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MONETARY POLICY AND THE PERFORMANCE OF NIGERIA CAPITAL MARKET: A TIME VARIANT ANALYSIS

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ABSTRACT: *This study examined the relationship between monetary policy and the performance of the Nigerian capital market using annual time series data sourced from the Central Bank of Nigeria Statistical Bulletin. The objective was to examine the long and short run relationship that exists between monetary policy variables and the performance of Nigerian capital market. Market capitalization and market turnover was modeled as the function of interest rate, exchange rate, monetary aggregates, monetary policy rate and treasury bill rate. The study applied the Ordinary Least Square (OLS) regression technique and causality, unit root, cointegration, vector error correction estimates. Findings revealed that interest rate, exchange rate monetary aggregate and monetary policy rate have positive and significant relationship with market capitalization but treasury bill rate have negative and significant relationship with market capitalization. Monetary policy rate, monetary aggregate and exchange rate have positive relationship with market turnover while Treasury bill rate and interest rate have negative and significant relationship with market turnover. The unit root test found the variables stationary at first difference, the cointergration test validates the presence of long run relationship, the granger causality test proved unidirectional causality while the vector error correction estimates justified adequate speed of adjustment. The study concludes that monetary policy has significant relationship with performance of Nigeria capital market. We recommend that the monetary authorities should ensure effect monetary policy transmission mechanism that will enhance the performance of the capital market.*

KEYWORDS: Monetary Policy, Capital Market, Exchange Rate, Time Series Monetary Policy Rate

INTRODUCTION

The Nigeria capital market is classified among the emerging financial market of world and one of the fast growing in Africa. In a deregulated financial market like Nigeria, the performance of the market depends on both monetary and macroeconomic policies. The central bank Act of 1959 as amended empowered CBN to perform monetary policy functions for the objective of achieving set goals in the economy. Apart from achieving macroeconomic goals, monetary policy also ensure that the financial market is sound and stable to transmit monetary policies to economy. The monetary policy function includes determining the optimal level of money in circulation through contractionary and expansionary monetary policy which affects the level of credit, interest rate, exchange rate and asset prices. Monetary policy 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. The historical thought on the effect of monetary policy on the economy dates back to the classical economists such as Milton Friedman and Irvin

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Fishers. Monetary policy has long been acknowledged as instrument used to influence investment and other macroeconomic indicators (Akani, 2017).

Nigerian Capital market was established in 1960 for the purpose of bridging savings and investment gap and simplifies the sourcing long term fund. It constitute a network of financial institutions and investors interact to mobilize and allocate long term funds to productive investment and funds are exchanged for financial assets issued by borrowers or traded by stock holders which in turn offers access to a variety of financial instruments that enable economic agents to pool, price, and exchange risk (Akani and Imegi, 2017). Monetary policy 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.

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 (Akani, 2017). 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.

Nigerian monetary policy thrust past three decades has been to increase the operational efficiency of the capital market, enhance financial sector deepening and economic growth. The Nigerian capital market has been in existence for 57 years (1960-2018) the performance of the market is still very low compared to capital market of other countries established within the same period. The ill performance despite various reforms questions the ability of the regulatory authorities and the policy makers. There are various studies on the relationship between monetary policy and the performance of the capital market, findings of the studies has been inconclusive, some scholars found positive relationship between monetary policy variables, others found negative relationship between the variables (Akani and Imegi, 2017; Akani and Lucky, 2014; Lucky, Akani and Anyamaobi, 2015; Echekoba, Ananwude, and Lateef,2018). Again some of the studies failed to integrated real monetary policy variables in the model, for instance, the study of Echekoba, Okaro, Ananwude and Akuesodo (2018) only used monetary policy rate and cash reserve ratio, from the above knowledge gap, this study examined the relationship between monetary policy and performance of Nigeria capital market.

