.4231
D(SMLIQ(-2))	-0.111156	0.219512	-0.506380	0.6187
D(STC_TC(-2))	-0.236908	0.078094	-3.033611	0.0071
D(STC_TC(-3))	-1.54E-05	0.054757	-0.000281	0.9998
D(CTRS_TC(-1))	-0.104854	0.394475	-0.265805	0.7934
D(CTRS_TC(-3))	0.356398	0.976144	0.365108	0.7193
D(CPS_GDP(-3))	-0.447237	0.363630	-1.229925	0.2346
D(LTC_TC(-1))	0.000274	0.052679	0.005197	0.9959
D(LTC_TC(-2))	-0.270943	0.077161	-3.511391	0.0025
D(NDC(-1))	-0.007585	0.005675	-1.336525	0.1980
ECM(-1)	-0.787353	0.238004	-1.207345	0.0029

R-squared	0.968038	Mean dependent var	0.042333
Adjusted R-squared	0.941284	S.D. dependent var	3.239804
S.E. of regression	2.333369	Akaike info criterion	4.821678
Sum squared resid	98.00301	Schwarz criterion	5.382157
Log likelihood	-60.32517	Hannan-Quinn criter.	5.000980
F-statistic	9.446118	Durbin-Watson stat	2.239362
Prob(F-statistic)	0.009827		

Appendix V:

Relationship between Exchange Rate Channel and Market Capitalization from 1981 - 2015

$MKTC/M2 = T_0 + T_1EXR/US + T_2EXBP + T_3EXR/JY + T_4EXR/CY + et_5$

Year	MKTC/M2 %	EXR/US%	EXR/BP %	EXR/JY %	EXR/CY %
1981	34.55	0.63	0.82	0.00	0.35
1982	31.67	0.67	0.91	0.00	0.33
1983	32.23	0.748	0.92	0.00	0.34
1984	27.36	0.80	0.91	0.00	0.31
1985	29.60	0.89	1.19	0.00	0.48
1986	28.56	2.02	2.55	0.02	1.95
1987	29.74	4.01	6.59	0.02	3.12
1988	26.07	4.53	8.08	0.03	3.61
1989	27.88	7.39	12.06	0.05	5.02
1990	30.84	8.03	16.24	0.06	6.93
1991	30.64	9.90	17.49	0.07	6.68
1992	28.08	17.29	27.86	0.13	13.64
1993	28.73	22.05	33.25	0.19	15.35
1994	28.79	21.88	33.42	0.20	16.92
1995	62.40	81.02	128.15	0.86	18.34
1996	82.64	81.25	126.41	0.74	17.70
1997	68.21	81.64	133.73	0.67	15.07
1998	53.80	83.80	142.61	0.71	15.17
1999	47.70	92.34	156.43	0.91	60.75
2000	53.76	101.77	149.53	0.94	66.96
2001	52.19	111.48	161.10	0.92	67.84
2002	50.79	120.65	182.05	0.96	91.56
2003	69.60	129.22	211.19	1.12	110.86
2004	99.09	133.00	244.52	1.23	117.50
2005	109.94	131.10	238.77	1.19	98.18
2006	134.83	128.14	234.73	1.09	104.14
2007	257.08	125.06	249.42	1.05	103.75
2008	119.41	117.78	218.24	1.14	123.40
2009	74.71	147.27	230.64	1.57	145.13
2010	89.88	148.31	230.09	1.69	142.99
2011	84.41	151.82	244.26	1.91	166.64
2012	106.52	155.45	247.05	1.95	168.60
2013	125.84	155.25	241.57	1.55	168.83
2014	95.45	156.48	252.27	1.52	162.42
2015	89.96	197.00	309.50	1.63	202.10

Keynotes:

MKTC/M2	=	Percentage of Market Capitalization to Broad Money Supply
EXR/US	=	Exchange Rate Per US Dollar
EXR/BP	=	Exchange Rate Per British Pounds
EXR/JY	=	Exchange Rate Per Japanese Yen
EXR/SF	=	Exchange Rate Per Chinese Yuan

Dependent Variable: MKTC_M2
Method: Least Squares
Date: 10/06/16 Time: 18:29
Sample: 1981 2015
Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR_US	-2.712678	0.612622	-4.427979	0.0001
EXR_SF	0.048398	0.187103	0.258672	0.7977
EXR_JY	4.742712	30.53362	0.155328	0.8776
EXR_BP	1.909254	0.297933	6.408341	0.0000
C	26.76290	6.550613	4.085556	0.0003

R-squared	0.783235	Mean dependent var	66.94143
Adjusted R-squared	0.754333	S.D. dependent var	46.87189
S.E. of regression	23.23197	Akaike info criterion	9.260499
Sum squared resid	16191.73	Schwarz criterion	9.482692
Log likelihood	-157.0587	Hannan-Quinn criter.	9.337200
F-statistic	27.09966	Durbin-Watson stat	1.770367
Prob(F-statistic)	0.000000		

