THE EFFECT OF MONETARY POLICY ON STOCK MARKET PERFORMANCE IN NIGERIA.

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March 2009

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ABSTRACT

This paper investigates the impact of monetary policy variables on the performance of the stock market in Nigeria using quarterly data for twenty four years (1984:1 – 2007:4). A linear combination of stock market index and monetary policy variables is estimated using ordinary least squares; co-integration and error-correction specification. It is observed that stock market performance is strongly determined by broad money supply, exchange rates and consumer price index in the short and long-run. Hence, the liquidity, exchange rate and price level channel of monetary policy transmission is supported by evidence as determinants of stock price movements in Nigeria. On the other hand, minimum rediscount rate and treasury bill rates show mixed results, they were unable to demonstrate significant relationship to changes in stock market index, though their coefficients follow expectations. However, on a parsimonious examination of the variables, it is observed that a significant relationship exists if used discriminately. Hence, for the interest rate channel of monetary policy transmission to effect changes in stock market index either minimum rediscount rate or treasury bills rate should be applied at a time and not simultaneously.

Key Words: monetary policy, stock market index, co-integration and error-correction model.

JEL Classification: E44, E52, G11, G18

1.0 Introduction

The primary objective of Monetary Policy formulation in any economy is to ensure price stability and adequate employment which in turn will create a stable macroeconomic environment for economic prosperity. It is of great concern to policy makers that monetary policy permeates deeply into the real sector to engender economic growth. This can only be achieved if monetary policy is properly transmitted into the macro-economy through the various channels notably interest rate channel, credit channel and the price level. An effective transmission mechanism will be one that will increase the return on investment. Investors can only benefit from returns on investment if earnings per stock are increasing adequately. Hence, the understanding of how policy actions affects the macro-economy deeply entails knowing how policy actions will affect key financial markets, as well as how changes in asset prices and returns in these markets affect the behavior of households, firms and other stakeholders. Several factors have been identified in studies as affecting the demand and/or supply of stocks, which include company fundamentals such as a change in the board of directors, appointment of new management, creation of new assets, dividends, earnings and external factors such as government rules and regulations, inflation, and other economic conditions, investor behavior, market conditions, money supply, competition, uncontrolled natural or environmental circumstances directly affecting the production of the company.

Monetary authorities however, use different instruments to effect policy on the various transmission channels. A monetary policy that is aimed at interest rate control may be either direct or indirect. When it is direct it is specifically applied to the portfolio or balance sheet of banks in the financial system using selective credit control, stabilization securities, and administered interest rates to mention but a few. An indirect monetary policy regime uses market determined instruments such as open market operations, variable rediscount rate and reserve requirements. A monetary policy framework that has its target at either the consumer price index or producer price index is aimed at inflation. On the other hand the credit channel of transmission is directed at credit availability through debt or equity market. The credit channel is merely an amplifying mechanism and not independent of the interest rate channel (Bernanke and Gertler, 1995).

Nonetheless, in Nigeria monetary policy has been known to be transmitted through the liquidity channel, credit channel and exchange rate channel (Uchendu 1996). In this study Uchendu observed that when direct controls were relaxed as part of the Structural Adjustment Program (SAP) of 1986, the inter-bank market rates became a source of monetary policy transmission in Nigeria. He further observed that credit availability also influenced the lending behavior of credit market during the period. A major shift in monetary policy formulation in Nigeria came on the heels of SAP as a measure to liberalize the financial system and subsequent opening up of the capital market to foreign participation.

Investors obtain funds from two main sources; debt and equity market. The debt market is the money market which comprises the financial institutions such as banks and equity market is where stocks are traded. Investors obtain funds from the debt market at a cost referred to as interest rate. At the equity market subscribers are co-owners, hence the stocks are offered at par value to ownership of the firm’s assets.