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LITERATURE REVIEW

The Nigerian Capital Market

The capital market has been identified as an institution that contributes to the socio-economic growth and development of emerging and developed economies (Donwa and Odia, 2010). This is made possible through some of the vital roles played such as channeling resources, promoting reforms to modernize the financial sectors, financial intermediation capacity to link deficit to the surplus sector of the economy and a veritable tool in the mobilization and allocation of savings among competitive uses which are critical to the growth and efficiency of the economy (Alile, 1984).

It helps to channel capital or long-term resources to firms with relatively high and increasing productivity thus enhancing economic expansion and growth (Alile, 1997). Ekundayo (2002) argues that a nation requires a lot of local and foreign investments to attain sustainable economic growth and development. The capital market provides a means through which this is made possible. However, the paucity of long-term capital has posed the greatest predicament to economic development in most African countries including Nigeria. Osaze (2000) sees the capital market as the driver of any economy to growth and development because it is essential for the long term growth capital formation. It is crucial in the mobilization of savings and channeling of such savings to profitable self-liquidating investment. The Nigerian capital market provides the necessary lubricant that keeps turning the wheel of the economy. It not only provides the funds required for investment but also efficiently allocates these funds to projects of best returns to fund owners. This allocative function is critical in determining the overall growth of the economy. The functioning of the capital market affects liquidity, acquisition of information about firms, risk diversification, savings mobilization and corporate control. Therefore, by altering the quality of these services, the functioning of stock markets can alter the rate of economic growth (Equakun, 2005). Okereke- Onyiuke (2000) posits that the cheap source of funds from the capital market remain a critical element in the sustainable development of the economy. She enumerated the advantages of capital market financing to include no short repayment period as funds are held for medium and long term period or in perpetuity, funds to state and local government without pressures and ample time to repay loans.

In 1986 Nigeria embraced the International Monetary Fund (IMF)-World Bank Structural Adjustment Programme (SAP) which influenced the economic policies of the Nigerian government and led to reforms in the late 1980s and early 1990s. The programme was proposed as an economic package to rapidly and effectively transform the Nigerian economy within two years (Yesufu, 1996). However, until SAP was abandoned in 1994, the objectives were not achieved due to the inability of government to judiciously implement some of its policy measures (Oyefusi and Mogbolu, 2003). The notable reforms include monetary and fiscal policies, sectoral reforms such as removal of oil subsidy in 1988 to the tune of 80%, interest deregulation from August 1987, financial market reform and public sector reforms which entails the full or partial privatization and commercialization of about 111 public owned enterprises. The Nigerian Stock Exchange was to play a key role during the offer for sale of the shares of the affected enterprises (World Bank, 1994; Oyefusi and Mogbolu, 2003).The introduction of SAP in Nigeria has resulted in a very significant growth of the country's stock market as a result of deregulation of the financial sector and the privatization exercise which exposed investors and companies to the significance of the stock market (Alile, 1996; Soyode, 1990).

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Adelegan (2005) argue that the liberalization of capital market led to the growth of the Nigerian capital market yet its impact at the macro-economy was negligible. Again the capital market was instrumental to the initial 25 banks that were able to meet the minimum capital requirement of N25billion during the banking sector consolidation in 2005.The stock market has helped government and corporate entities to raise long-term capital for financing new projects, and expanding and modernizing industrial/commercial concerns (Nwankwo, 1991).

Monetary Policy Transmission Mechanism: Interest Rate Transmission Mechanisms

Interest rate channel is 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.

In an underdeveloped financial market like Nigeria, 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.

Investment-based Channels: Direct Interest-Rate Channels

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:

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

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;

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

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.

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.

The Monetarist and Transmission of Monetary Policy

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

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

- 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.

Credit Transmission Mechanisms

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

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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 key point is that monetary policy besides shifting the supply of deposits also shifts the supply of bank loans. For instance, an expansionary monetary policy that increases bank reserves and bank deposits increase the quantity of bank loans available. Where many borrowers are dependent on bank loans to finance their activities, this increase in bank loans will cause a rise in investment (and also consumer) spending, leading ultimately to an increase in aggregate output, (Y). The schematic presentation of the resulting monetary policy effects is given by the following:

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

(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).