Null Hypothesis: D(MKTC_M2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.569121	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(EXR_US,2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.603527	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(EXR_SF) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.185789	0.0002
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(EXR_JY) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.453404	0.0001
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.
Null Hypothesis: D(EXR_BP,2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.575758	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Pairwise Granger Causality Tests
Date: 10/06/16 Time: 18:37
Sample: 1981 2015
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
EXR_US does not Granger Cause MKTC_M2	33	3.73851	0.0364
MKTC_M2 does not Granger Cause EXR_US		3.55856	0.0420
EXR_SF does not Granger Cause MKTC_M2	33	2.81453	0.0769
MKTC_M2 does not Granger Cause EXR_SF		1.53905	0.2322
EXR_JY does not Granger Cause MKTC_M2	33	3.11303	0.0601
MKTC_M2 does not Granger Cause EXR_JY		3.71562	0.0371
EXR_BP does not Granger Cause MKTC_M2	33	4.96811	0.0142
MKTC_M2 does not Granger Cause EXR_BP		2.77447	0.0796

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.801987	53.44092	33.87687	0.0001
At most 1*	0.553845	26.63391	21.58434	0.0058
At most 2*	0.263205	27.07972	21.13162	0.0071
At most 3*	0.163817	14.90395	5.264609	0.0056
At most 4	0.013632	0.452962	3.841466	0.5009

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

1 Cointegrating Equation(s): Log likelihood -464.4918

Normalized cointegrating coefficients (standard error in parentheses)

MKTC_M2	EXR_US	EXR_SF	EXR_JY	EXR_BP
1.000000	10.21468	0.224192	-211.9236	5.201027
	(0.80882)	(0.20018)	(38.7129)	(0.35640)

Dependent Variable: D(MKTC_M2)
Method: Least Squares
Date: 10/06/16 Time: 18:41
Sample (adjusted): 1985 2015
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.108074	7.436675	0.686876	0.5034
D(MKTC_M2(-1))	1.374290	0.464936	2.955867	0.0104
D(MKTC_M2(-2))	1.398312	0.497867	2.808605	0.0139
D(MKTC_M2(-3))	0.916486	0.351277	2.609014	0.0206
D(EXR_US(-1))	4.826099	1.917755	2.516536	0.0247
D(EXR_US(-2))	6.634242	2.065370	3.212132	0.0063
D(EXR_US(-3))	-1.599766	1.917273	-0.834396	0.4181
D(EXR_SF(-1))	-0.134376	0.491684	-0.273298	0.7886
D(EXR_SF(-2))	-0.297087	0.500206	-0.593929	0.5620
D(EXR_SF(-3))	-2.156664	0.829656	-2.599468	0.0210
D(EXR_JY(-1))	-173.8774	83.50962	-2.082124	0.0562
D(EXR_JY(-2))	114.3852	94.82267	1.206306	0.2477
D(EXR_JY(-3))	283.1324	133.2054	2.125532	0.0518
D(EXR_BP(-1))	-1.933898	1.244765	-1.553624	0.1426
D(EXR_BP(-2))	-4.876563	1.614267	-3.020915	0.0092
D(EXR_BP(-3))	-1.265565	0.845487	-1.496848	0.1566
ECM(-1)	-0.560684	0.813852	-4.928029	0.0002

R-squared	0.803318	Mean dependent var	2.019355
Adjusted R-squared	0.778538	S.D. dependent var	37.36303
S.E. of regression	24.25612	Akaike info criterion	9.517059
Sum squared resid	8237.031	Schwarz criterion	10.30344
Log likelihood	-130.5144	Hannan-Quinn criter.	9.773400
F-statistic	6.573798	Durbin-Watson stat	1.814303
Prob(F-statistic)	0.000577		

Dependent Variable: D(MKTC_M2)
Method: Least Squares
Date: 10/06/16 Time: 18:42
Sample (adjusted): 1985 2015
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.914090	7.110326	0.269199	0.7904
D(MKTC_M2(-1))	0.666702	0.263610	2.529120	0.0195
D(EXR_US(-1))	3.118992	1.109447	2.811304	0.0105
D(EXR_SF(-1))	-0.100383	0.485237	-0.206875	0.8381
D(EXR_SF(-2))	-1.114810	0.504861	-2.208151	0.0385
D(EXR_SF(-3))	0.269077	0.528664	0.508975	0.6161
D(EXR_JY(-2))	13.92029	35.94467	0.387270	0.7025
D(EXR_JY(-3))	44.02011	38.53681	1.142287	0.2662