The basis of the distinction between the money market and capital market lies in the degree of tenor of instruments bought and sold in each of these markets. Onyido (1994) stated that the money market primarily exists as a means of liquidity adjustment, while the capital market provides the bridge by which the savings of surplus units may be transformed into medium and long-term investments in deficit units. The capital market affords business firms and governments the opportunity to sell stocks and bonds, to raise long-term funds from the savings of other economic agents. The sourcing of long-term finance through the capital market is essential for sustainable economic growth (Iyoha, 2004).

It is imperative that monetary policy should endeavor to maintain growth and/or stability of returns on investment in the stock market. There is a clear indication that the pain of an economic recession is deeply felt if there is a severe downturn or persistent fall in stock prices which culminates into lower earnings per share. A stock market crash reduces aggregate demand, putting downward pressure on output and employment. The standard response is for the Central Bank to lower interest rates by increasing money supply. However, for monetary policy to permeate into the financial market and affect stock prices it must pass through one or more of the known channels of transmission.

The effect of monetary policy on equity prices and interest rates is relevant to several possible transmission mechanisms from central bank actions to the real economy. For example, the Central Bank controls the minimum rediscount rate, which purportedly affects market determined interest rates and asset prices and in turn real variables through various possible investment and consumption channels.

Although several studies have discussed the relationship between stock market performance and macroeconomic variables, none to the knowledge of the author in the case of Nigeria has used monetary policy variables to explain changes in stock prices. However, Adebiyi (2005) studied the performance of the capital market and economic growth in Nigeria using a co-integration and error correction model. He used Gross Domestic Product as dependent variable and number of securities, market capitalization and turnover ratios as explanatory variables to study their long run equilibrium relationship. He found that a one percent increase in stock market capitalization ratio would lead to about thirty three percent raise in real GDP, which shows that stock market has continually affected real GDP growth rate and on the other hand demonstrates a long-run equilibrium relationship between the variables under study.

Nevertheless, our emphasis here is to know whether variations in stock market performance can be linked to changes in monetary policy variables.

In this paper the issues for determination are as follows;

(i). Is monetary policy a veritable tool towards improving the performance of the stock market?

(ii). What is the relationship between variations in stock prices and money supply?

(iii). What is the relationship between stock price movements and exchange rate?

(iv). What is the effect of changes in consumer prices on stock performance?

This paper therefore investigates the impact of monetary policy variables on the performance of the stock market in Nigeria using quarterly data for twenty four years (1984:1 – 2007:4). The primary motivation for this study is to enable policy makers understand the growing need to formulate monetary policies that will be responsive to changes in stock prices, since the stock market is a veritable source of long-term capital. The effectiveness of monetary policy should therefore be anchored on the potency of its instruments on stock market performance.

To answer these questions raised above, the study will be divided into five sections; the first section is the introduction that draws the background and the road map to the study. The second section will cover a review of related literature and the third section will be a theoretical framework for the study. The fourth section will focus on the data, analytical concepts and model specification. In the fifth and final section we will examine the results and proffer policy recommendations and conclusion to the study.

2.0 Literature Review.

Economists generally agree that restrictive monetary policy leads to lower stock prices. On the other hand expansionary monetary policy leads to higher stock prices. Some researchers also argue that changes in monetary policy influence forecasts of market determined interest rates, equity cost of capital, and expectations of corporate profitability (Waud, 1970). The fundamental approach is that an increase in interest rates due to a contractionary or restrictive monetary policy will leave investors with no other opportunity to raise funds except through the equity market. In a bid to boost the demand for their stock, the price will fall to a level that will be attractive to an investor at least in the short run, perhaps through public offers.

The origin of the relationship between money supply, interest rates and stock prices point to Friedman's money demand function. Friedman (1956), attempted to integrate two distinct decisions to be made by agents; a decision on the quantity of savings (IS) and decision on how to allocate those savings among assets in a portfolio (LM) and in so doing transformed the liquidity preference theory of the demand for money. He proposed that portfolio allocation decisions could have an impact on consumption – savings decisions determined by interest rate movements.