Exchange Rate Transmission Mechanisms Channel

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.

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

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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:

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

- 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:

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

  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:

$$i \downarrow \Rightarrow e \downarrow \Rightarrow NW \updownarrow \Rightarrow y \updownarrow \Rightarrow \Pi \updownarrow \quad (7)$$

- 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).

Asset Prices Channels

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.

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

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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):

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

Consider two ways of increasing the size of a firm:

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

- The ratio of the market value of a firm to the replacement cost of its assets is known as Tobin's q
- Tobin (1969) argued that a firm should invest in new buildings and equipment if the stock market will value the project at more than its cost (that is, if the project's q is greater than 1)
- Increased equity prices (P_e) mean that new investment projects have become relatively cheaper to finance and therefore more attractive

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

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

- 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).

Theories of Stock Market Price: The Efficient Market Hypothesis

The efficient market hypothesis was developed by Fama (1970). The concept of EMH was defined as the market which adjusts speedily to available information. It assumed that the value of the market price of stocks is linear function available information which does not give room for excess return on stocks through the messaging of any market information. The efficiency of stock market has over the years attracted the attention of research in financial economies especially the stock market of the developing countries. This is because the functioning of the capital market is a policy structure for achieving macroeconomic goals. Fama (1965) observed that stock market where successive price changes in the individual securities are independent is by their definition, a random walk market. Fama assumed that sufficient but not necessary conclusions for efficiency are:

i. The absence of transaction cost in the process of the security trading

ii. Availability of the required information without lost and

iii. There is consensus agreement between the parties on the implication of current information for the available price and distribution of future price. The efficient market hypothesis was categorized into three according to speed to which the information affects the stock price:

iv. The Weak form of efficient-market-hypothesis

v. The Semi-strong form efficient market hypothesis and

vi. The Strong-form efficient market hypothesis

The Weak-Form Efficient Market-Hypothesis

This assumed that the current price of any stock can not contain any valid information to predict and forecast the future price behaviour of the stock. Excess return cannot be earned in the long run by investment strategies based on historic share value of the stock. This implies that fluctuation in stock price, up and down is not the function of information that were not available in the time series but noted that fluctuation of share price is random.

The Semi-Strong Form Efficient Market-Hypothesis

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This is of the opinion that public available information such as financial statement strategy and past history are fully reflected in current price of the stock price and that no excess returns can be earned by trading on the information. This captured some classes of investors by evaluating the earnings and the profit position of the firms before and other investment. This was the case of the stock prices of the banking industry in Nigeria in the banking sector crisis in 2008 that was caused by the margin loans.

The Strong-Form Efficient Market-Hypothesis

This advocate that all information both public and private is fully reflected in the price and there is no avenue for excess return. The availability of legal barriers to both private and public information renders the strong form of efficient relevant hypothesis except where these laws are ignored.

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.

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:

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

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

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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:

$L(s) = L(r) = R - dr$ (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.

$Md = L\ (Y, r)$ (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.

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:

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

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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:

$$r = r\ (Y, \pi), \quad (15)$$

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

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.

Empirical Review

Echekoba et al., (2018) utilized time series data to determine the effect of monetary policy on the performance of Nigerian capital market. The study was motivated by the inconclusive debate on the real effect of monetary policy on capital market performance. Specifically, this study ascertained the effect of monetary policy rate and cash reserve ratio on the performance of Nigerian capital market surrogated by all share index. Secondary data for the period 1986 to 2016 were collected from the Nigerian Stock Exchange and Central Bank of Nigeria annual reports of various editions. The study applied the Ordinary Least Square (OLS) regression technique and causality analysis in which variations in all share index was regressed on monetary policy rate and cash reserve ratio. The analysis revealed that monetary policy tools have no significant effect on capital market performance. The monetary policy rate has negative significant relationship with capital market performance while cash reserve ratio positively relates with performance of the capital market.