D(EXR_BP(-1))	-1.930372	0.765538	-2.521588	0.0198
ECM(-1)	-0.544889	0.323681	-4.772870	0.0001

R-squared	0.804541	Mean dependent var	2.019355
Adjusted R-squared	0.785058	S.D. dependent var	37.36303
S.E. of regression	28.08303	Akaike info criterion	9.763905
Sum squared resid	16561.79	Schwarz criterion	10.22648
Log likelihood	-141.3405	Hannan-Quinn criter.	9.914693
F-statistic	5.566976	Durbin-Watson stat	2.173426
Prob(F-statistic)	0.007810		

Appendix VI:

Relationship between Exchange Rate Channel and Stock Market Liquidity from 1981 - 2015

$SMLIQ = P_0 + P_1EXR/US + P_2EXBP + P_3EXR/JY + P_4EXR/CY + et_6$

Year	SMLIQ %	EXR/US %	EXR/BP %	EXR/JY %	EXR/CY %
1981	3.62	0.63	0.82	0.00	0.35
1982	4.11	0.67	0.91	0.00	0.33
1983	3.44	0.748	0.92	0.00	0.34
1984	3.47	0.80	0.91	0.00	0.31
1985	4.80	0.89	1.19	0.00	0.48
1986	7.32	2.02	2.55	0.02	1.95
1987	4.66	4.01	6.59	0.02	3.12
1988	8.50	4.53	8.08	0.03	3.61
1989	4.77	7.39	12.06	0.05	5.02
1990	1.38	8.03	16.24	0.06	6.93
1991	1.05	9.90	17.49	0.07	6.68
1992	1.58	17.29	27.86	0.13	13.64
1993	1.69	22.05	33.25	0.19	15.35
1994	1.49	21.88	33.42	0.20	16.92
1995	1.02	81.02	128.15	0.86	18.34
1996	2.44	81.25	126.41	0.74	17.70
1997	3.66	81.64	133.73	0.67	15.07
1998	5.17	83.80	142.61	0.71	15.17
1999	4.69	92.34	156.43	0.91	60.75
2000	5.96	101.77	149.53	0.94	66.96
2001	8.71	111.48	161.10	0.92	67.84
2002	7.77	120.65	182.05	0.96	91.56
2003	8.86	129.22	211.19	1.12	110.86
2004	10.69	133.00	244.52	1.23	117.50
2005	9.07	131.10	238.77	1.19	98.18
2006	9.18	128.14	234.73	1.09	104.14
2007	8.16	125.06	249.42	1.05	103.75
2008	17.56	117.78	218.24	1.14	123.40
2009	9.75	147.27	230.64	1.57	145.13
2010	8.07	148.31	230.09	1.69	142.99
2011	6.22	151.82	244.26	1.91	166.64
2012	5.47	155.45	247.05	1.95	168.60
2013	12.32	155.25	241.57	1.55	168.83
2014	7.91	156.48	252.27	1.52	162.42
2015	6.07	197.00	309.50	1.63	202.10

Keynotes:

SMLIQ	=	Stock Market Liquidity
EXR/US	=	Exchange Rate Per US Dollar
EXR/BP	=	Exchange Rate Per British Pounds
EXR/JY	=	Exchange Rate Per Japanese Yen
EXR/SF	=	Exchange Rate Per Chinese Yuan

Dependent Variable: SMLIQ
Method: Least Squares
Date: 10/06/16 Time: 18:46
Sample: 1981 2015
Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR_US	-0.082879	0.071432	-1.160236	0.2551
EXR_SF	0.049729	0.021816	2.279436	0.0299
EXR_JY	-4.257627	3.560258	-1.195876	0.2411
EXR_BP	0.067522	0.034739	1.943689	0.0614
C	3.803701	0.763810	4.979908	0.0000

R-squared	0.505678	Mean dependent var	6.018000
Adjusted R-squared	0.439768	S.D. dependent var	3.619139
S.E. of regression	2.708876	Akaike info criterion	4.962508
Sum squared resid	220.1403	Schwarz criterion	5.184701
Log likelihood	-81.84390	Hannan-Quinn criter.	5.039209
F-statistic	7.672286	Durbin-Watson stat	1.391941
Prob(F-statistic)	0.000221		

Null Hypothesis: D(SMLIQ) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.003915	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.
Null Hypothesis: D(EXR_US) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.603527	0.0001
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(EXR_SF) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.185789	0.0002
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(EXR_JY,2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5,5453404	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(EXR_BP,2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.575758	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Pairwise Granger Causality Tests
Date: 10/06/16 Time: 18:53
Sample: 1981 2015
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.