The interest rate channel of monetary policy transmission has become so prominent following the recommendation of the Radcliffe Report (1988) in the United States, which recommended that monetary authorities should regard the structure of interest rates rather than the supply of money as the centre piece of monetary action. The interest rate channel is expounded in the marginal efficiency of capital function which posits an inverse relationship between real interest rate and the present value of capital and consumer durable goods. This implies that a reduction in the real interest rate will lead to an increase in the present value of capital and durable consumer goods and increase the ratio of the market value to asset value (Mbutor 2007).

Bernanke and Gertler (1995) found that monetary policy does not only affect the interest rate but also the external finance premium and this brings to light the notion of credit channel of monetary transmission mechanism. The lending channel however, is an extension of the credit channel, and the main focus is on banks which is consistent with the finding that banks are the major conveyors of monetary policy impulses to the real sectors of the economy. Earlier Bernanke and Blinders (1992) observed that as interest rates are rising, firms that have their loan sourcing potentials eroded by high interest rates will suffer some adjustment costs which can be traced to the effect of monetary contraction which include a reduction in bank deposits and their holding of securities, a lagged decrease in bank loans, and measures of aggregate output will respond to monetary impulses with a similar lag and simultaneously bank loans will suffer a decline. The lending channel has often restricted the traditional monetary stance Bofinger (2001) illustrated this using a three variable model on an IS-

LM framework which includes, money, bonds and reserves that banks hold with the central bank. This implies that the role of banks in the transmission process is perhaps insignificant, Kashyap (1997), disclosed that banks do nothing unique on the asset side of their balance sheets like the household they also invest in bonds and other securities. The implication of this finding is that a stock market shock will affect the banks as much as it will affect households and firms.

Mbutor (2007), studied the lending channel of Monetary Policy Transmission in Nigeria, using GDP as a dependent variable on the explanatory variables which includes domestic prices proxied by consumer price index, treasury bill rates as a proxy for minimum rediscount rate, broad money (M2), exchange rate, total quantity of loans and maximum lending rate as a proxy for the price of loans. He found that an increase in the minimum rediscount rate by 0.25 percentage points will leave the quantity of loans made by the banks unaffected in the first period. The lagged fall in the quantity of loans is consistent with expectations that loan contracts take some time to be adjusted. This evidence confirms that an increase in the minimum rediscount rate (MRR) causes banks to reduce the quantity of loans which they extend to their customers, therefore the hypothesis that the lending channel of monetary policy transmission mechanism exist in Nigeria is therefore accepted.

Exchange rate is another important source of monetary policy transmission mechanism identified in Nigeria by Uchendu (1996). In the wake of financial liberalization worldwide and increasing trade and capital movements, exchange rates have been identified as one of the major determinants of business profitability and equity prices (Kim 2003).

In several jurisdictions the impact of macroeconomic variables on stock prices has been investigated, though with varying results. Ibrahim (2003) studied the long run relationship and dynamic interactions between Malaysian Stock Market, various economic variables, and major equity markets in the United States and Japan. He used real output, aggregate price level, money supply, and exchange rate as explanatory variables for the variations in stock price movements. The findings of this study were in two folds: first, the Malaysian stock price index is positively related to money supply, consumer price index, and industrial production. Second, that stock price index is negatively related to the movement of exchange rates.

Using the Tokyo Stock market as a case study, Mukherjee and Naka (1995) studied the relationship between stock prices and several macroeconomic variables which include exchange rate, money supply, index of industrial production, inflation and interest rates. They used data ranging from January 1971 to December 1990 on a Vector Error Correction Model. They observed a positive relationship for all other variables except for inflation and interest rates were a mixed relationship was observed. Dmitrios Tsoukalas (2003), studied the relationship between stock prices and macroeconomic factors in Cyprus using the Vector Autoregressive model. The variables examined include exchange rate, industrial production, money supply, and consumer prices. The result of the study indicates a strong relationship between stock prices and all the macroeconomic factors.