Echekoba, Ananwude and Lateef (2018) empirically examined the effect of monetary policy tools on performance of the Nigerian capital market was re-examined. The real effect of monetary policy tools on capital market performance is still not clear both from theoretical and empirical background, especially in emerging economies like Nigeria. Explicitly, this study evaluated the effect of monetary policy rate (the rate at the Central Bank of Nigeria extends credit facility to other financial institutions operating in the country), cash reserve ratio, liquidity ratio and loan to deposit ratio on the performance of the Nigerian capital market. Nigerian Stock Exchange and Central Bank of Nigeria annual reports of various editions supplied the relevant data for analysis. The Autoregressive Distributive Lag (ARDL) was the technique applied in estimating the model and for co-integration assessment, while granger causality analysis aided in ascertaining the effect of monetary policy tools on capital market performance. The result of the analysis illustrated that monetary policy tools and capital market performance in Nigeria are not co-integrated. The study also found that Nigerian capital market performance is not significantly affected by monetary policy announcement by the Central Bank of Nigeria rather; it is monetary policy rate that is significantly influenced by performance of the capital market.

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Akani and Imegi (2017) examined the effects of monetary policy transmission mechanism on liquidity of Nigerian capital market from 1981-2016. The required data were sourced from Central Bank of Nigeria (CBN) statistical bulletin. The study have capital market liquidity as dependent variable while treasury bill rate, savings rate, prime lending rate, net domestic credit, monetary policy rate, maximum lending rate, exchange rate and credit to private sector as the independent variables. The Ordinary Least Square multiple regressions with econometric view were used as data analysis techniques. Co integration test, Granger Causality Test, Augmented Dickey Fuller Test and Vector Error Correction Model were used to examine the variables and its relationship to the dependent variables. The study found that monetary policy transmission mechanism has significant impact on the liquidity of the capital market.

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 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 R^2 of 75% in model I and R^2 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.

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.

Abaenewe and Ndugbu (2012) investigated the effect of monetary policy development on equity prices in the Nigerian Stock Exchange Market using annual data from 1985 to 2010. The ordinary least square regression (OLS) was run using five monetary policy variables including minimum rediscount rate, treasury bill rate, interest rate, exchange rate and consumer price index (proxy for inflation) on the equity prices (proxied by all share price index). The first investigation of this study is that minimum rediscount rates and Treasury bill rates are highly correlated and cannot be applied simultaneously in monetary policy management. As a consequence, the Treasury bill rates were dropped in the course of further analysis. The general result of the analysis showed a weak correlation between monetary policy and equity prices. This reflected in the explanatory variables which accounted only 15.6% in the changes of equity prices in Nigeria. All the explanatory variables are negatively and insignificantly related

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to equity prices, except the consumer price index that has insignificant positive relationship with equity prices. The study has revealed that monetary policy has not made significant influence over the prices of ordinary equities in Nigeria. What this means is that the equities market has not significantly absorbed the monetary policy impulses and therefore cannot be taken as being a good transmission channel for monetary policy implementation in Nigeria until the distortion in the financial system caused by huge fiscal spending is corrected. This study therefore recommends that policy makers should be aware of these weak monetary policy impacts on equities market, and make their decisions in a more effective manner that can link monetary policy to the equities market to ensure price stability and encourage investors.

METHODOLOGY

The data for this study were secondary data sourced from the Central Bank of Nigeria (CBN) statistical

Model Specification

In attempting to investigate the relationship between macroeconomic variables and financial market stability the study adopt the following models

$$MCT = f(MPR, TBR, EXR, INTR, MOG) \quad 17$$

Transforming equation 1 above to econometrics method, we have

$$MCT = \beta 0 + \beta_1 MPR + \beta_2 TBR + \beta_3 EXR + \beta_4 INTR + \beta_5 MOG + \mu t \quad 18$$

$$MTO = f(MPR, TBR, EXR, INTR, MOG) \quad 19$$

Transforming equation 1 above to econometrics method, we have

$$MTO = \beta 0 + \beta_1 MPR + \beta_2 TBR + \beta_3 EXR + \beta_4 INTR + \beta_5 MOG + \mu t \quad 20$$