EXR_US does not Granger Cause SMLIQ	33	4.31136	0.0077
SMLIQ does not Granger Cause EXR_US		0.07344	0.9294
EXR_SF does not Granger Cause SMLIQ	33	1.12049	0.3403
SMLIQ does not Granger Cause EXR_SF		0.28270	0.7559
EXR_JY does not Granger Cause SMLIQ	33	5.63267	0.0005
SMLIQ does not Granger Cause EXR_JY		1.27414	0.2954
EXR_BP does not Granger Cause SMLIQ	33	4.72136	0.0232
SMLIQ does not Granger Cause EXR_BP		0.13577	0.8736

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None*	0.627378	52.57729	33.87687	0.0008
At most 1*	0.319612	27.70802	17.58434	0.0005
At most 2*	0.232045	21.712777	11.13162	0.0349
At most 3	0.171656	6.214793	14.26460	0.5858
At most 4	0.047589	1.609034	3.841466	0.2046

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

1 Cointegrating Equation(s): Log likelihood -408.1757

Normalized cointegrating coefficients (standard error in parentheses)

SMLIQ	EXR_US	EXR_CY	EXR_JY	EXR_BP
1.000000	2.278442	-0.110046	74.00593	0.913073
	(0.35139)	(0.09114)	(16.9523)	(0.15730)

Dependent Variable: D(SMLIQ)
Method: Least Squares
Date: 10/06/16 Time: 18:58
Sample (adjusted): 1985 2015
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.326737	0.835687	0.390980	0.7017
D(SMLIQ(-1))	0.160427	0.425062	0.377421	0.7115
D(SMLIQ(-2))	0.320701	0.439985	0.728891	0.4781
D(SMLIQ(-3))	0.154174	0.329397	0.468050	0.6470
D(EXR_US(-1))	-0.112912	0.152535	-0.740238	0.4714

D(EXR_US(-2))	-0.095802	0.145021	-0.660611	0.5196
D(EXR_US(-3))	-0.022190	0.208463	-0.106447	0.9167
D(EXR_SF(-1))	0.002318	0.057582	0.040256	0.9685
D(EXR_SF(-2))	0.073634	0.054675	1.346743	0.1995
D(EXR_SF(-3))	-0.131684	0.064262	-2.049170	0.0597
D(EXR_JY(-1))	-5.888331	8.266462	-0.712316	0.4880
D(EXR_JY(-2))	9.907805	9.359902	1.058537	0.3077
D(EXR_JY(-3))	8.025800	14.44704	0.555533	0.5873
D(EXR_BP(-1))	0.110744	0.069389	1.595999	0.1328
D(EXR_BP(-2))	-0.016832	0.074082	-0.227211	0.8235
D(EXR_BP(-3))	-0.034157	0.074111	-0.460884	0.6520
ECM(-1)	-0.593773	0.469462	-1.264794	0.2266

R-squared	0.635702	Mean dependent var	0.083871
Adjusted R-squared	0.609362	S.D. dependent var	3.193734
S.E. of regression	2.821784	Akaike info criterion	5.214460
Sum squared resid	111.4745	Schwarz criterion	6.000840
Log likelihood	-63.82413	Hannan-Quinn criter.	5.470800
F-statistic	8.526881	Durbin-Watson stat	1.996881
Prob(F-statistic)	0.000927		

Dependent Variable: D(SMLIQ)
Method: Least Squares
Date: 10/06/16 Time: 19:00
Sample (adjusted): 1985 2015
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.297672	0.744930	0.399597	0.6937
D(SMLIQ(-1))	-0.101825	0.236609	-0.430350	0.6715
D(SMLIQ(-3))	0.093379	0.224406	0.416118	0.6818
D(EXR_US(-1))	-0.038297	0.109732	-0.349009	0.7307
D(EXR_US(-2))	-0.105036	0.093570	-1.122536	0.0049
D(EXR_SF(-1))	0.010744	0.053557	0.200607	0.0130
D(EXR_JY(-1))	-6.362444	6.730485	-0.945317	0.3558
D(EXR_JY(-2))	7.939324	6.290685	1.262076	0.0214
D(EXR_JY(-3))	-1.477855	3.872102	-0.381667	0.7067
D(EXR_BP(-1))	0.071573	0.062220	1.150312	0.2636
ECM(-1)	-0.634904	0.314085	-2.021443	0.0018

R-squared	0.729339	Mean dependent var	0.083871
Adjusted R-squared	0.664009	S.D. dependent var	3.193734
S.E. of regression	2.954836	Akaike info criterion	5.276186
Sum squared resid	174.6211	Schwarz criterion	5.785020
Log likelihood	-70.78088	Hannan-Quinn criter.	5.442053
F-statistic	11.504710	Durbin-Watson stat	2.404536
Prob(F-statistic)	0.000266		

Appendix VII:

Relationship between Asset Pricing Channel and Market Capitalization from 1981 - 2015