Inflation is primarily a monetary phenomenon and reflects what happens to the quantity of money per unit of output. However, from the long-run point of view, the problem of monetary policy reduces to the desired rate of inflation and the best way to obtain that rate. This is because monetary policy is concerned primarily with the quantity of money, and less with the terms and availability of credit. One of the most intriguing facts in financial market literature is the poor performance of the stock market during periods of inflation. The failure of equities to maintain their value during times of inflation is considered anomalous as stocks representing claims to real assets, should provide a good hedge against inflation (Ely and Robinson, 1993). In a study of the relationship between real stock returns and inflation for the Group of Seven Countries carried out by the United States Presidential Task Force on Market Mechanisms in 1988, using monthly data over the period 1950 – 1986, a significant negative relationship was observed on four of the seven countries examined. 'Inflation fears' was cited as a possible contributing factor to the stock market crash of October 1987 which led to the setting up of the task force.

Bodie (1976), Nelson (1976) and Fama and Schwert (1977) are some of the studies that have documented the inverse relationship between real common stock returns and various measures of both actual and expected inflation. However, the literature is divided over the reasons why equities might fail to maintain their value during periods of inflation. Ely and Robinson (1993) have examined two main arguments that have been advanced as possible explanations for this anomaly especially for the United States stock market. First, they examined the so-called 'tax effect' hypothesis – which focuses on the treatment of depreciation and the valuation of inventories in periods of inflation, particularly that share prices fail to keep pace with inflation because inflation increases corporate tax liabilities and thus reduces after tax earnings. In this case inflation can be said to "cause" movements in stock prices. Secondly, the 'proxy-effect' hypothesis is the alternative explanation for why real stock returns are negatively correlated with inflation. This hypothesis involves two main assumptions – one that cyclical variations in earnings and output growth are positively correlated, and the other that monetary policy is counter cyclical.

Consequently, in considering the impact of inflation on stock prices as proposed in this study we shall ignore the tax effect hypothesis, this limitation is because we have set out to consider inflation as a monetary phenomenon and its effect can only be adequately observed with a view to the proxy-effect hypothesis mentioned above.

The proxy-effect hypothesis was first introduced by Eugene Fama (1981). Fama's explanation for the inverse relationship between expected economic activity and current inflation follows two main assumptions; that individuals are "rational" in the sense of making use of all available current information relevant to their money and financial decisions, and that individuals' current demand for money is related to future real economic activity and current interest rates. Assuming that the money supply, real economic activity, and interest rates are exogenous, the demand for money will become a means for the transmission of expected future inflation to current inflation.

Furthermore, the lowering in expected future output growth leads to a lowering in expected future dividends and has the direct and immediate effect of reducing current stock returns. But also the decline in expected future output growth leads to a decrease in money demand currently and excess supply of money. Following Fama's assumption that interest rates and the money supply are exogenous, the excess supply of money is accompanied by an increase in the price level to restore monetary equilibrium. Essentially, the forward looking nature of individuals' money demand generates an inverse relationship between current inflation and expected future growth in national output. This enables a decrease in future output growth to cause both a decline in current stock returns an increase in current inflation.

Benderly and Zwick (1985) agree with Fama that the relationship between stock returns and inflation is spurious. Unlike Fama, Benderly and Zwick argue that the relationship runs from inflation to expected output growth. They base their conclusion on a real balance model of output in which changes in aggregate demand are related to changes in real money balances.

Geske and Roll (1983), relaxed the assumption of an exogenous money supply, and suggested an extension of Fama's argument. They posit that a "reverse causality" actually drives the inverse relationship between stock returns and inflation. Their model involves the central bank. When deficit begins to grow because of a decrease in output, outstanding government debt increases. The central bank chooses to monetize a portion of this debt, thus leading to inflation. Since this debt monetization is anticipated by rational individuals, a decline in the stock market will cause an increase in expected future inflation. Therefore stock returns are inversely correlated with expected future inflation.

The Fama model excludes any response by the monetary authority while Geske and Roll stress a policy response of debt monetization. This argument is further developed by Kaul (1987) who agrees that the relationship between stock returns and inflation is spurious. Following Fama, Kaul stresses the importance of the money demand linkage in his analysis but is also willing to incorporate a response of the monetary authorities. Unlike Geske and Roll, however, this response does not hinge exclusively on debt monetization. Rather, Kaul presumes that the central bank follows a countercyclical money supply process.