Where

MCT = Nigeria stock market capitalization

MTO = Nigeria stock market turnover

MPR = Monetary policy rate

TBR = Treasury bill rate

EXR = naira exchange rate per US dollar

INTR = interest rate

MOG = Monetary Aggregate

μt = Error term

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Estimation Techniques

i. Stationarity Test:

Time series data were assumed to be non-stationary and this implies that the result obtained from Ordinary Least Square (OLS) may be misleading (Suleman and Azeeze, 2012). It is therefore necessary to test the stationarity of the variables using the Augmented Dickey Fuller 1979 test to both level and first difference. The ADF test constructs a parameter correction for higher order correlation by assuming that the times series follows an auto regressive process. Mathematically expressed as

$$\Delta y_t = c + \beta_t + \alpha y_{t-1} + \sum_{t-i}^{k} \gamma_j \Delta y_{t-j} + \varepsilon_t \quad \ldots\ldots 21$$

$$\Delta y_t = c + \alpha y_{t-1} + \sum_{t-i}^{k} \gamma_j \Delta y_{t-j} + \varepsilon_t \quad \ldots\ldots 22$$

Equation 1 is used to test for the null hypotheses of non stationarity of unit root against trend stationarity alternative in $Y_t$where y refers to the examined time series. Equation 2 tests the null hypotheses of a unit root against a mean stationarity alternative.

ii. JohansenCointegration Test

The cointegration test established whether a long run equilibrium relationship exist among the variables. It is generally accepted that to establish a cointegration, the likelihood ratio must be greater than the Mackinnon critical values. The model can be stated as

$$\Delta X_t = \mu + \Psi_1 \Delta X_{t-1} + \Psi_2 \Delta X_{t2} + \ldots + \Psi_{p-1} \Delta X_t - p + 1 \quad \ldots\ldots 23$$

Where μ is a constant term.

ΔX_t Represents the first cointegrating differences

iii. Granger Causality

To determine the direction of causality between the variables, the study employed the standard Granger causality test (Granger, 1969). The test is based on Vector Error Correction Model (VECM) which suggests that while the past can cause or predict the future, the future cannot predict or cause the past.

$$Y_t = \alpha_o + \sum_{i=1}^{n} \alpha_1^{y} Y_{t-1} \sum_{i=1}^{n} X_{a1} X\mu \quad \ldots\ldots 24$$

and

$$X_t = \beta_o + \sum_{i=1}^{n} {}^{y}_{\beta 1} Y_{t-1} \sum_{i=1}^{n} X_{\beta 1} XY_t \quad \ldots\ldots 25$$

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iv. Vector Error Correction Model

Co-integration is a prerequisite for the error correction mechanism. Since co-integration has been established, it is pertinent to proceed to the error correction model. The VECM is of this form:

$$\Delta y_t = \alpha\beta y_{t-1} + \sum_{i=1}^{j=1} \Gamma_j \Delta y_{t-1} + \pi + \varsigma_t, t = 1,.....,T \quad \text{.....26}$$

Where Y_t is a vector of indigenous variables in the model. α is the parameter which measures the speed of adjustment through which the variables adjust to the long run values and the β is the vectors which estimates the long run cointegrating relationship among the variables in the model. π is the draft parameter and is the matrix of the parameters associated with the exogenous variables and the stochastic error term.