$MKTC/M2 = Y_0+Y_1TBR+ Y_2ASPCB/MKTC + Y_3ASPFI/MKTC + Y_4SPCMS/MKTC + Y_5ASPS/MKTC + et_7$

Year	MKTC/M2 %	TBR %	ASPCB/MKTC %	ASPFI/MKTC %	SPCMS/MKTC %	ASPS/MKTC %
1981	34.55	5.00	19.92	19.02	25.16	30.94
1982	31.67	7.00	20.44	19.66	25.78	30.66
1983	32.23	7.00	18.56	18.35	22.88	27.74
1984	27.36	8.50	19.67	19.51	24.33	22.63
1985	29.60	8.50	17.08	16.50	16.38	23.83
1986	28.56	8.50	21.59	17.31	20.16	22.77
1987	29.74	11.75	18.20	15.54	16.83	19.30
1988	26.07	11.75	15.12	13.85	14.39	17.25
1989	27.88	17.50	13.39	9.74	12.50	15.64
1990	30.84	17.50	12.54	6.33	11.57	13.41
1991	30.64	15.00	9.57	3.07	9.07	11.36
1992	28.08	21.00	7.96	2.04	8.15	10.04
1993	28.73	26.90	5.76	1.40	6.46	7.20
1994	28.79	12.50	4.15	1.71	5.08	7.23
1995	62.40	12.50	1.80	0.65	2.64	3.80
1996	82.64	12.25	1.58	0.73	2.39	2.20
1997	68.21	12.00	1.54	1.71	2.22	2.50
1998	53.80	12.95	1.86	1.87	2.67	2.76
1999	47.70	17.00	1.66	1.66	2.41	2.43
2000	53.76	12.00	1.07	1.10	1.54	1.59
2001	52.19	12.95	0.82	0.89	1.13	1.18
2002	50.79	18.88	0.76	0.78	1.02	1.05
2003	69.60	15.02	0.46	0.46	0.59	0.59
2004	99.09	14.21	0.31	0.32	0.38	0.39
2005	109.94	7.00	0.24	0.25	0.29	0.30
2006	134.83	8.80	0.14	0.16	0.17	0.17
2007	257.08	6.91	0.06	0.07	0.07	0.07
2008	119.41	9.55	0.08	0.09	0.09	0.04
2009	74.71	6.13	0.07	0.12	0.06	0.12
2010	89.88	10.25	0.08	0.09	0.08	0.09
2011	84.41	16.75	0.08	0.09	0.09	0.09
2012	106.52	17.20	0.06	0.07	0.06	0.06
2013	125.84	13.34	0.05	0.06	0.05	0.05
2014	95.45	13.04	0.05	0.08	0.06	0.06
2015	89.96	14.71	0.06	0.08	0.06	0.00

Key notes:

MKTC/M2 = Market Capitalization to Broad Money Supply
TBR = Treasury Bill Rate
ASPCB/MKTC = Aggregate Stock Prices of Commercial Banks to Market Capitalization
ASPFI/MKTC = Aggregate Stock Prices of Non Financial Institutions to Market Capitalization
SPCMS/MKTC = Aggregate Stock Prices of Manufacturing Sector to Market Capitalization
ASPS/MKTC = Aggregate Stock Price to Market Capitalization

Dependent Variable: MKTC_M2
Method: Least Squares
Date: 10/06/16 Time: 19:16
Sample: 1981 2015
Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SPCMS_MKTC	-0.121117	5.941846	-0.020384	0.9839
TBR	-4.719420	1.666130	-2.832563	0.0083
ASPS_MKTC	-2.819779	4.358627	-0.646942	0.5228
ASPFI_MKTC	-0.192966	4.568627	-0.042237	0.9666
ASPCB_MKTC	-0.509137	4.809142	-0.105869	0.9164
C	153.9803	22.67251	6.791498	0.0000

R-squared	0.555781	Mean dependent var	66.94143
Adjusted R-squared	0.479191	S.D. dependent var	46.87189
S.E. of regression	33.82608	Akaike info criterion	10.03515
Sum squared resid	33181.90	Schwarz criterion	10.30178
Log likelihood	-169.6151	Hannan-Quinn criter.	10.12719
F-statistic	7.256613	Durbin-Watson stat	1.414495
Prob(F-statistic)	0.000163		

Null Hypothesis: D(MKTC_M2,2) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.569121	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(SPCMS_MKTC,2) has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.592101	0.0011
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

Null Hypothesis: D(TBR) has a unit root
Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.779855	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.
*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(ASPS_MKTC,2) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.23946	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(ASPFI_MKTC,2) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.312181	0.0020
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(ASPCB_MKTC,2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-13.40350	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	