The sequence of events as viewed by Kaul occurs as follows. First, expected future output decline is signaled by a fall in stock prices. The central bank then responds with a countercyclical policy which results in an increase in the money supply. This causes both an increase in current inflation and an upward revision in inflation expectations. As a result, there is an observed inverse relationship between stock returns and both actual and expected inflation.

Kaul's version of the proxy effect hypothesis thus incorporates two commonly accepted effects of a perceived reduction in future national output growth. For one, the anticipated slowing lowers current stock returns. For another, the anticipated slowing causes a current monetary expansion and thus inflation. These two conditions are however sufficient to generate the inverse relationship often found between stock returns and inflation. The inverse relationship between expected future national output growth and current inflation is the result of the equilibrium process in the monetary sector.

Zhao (1999) examined the relationship between inflation, output and stock prices in the Chinese economy. The study employs monthly data for the period

January 1993 to March 1998. The results show a significant but negative relationship between stock prices and inflation. Similarly the study found a negative but significant relationship between output and stock prices.

Udegbunam and Eriki (2001), in their study on the Nigerian Stock Market, examining the relation between stock prices and inflation found a strong evidence to support the proposition that inflation exerts a significant negative influence on the behaviour of stock prices. The study further revealed that stock prices are also strongly driven by the level of economic activity measured by Gross Domestic Product (GDP), interest rate, money stock and financial deregulation.

This study is therefore set to test whether monetary policy variables have any significant relationship or can adequately be used to effect positive changes on stock prices in Nigeria. Using the available data we have set out to observe the correlation between monetary policy variables and stock prices and the particular effect of inflation on stock prices. From the literature reviewed above, we have observed that according to Uchendu (1996), monetary policy in Nigeria is adequately transmitted through the liquidity, credit and exchange rate channels and Udegbunam and Eriki (2001) have also demonstrated that there exist a relationship between stock prices and the level of economic activity, interest rate, money stock and policy shift to deregulation. Hence we shall draw our analogy based on this known premise.

3.0 Theoretical Framework

(a) A model of equity prices, output, interest rates and money supply

One of the earliest underlining theories of monetary phenomenon on macroeconomic factors which include return on equity is in the restatement of the quantity theory by Friedman (1956), where he proposed a general money demand function in the form;

$M^d = f(Y_p, r_b , r_e , r_m, \Pi^e)$ ……………………………(1)

Where money demand is positively related to permanent income $Y_{p,}$ negatively related to expected interest rates on bonds $r_{b,}$ the expected rate of return on equity $r_{e,}$ expected market interest rate r_m, and inflation rate Π^e .

The rate of return on bonds and equity represent the opportunity costs of holding money. The rate of return on money is the services provided by holding money as well as any interest payments on money deposits at banks. Expected inflation Π^e represents the return on holding goods. This element is the distinctive relationship that agents hold goods as assets and substitutes them for money if they expect a price to rise that is capital gains on holding goods.

This illustration is governed by the flow constraint;
$(\psi^d - \psi^s) + dV = 0$ ………………………………..(2)
where ψ^d is aggregate demand and ψ^s is aggregate supply and dV is the change in inventory holdings. On the other hand, the asset allocation decision can be viewed from Walras's Law stock constraint;
$(M^d - M^s) + (B^d - B^s) = 0$ …………………………(3)
where M^d and M^s is the stock level of money demand and supply and B^d and B^s is the stock level of bond demand and supply – refers to all alternative interest bearing financial assets which includes equities.
Considering a condition of full equilibrium, if there is an increase in money supply M^s, the left hand equation will be negative, which is a situation of excess money supply, which will make the term on the right to be positive for excess bond demand. Hence the price of bonds or equity will increase and necessarily interest rate will fall – bringing the equity market into equilibrium, and by Walras' Law, the money market as well will be in equilibrium.
A generalized portfolio constraint can be stated by relating the money demand to conditions in the goods market to create a direct channel of aggregate demand to output.
$(M^d - M^s) + (B^d - B^s) + (\psi^d - \psi^s) = 0.$ ……………..(4)
In an expansionary monetary policy, M^s will increase hence the money market that is the term on the left will be negative. In any case because of the goods market there may not necessarily be an excess demand for bonds, since the disequilibrium in the money market can be offset by an excess demand for goods i.e. $M^d - M^s < 0$, $B^d - B^s = 0$, and $\psi^d - \psi^s > 0$. By the Keynesian multiplier, as there is excess aggregate demand, then output ψ^s will rise and money demand M^d will rise so that the goods market and money market are brought into equilibrium. Therefore Friedman's proposition is that an increase in money supply does not necessarily imply an excess demand for equity or bonds but may be offset by an increase in the demand for durable household goods such as a house or an automobile. This proposition is one that we wish to prove or rebut in this study, to know whether changes in money supply actually leads to proportionate changes in stock prices or otherwise.