RESULTS AND DISCUSSION

Table 1: Level Series OLS multiple Regression Summary

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
		MODEL I		
INTR	0.720796	2.875795	0.250642	0.8041
EXR	0.204818	0.110319	1.856607	0.0747
MOG	0.028899	0.010767	2.684059	0.0125
MPR	5.081961	3.861764	1.315969	0.1997
TBR	-6.878150	3.069416	-2.240866	0.0338
C	33.75624	25.29480	1.334513	0.1936
R^2	0.533611			
ADJ. R^2	0.443921			
F-STATISTICS	5.949487			
F-PROB	0.000854			
Durbin-Watson stat	1.833985			
		MODEL II		
TBR	-0.720077	0.214598	-3.355472	0.0024
MPR	0.775755	0.269995	2.873226	0.0080
MOG	0.002514	0.000753	3.339209	0.0025
INTR	-0.114821	0.201061	-0.571078	0.5729
EXR	0.016548	0.007713	2.145507	0.0414
C	4.154353	1.768482	2.349107	0.0267
R^2	0.603784			
ADJ. R^2	0.527589			
F-STATISTICS	7.924166			
F-PROB	0.000121			
Durbin-Watson stat	1.248267			

Source: Extracts from E-view 9.0 (2018)

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Table 2: Unit Root Test Summary Results at First Difference

VARIABLE	ADF STATISTICS	MACKINNON 1%	5%	10%	PROB.	ORDER OF INTR.
		MODEL I				
MCT	-6.265534	-3.689194	-2.971853	-2.621007	0.0000	1(1)
MPR	-7.248408	-3.661661	-2.960411	-2.625121	0.0000	1(1)
TBR	4.573184	-3.711457	-2.981038	-2.629906	0.0000	1(1)
EXR	-5.193436	-3.646342	-2.976263	-2.627420	0.0000	1(1)
INTR	-5.734927	-3.679322	-2.967767	-2.622989	0.0000	1(1)
MOG	-6.112765	-3.670170	-2.963972	-2.621007	0.0000	1(1)
		MODEL II				
MTO	-6.091185	-3.699871	-2.976263	-2.627420	0.0000	1(1)
MPR	-5.193436	-3.699871	-2.976263	-2.967767	0.0000	1(1)
TBR	-6.368636	-3.679322	-2.951125	-2.627420	0.0000	1(1)
EXR	-6.112765	-3.670170	-2.963972	-2.621007	0.0000	1(1)
INTR	-7.615510	-3.689194	-2.971853	-2.625121	0.0000	1(1)
MOG	-6.169593	-3.679322	-2.967767	-2.622989	0.0000	1(1)

Source: Extracts from E-view 9.0 (2018)

Table 3: Johansen Co-Integration Test Results: Maximum Eigen

MODEL I	Hypothesized No. of CE(s)	Eigen Value	Maximum-Eigen	0.05 Critical Value	Prob.**	Decision
	None *	0.873118	172.9831	95.75366	0.0000	Reject H_0
	At most 1 *	0.861835	111.0480	69.81889	0.0000	Reject H_0
	At most 2 *	0.698800	51.66893	47.85613	0.0210	Reject H_0
	At most 3	0.285620	15.66948	29.79707	0.7353	Reject H_0
	At most 4	0.161605	5.579273	15.49471	0.7446	Reject H_0
	At most 5	0.009663	0.291297	3.841466	0.5894	Accept H_0
	None *	0.856233	136.6472	95.75366	0.0000	Reject H_0
MODEL II	At most 1 *	0.716681	78.46046	69.81889	0.0087	Reject H_0
	At most 2	0.534255	40.62502	47.85613	0.2009	Reject H_0
	At most 3	0.342484	17.70150	29.79707	0.5882	Reject H_0
	At most 4	0.156807	5.122917	15.49471	0.7956	Accept H_0
	At most 5	0.000204	0.006123	3.841466	0.9369	Accept H_0

Source: Extracts from E-view 9.0 (2018)

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Table 4: Normalized Co-integrating Equation

MCT	INTR	EXR	MOG	MPR	TBR
1.000000	-12.27413	0.279426	-0.020274	-13.34806	27.99677
	(1.78546)	(0.06803)	(0.01103)	(2.05298)	(2.40848)
MTO	TBR	MPR	MOG	INTR	EXR
1.000000	5.191829	-1.102616	-0.036845	-4.279621	0.207003
	(1.40001)	(1.34692)	(0.00717)	(0.95259)	(0.03963)