10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Pairwise Granger Causality Tests
Date: 10/06/16 Time: 19:24
Sample: 1981 2015
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TBR does not Granger Cause MKTC_M2	33	0.77045	0.4724
MKTC_M2 does not Granger Cause TBR		4.00177	0.0340
SPCMS_MKTC does not Granger Cause MKTC_M2	33	5.00177	0.0040
MKTC_M2 does not Granger Cause SPCMS_MKTC		1.33175	0.2802
ASPS_MKTC does not Granger Cause MKTC_M2	33	2.03834	0.1491
MKTC_M2 does not Granger Cause ASPS_MKTC		0.82126	0.4502
ASPFI_MKTC does not Granger Cause MKTC_M2	33	1.68950	0.2029
MKTC_M2 does not Granger Cause ASPFI_MKTC		0.28433	0.7547
ASPCB_MKTC does not Granger Cause MKTC_M2	33	4.25753	0.0433
MKTC_M2 does not Granger Cause ASPCB_MKTC		0.75162	0.4809

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.899079	75.68280	40.07757	0.0000
At most 1 *	0.796902	52.60415	33.87687	0.0001
At most 2 *	0.709368	40.77800	27.58434	0.0006
At most 3 *	0.593179	29.67960	21.13162	0.0025
At most 4 *	0.576778	28.37536	14.26460	0.0002
At most 5 *	0.233254	8.764793	3.841466	0.0031

Max-eigenvalue test indicates 6 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

1 Cointegrating Equation(s):	Log likelihood	-364.8022

Normalized cointegrating coefficients (standard error in parentheses)

MKTC_M2	TBR	SPCMS_MKTC	ASPS_MKTC	ASPFI_MKTC	ASPCB_MKTC
1.000000	8.945349	66.78068	-16.68082	- 6.982401	-60.22176
	(1.75393)	(12.0034)	(9.14174)	(5.22650)	(5.68032)

Dependent Variable: D(MKTC_M2)
Method: Least Squares
Date: 10/06/16 Time: 19:30
Sample (adjusted): 1985 2015
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.563276	12.94888	0.352407	0.7312
D(MKTC_M2(-1))	0.517245	0.458373	1.128435	0.2831
D(MKTC_M2(-2))	0.231096	0.379349	0.609190	0.5548
D(MKTC_M2(-3))	0.342993	0.344961	0.994293	0.3414
D(SPCMS_MKTC(-1))	-13.09396	28.30548	-0.462595	0.6527
D(SPCMS_MKTC(-2))	-2.166828	37.42909	-0.057892	0.9549
D(SPCMS_MKTC(-3))	-3.490571	30.33003	-0.115086	0.9105
D(TBR(-1))	3.508497	3.708299	0.946120	0.3644
D(TBR(-2))	0.528878	2.586094	0.204508	0.8417
D(TBR(-3))	2.362485	2.881118	0.819989	0.4296
D(ASPS_MKTC(-1))	3.003469	12.58220	0.238708	0.8157
D(ASPS_MKTC(-2))	7.499358	19.30989	0.388369	0.7052
D(ASPS_MKTC(-3))	13.06594	17.20080	0.759612	0.4635
D(ASPFI_MKTC(-1))	3.510424	21.03817	0.166860	0.8705
D(ASPFI_MKTC(-2))	-1.336239	26.10277	-0.051191	0.9601
D(ASPFI_MKTC(-3))	-5.274073	21.95149	-0.240260	0.8145
D(ASPCB_MKTC(-1))	12.12579	37.84411	0.320414	0.7547
D(ASPCB_MKTC(-2))	-10.54973	45.37511	-0.232500	0.8204
D(ASPCB_MKTC(-3))	1.254811	32.04912	0.039153	0.9695
ECM(-1)	-1.041381	0.528351	-1.971004	0.0744

R-squared	0.872871	Mean dependent var	2.019355
Adjusted R-squared	0.852398	S.D. dependent var	37.36303
S.E. of regression	47.90244	Akaike info criterion	10.83044
Sum squared resid	25241.08	Schwarz criterion	11.75559
Log likelihood	-147.8718	Hannan-Quinn criter.	11.13202
F-statistic	6.553017	Durbin-Watson stat	1.896594
Prob(F-statistic)	0.000234		

Dependent Variable: D(MKTC_M2)
Method: Least Squares
Date: 10/06/16 Time: 19:31
Sample (adjusted): 1985 2015
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.168986	9.796116	0.425575	0.6752
D(MKTC_M2(-1))	0.309641	0.259342	1.193948	0.2472
D(MKTC_M2(-3))	0.198026	0.220205	0.899280	0.3798
D(SPCMS_MKTC(-1))	0.826657	8.382266	0.098620	0.9225
D(TBR(-1))	2.267472	2.114269	1.072461	0.2969
D(TBR(-2))	-0.276307	1.749928	-0.157896	0.8762
D(TBR(-3))	1.615429	1.917452	0.842487	0.0000
D(ASPS_MKTC(-1))	2.088761	6.041190	0.345753	0.0033
D(ASPS_MKTC(-3))	2.937155	5.954507	0.493266	0.6275
D(ASPFI_MKTC(-1))	-1.136245	8.824234	-0.128764	0.8989
D(ASPCB_MKTC(-1))	0.627481	10.87970	0.057674	0.0029
ECM(-1)	-0.779719	0.277027	-2.814591	0.0111