Vector Error Correction Model (VECM)

Table 5: Parsimonious Error Correction Results

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
		MODEL I		
C	11.77062	10.66074	1.104109	0.2896
D(MCT(-1))	0.708466	0.354227	2.000033	0.0668
D(INTR(-1))	0.028924	3.831980	0.007548	0.9941
D(INTR(-2))	6.338676	3.581062	1.770055	0.1002
D(EXR(-2))	-0.163045	0.639240	-0.255060	0.8027
D(EXR(-3))	-0.435051	0.708061	-0.614426	0.5495
D(MOG(-1))	-0.011568	0.051912	-0.222832	0.8271
D(MOG(-2))	-0.132718	0.064681	-2.051879	0.0609
D(MPR(-1))	-3.746042	3.922680	-0.954970	0.3570
D(MPR(-2))	6.589959	6.678202	0.986786	0.3418
D(MPR(-3))	-14.12872	7.997945	-1.766544	0.1008
ECM(-1)	0.797956	4.303118	0.882606	0.3935
R^2	0.787945			
ADJ. R^2	0.559578			
F-STATISTICS	3.450350			
F-PROB	0.015948			
Durbin-Watson	2.173426			
		MODEL II		
C	0.660018	0.812838	0.811993	0.4314
D(MTO(-1))	-0.115800	0.272114	-0.425557	0.6774
D(TBR(-1))	0.367233	0.397176	0.924610	0.3720
D(TBR(-2))	0.720397	0.439784	1.638071	0.1254
D(TBR(-3))	-0.969405	0.654803	-1.480452	0.1626
D(MPR(-1))	-0.375295	0.458349	-0.818799	0.4277
D(MPR(-2))	-0.009260	0.589949	-0.015696	0.9877
D(MPR(-3))	1.286809	0.728786	1.765688	0.1009
D(MOG(-1))	0.001617	0.004647	0.348042	0.7334
D(MOG(-3))	-0.008881	0.007088	-1.252852	0.2323
D(INTR(-1))	-0.106190	0.294395	-0.360707	0.7241
ECM(-1)	-0.445157	0.351950	-1.264831	0.2281
R^2	0.676288			
ADJ. R^2	0.327674			
F-STATISTICS	1.939935			
F-PROB.	0.120534			
Durbin-Watson	2.230686			

Source: Extracts from E-view 9.0 (2018)

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PAIR WISE CAUSALITY TEST

Table 6: Pair Wise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.	DECISION	REMARK
MODEL I					
INTR does not Granger Cause MCT	30	0.55918	0.5787	Accept H_0	No Causality
MCT does not Granger Cause INTR		0.35489	0.7047	Accept H0	No causality
EXR does not Granger Cause MCT	30	2.43888	0.1077	Accept H_0	No Causality
MCT does not Granger Cause EXR		0.03123	0.9693	Accept H0	No causality
MOG does not Granger Cause MCT	30	2.18381	0.1336	Accept H_0	No causality
MCT does not Granger Cause MOG		7.07306	0.0037	Reject H0	No causality
MPR does not Granger Cause MCT	30	0.32992	0.7221	Reject H_0	Causality
MCT does not Granger Cause MPR		1.62678	0.2167	Accept	No causality
TBR does not Granger Cause MCT	30	0.04312	0.9579	Accept H_0	N0 Causality
MCT does not Granger Cause TBR		1.52365	0.2375	Accept	No causality
MODEL II					
TBR does not Granger Cause MTO	30	0.52587	0.5974	Accept H_0	No Causality
MTO does not Granger Cause TBR		0.24446	0.7850	Accept H0	No causality
MPR does not Granger Cause MTO	30	0.52214	0.5996	Accept H_0	No Causality
MTO does not Granger Cause MPR		1.38622	0.2686	Accept	H0 Causality
MOG does not Granger Cause MTO	30	0.37436	0.6915	Accept H_0	NoCausality
MTO does not Granger Cause MOG		4.99309	0.0150	Reject H0	causality
INTR does not Granger Cause MTO	30	0.23751	0.7903	Accept H_0	No causality
MTO does not Granger Cause INTR		0.62504	0.5434	Accept H0	No causality
EXR does not Granger Cause MTO	30	2.26514	0.1247	Reject H_0	No Causality
MTO does not Granger Cause EXR		0.02907	0.9714	Accept H0	No Causality