R-squared	0.948782	Mean dependent var	2.019355
Adjusted R-squared	0.918239	S.D. dependent var	37.36303
S.E. of regression	37.88691	Akaike info criterion	10.39173
Sum squared resid	27272.94	Schwarz criterion	10.94683
Log likelihood	-149.0719	Hannan-Quinn criter.	10.57268
F-statistic	11.925099	Durbin-Watson stat	2.042772
Prob(F-statistic)	0.000542		

Appendix VIII:

Relationship between Asset Pricing Channel and Stock market Liquidity from 1981 - 2015

$SMLIQ = Z_0 + Z_1TBR + Z_2ASPCB/MKTC + Z_3ASPFI/MKTC + Z_4SPCMS/MKTC + Z_5ASPS/MKTC + et_8$

Year	SMLIQ %	TBR %	ASPCB/MKTC %	ASPFI/MKTC %	SPCMS/MKTC %	ASPS/MKTC %
1981	3.62	5.00	19.92	19.02	25.16	30.94
1982	4.11	7.00	20.44	19.66	25.78	30.66
1983	3.44	7.00	18.56	18.35	22.88	27.74
1984	3.47	8.50	19.67	19.51	24.33	22.63
1985	4.80	8.50	17.08	16.50	16.38	23.83
1986	7.32	8.50	21.59	17.31	20.16	22.77
1987	4.66	11.75	18.20	15.54	16.83	19.30
1988	8.50	11.75	15.12	13.85	14.39	17.25
1989	4.77	17.50	13.39	9.74	12.50	15.64
1990	1.38	17.50	12.54	6.33	11.57	13.41
1991	1.05	15.00	9.57	3.07	9.07	11.36
1992	1.58	21.00	7.96	2.04	8.15	10.04
1993	1.69	26.90	5.76	1.40	6.46	7.20
1994	1.49	12.50	4.15	1.71	5.08	7.23
1995	1.02	12.50	1.80	0.65	2.64	3.80
1996	2.44	12.25	1.58	0.73	2.39	2.20
1997	3.66	12.00	1.54	1.71	2.22	2.50
1998	5.17	12.95	1.86	1.87	2.67	2.76
1999	4.69	17.00	1.66	1.66	2.41	2.43
2000	5.96	12.00	1.07	1.10	1.54	1.59
2001	8.71	12.95	0.82	0.89	1.13	1.18
2002	7.77	18.88	0.76	0.78	1.02	1.05
2003	8.86	15.02	0.46	0.46	0.59	0.59
2004	10.69	14.21	0.31	0.32	0.38	0.39
2005	9.07	7.00	0.24	0.25	0.29	0.30
2006	9.18	8.80	0.14	0.16	0.17	0.17
2007	8.16	6.91	0.06	0.07	0.07	0.07
2008	17.56	9.55	0.08	0.09	0.09	0.04
2009	9.75	6.13	0.07	0.12	0.06	0.12
2010	8.07	10.25	0.08	0.09	0.08	0.09
2011	6.22	16.75	0.08	0.09	0.09	0.09
2012	5.47	17.20	0.06	0.07	0.06	0.06
2013	12.32	13.34	0.05	0.06	0.05	0.05
2014	7.91	13.04	0.05	0.08	0.06	0.06
2015	6.07	14.71	0.06	0.08	0.06	0.00

Keynotes:

SMLIQ = Stock Market Liquidity
TBR = Treasury Bill Rate
ASPCB/MKTC = Aggregate Stock Prices of Commercial Banks to Market Capitalization
ASPFI/MKTC = Aggregate Stock Prices of Non Financial Institutions to Market Capitalization
SPCMS/MKTC = Aggregate Stock Prices of Manufacturing Sector to Market Capitalization
ASPS/MKTC = Aggregate Stock Price to Market Capitalization

Dependent Variable: SMLIQ
Method: Least Squares
Date: 10/06/16 Time: 22:22
Sample: 1981 2015
Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SPCMS_MKTC	-0.751649	0.491828	-1.528278	0.1369
ASPS_MKTC	-0.263224	0.360271	-0.730629	0.4707
ASPFI_MKTC	1.243803	0.308204	4.035653	0.0003
ASPCB_MKTC	-0.140890	0.360214	-0.391129	0.6985
C	7.846821	0.633161	12.39310	0.0000