Source: Extracts from E-view 9.0 (2018)

DISCUSSION OF FINDINGS

Findings of this study were presented in the tables above. Tables I found that monetary policy variables examined in this study can explain 53.3 percent changes on market capitalization and 60.3 percent changes on market turnover. Evidence from the model test proved that the monetary policy variables formulated in the model is significant in explaining variation in Nigerian capital market performance (F-Statistics and probability). The Durbin Watson test of the models proved the presence of serial autocorrelation among the variables. The presence of serial auto correlation enables us to test for unit root using the Dickey Fuller unit root test. However, beta coefficient of the variables as shown in the tables found all the independent variables have positive relationship with market capitalization except treasury bill rate, while treasury bill rate and interest rate have negative relationship with market turnover. The positive relationship between the monetary policy variables and the capital market indicators confirm the objective of monetary policy. apart from the monetary policy objective of achieving macroeconomic goals of full employment, price stability, external balance and economic growth, Monterey policy also ensure the stability of the financial market as it is the transmission mechanism for monetary policy. The positive effect of the variables confirm the findings of Akani and Imegi (2017) that monetary policy transmission mechanism has significant impact on the liquidity of the capital market, the findings of Akani and Lucky (2014) that there exists a long-run relationship between Currency in Circulation (CR) and

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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, the findings of Akani, Okonkwo and Ibenta (2016) 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, the findings of Akani (2013) revealed that changes in the variables exists significant impact on aggregate stock price but contrary to the findings of Echekoba et al., (2018) that monetary policy tools have no significant effect on capital market performance. The monetary policy rate has negative significant relationship with capital market performance while cash reserve ratio positively relates with performance of the capital market and the findings of Echekoba, Ananwude and Lateef (2018) that monetary policy tools and capital market performance in Nigeria are not co-integrated and that Nigerian capital market performance is not significantly affected by monetary policy announcement by the Central Bank of Nigeria rather; it is monetary policy rate that is significantly influenced by performance of the capital market.

Result of the unit root presented in table II found that the variables are stationary at first difference and integrated in the order of 1(I). The cointgeration test (table III) found the presence of long run relationship. The nature of long run relationship (Normalized cointgration test) in table IV found that interest rate, monetary aggregates and monetary policy rate have negative long run relationship while exchange rate and monetary policy rate have positive long run relationship with market capitalization. Interest rate and Treasury bill rate have positive long run relationship while exchange rate, monetary policy rate and monetary aggregates have negative long run relationship with market turnover. The vector error correction estimates (table V) proved monetary policy variables can adjust by 79 percent annually with market capitalization and 44 percent with market turnover. The granger causality test (Table VI) found unidirectional causality from monetary aggregates to market capitalization and unidirectional causality from market turnover to monetary aggregates.

CONCLUSION AND RECOMMENDATIONS

From the findings of the study, interest rate, exchange rate monetary aggregate and monetary policy rate have positive and significant relationship with market capitalization but treasury bill rate have negative and significant relationship with market capitalization. Monetary policy rate, monetary aggregate and exchange rate have positive relationship with market turnover while Treasury bill rate and interest rate have negative and significant relationship with market turnover. From the regression summary, 53.3 percent and 60.3 percent variation on market capitalization and market turnover can be explained by variation on the monetary policy variables in the model. The study concludes significant relationship between monetary policy variable, market capitalization and market turnover. We recommend that the monetary authorities should ensure effective monetary policy transmission that will enhance the performance of Nigeria capital market and that the monetary policy targets should be integrated with the operational efficiency of Nigerian capital market to leverage the negative impact of the monetary policy variables on the performance of the capital market.

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