R-squared	0.466341	Mean dependent var	6.018000
Adjusted R-squared	0.395186	S.D. dependent var	3.619139
S.E. of regression	2.814596	Akaike info criterion	5.039078
Sum squared resid	237.6585	Schwarz criterion	5.261271
Log likelihood	-83.18387	Hannan-Quinn criter.	5.115779
F-statistic	6.553913	Durbin-Watson stat	1.337746
Prob(F-statistic)	0.000648		

Null Hypothesis: D(SMLIQ) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.003915	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(SPCMS_MKTC,2) has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.592101	0.0011
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(TBR,2) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.341678	0.0000
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(ASPS_MKTC,2) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.23946	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(ASPFI_MKTC,2) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.312181	0.0020
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(ASPCB_MKTC,2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-13.40350	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.
Pairwise Granger Causality Tests
Date: 10/06/16 Time: 22:45
Sample: 1981 2015
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
SPCMS_MKTC does not Granger Cause SMLIQ	33	0.81964	0.4509
SMLIQ does not Granger Cause SPCMS_MKTC		3.50068	0.0404
TBR does not Granger Cause SMLIQ	33	0.35523	0.7041
SMLIQ does not Granger Cause TBR		0.52001	0.6001
ASPS_MKTC does not Granger Cause SMLIQ	33	0.81447	0.4531
SMLIQ does not Granger Cause ASPS_MKTC		0.93871	0.4031
ASPFI_MKTC does not Granger Cause SMLIQ	33	5.73990	0.0003
SMLIQ does not Granger Cause ASPFI_MKTC		0.10977	0.8964
ASPCB_MKTC does not Granger Cause SMLIQ	33	7.75941	0.0000
SMLIQ does not Granger Cause ASPCB_MKTC		0.89240	0.4210

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.878085	69.44624	40.07757	0.0000
At most 1 *	0.783610	50.51218	33.87687	0.0002
At most 2 *	0.714249	41.33695	27.58434	0.0005
At most 3 *	0.640780	33.78603	21.13162	0.0005
At most 4 *	0.426696	18.35917	14.26460	0.0107
At most 5 *	0.211022	7.821543	3.841466	0.0052

Max-eigenvalue test indicates 6 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

1 Cointegrating Equation(s): Log likelihood -281.9123

Normalized cointegrating coefficients (standard error in parentheses)

SMLIQ	SPCMS_MKTC	TBR	ASPS_MKTC	ASPFI_MKTC	ASPCB_MKTC
1.000000	13.29820	0.227493	4.902842	-1.640551	-7.730167
	(1.94414)	(0.28601)	(1.47514)	(0.84802)	(0.92047)

Dependent Variable: SMLIQ
Method: Least Squares
Date: 10/06/16 Time: 22:48
Sample (adjusted): 1982 2015
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.632912	1.888189	5.101667	0.0000
SPCMS_MKTC	-0.756822	0.480736	-1.574299	0.1271
TBR	-0.137285	0.139675	-0.982889	0.3344
ASPS_MKTC	-0.413479	0.367612	-1.124770	0.2706
ASPFI_MKTC	1.039873	0.374615	2.775845	0.0099
ASPCB_MKTC	0.199869	0.409891	0.487615	0.6298
ECM(-1)	-0.582439	0.184308	1.532429	0.1371

R-squared	0.686101	Mean dependent var	6.088529
Adjusted R-squared	0.655235	S.D. dependent var	3.649068
S.E. of regression	2.717919	Akaike info criterion	5.018851
Sum squared resid	199.4513	Schwarz criterion	5.333102
Log likelihood	-78.32047	Hannan-Quinn criter.	5.126020
F-statistic	5.414105	Durbin-Watson stat	2.082389
Prob(F-statistic)	0.000878		

Dependent Variable: D(SMLIQ)
Method: Least Squares
Date: 10/06/16 Time: 23:03
Sample (adjusted): 1985 2015
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.117329	0.604789	0.193999	0.8477
D(SMLIQ(-1))	-0.066118	0.177734	-0.372004	0.0000
D(SMLIQ(-3))	-0.065514	0.175624	-0.373035	0.0023
D(SPCMS_MKTC(-3))	-0.131377	0.283110	-0.464048	0.6466
D(ASPS_MKTC(-1))	0.195461	0.371464	0.526192	0.0034
ECM(-1)	-0.685463	0.208229	-3.291877	0.0030

R-squared	0.899077	Mean dependent var	0.083871
Adjusted R-squared	0.880893	S.D. dependent var	3.193734
S.E. of regression	2.689396	Akaike info criterion	4.988496
Sum squared resid	180.8213	Schwarz criterion	5.266042
Log likelihood	-71.32168	Hannan-Quinn criter.	5.078969
F-statistic	9.461343	Durbin-Watson stat	2.058314
Prob(F-statistic)	0.000330		