(b) A model of Stock Price Determination

Mishkin (2007) stated that monetary policy effects on stock market performance is based on the following conditions; if the central bank reduces interest rate, the return on bonds will fall, and investors will be willing to accept a lower return on an investment in equity which is an alternative asset. The resulting decline in the required rate of return would lower the denominator in the Gordon growth model which will raise stock prices. Secondly, a reduction in interest rates is likely to stimulate the economy, so that the growth rate in dividends is likely to increase. The rise in dividend growth rate also causes the denominator in the Gordon growth model to decrease, which will also lead to a rise in stock prices.

In general, the price of a firm's stock today can be expressed as the present discounted value of expected future dividends (see Brealey and Myers, 1984).

That is $V_t = \Sigma \frac{DIV^e_{t+i}}{(1+R)^i}$ …………………(5)

where V_t is the money value of the firm's stock today,
DIV^e_{t+i} equals the firm's nominal expected future dividend at period t+i.
R is the nominal rate at which market participants discount these expected future cash flows or the rate of return required by investors. Equation (5) is analogous to Gordon growth model.

Consider first the numerator of (5) above. There are essentially two ways that expected dividends can grow over time. One of these is through growth in expected real earnings, and the other is through inflation. That is, $DIV^e_{t+i} = div^e_{t+i} * P^e_{t+i}$ where div^e_{t+i} represents real earnings of the firm in period t+i and P^e_{t+i} is the expected price level in period t+i. One major aspect of this study is to investigate the relationship between inflation and stock prices, hence both actual and expected real earnings will be treated as constant over time. This allows div^e_{t+1} to be expressed as *div* in all the periods.

It is also assumed that inflation, π, is constant over time and fully anticipated. Under these assumptions, P^e_{t+I} can be written as $P_t(1 + \pi)^i$.
This makes it possible to separate expected nominal dividend to two basic components; real dividends and the general level of prices, hence

$DIV^e_{t+ii} = div * P_t(1 + \pi)^i$ ……………………………(6)

Consider now the denominator of equation (5), the nominal rate of discount can be separated into two components – inflation and the constant real rate of discount (*r*) – by making use of the Fisher relationship.
That is,

$$1 + R = (1 + r)(1 + \pi) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(7)$$

From equation (7), the value of a firm's stock can be expressed as;

$$V_t = \sum \frac{div^* P_t(1 + \pi)^i}{(1 + r)^i(1 + \pi)^i} \quad \ldots\ldots\ldots\ldots\ldots\ldots(8)$$

Equation (8) reduces to

$$V_t = \frac{div * P_t}{r} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(9)$$

Equation (9) makes it clear that stock prices follow a random walk and will not increase proportionately with an increase in the general price level if inflation is associated with either a reduction in real dividends of the firm, or an increase in individuals' discount rate.

Equation (9) explains both the tax-effect hypothesis and the proxy-effect hypothesis. The tax-effect hypothesis is represented in the case where either *div* is reduced, or *r* is increased due to an increase in P_t. The proxy-effect hypothesis, on the other hand, is represented as the case where an anticipated reduction in national output growth causes a reduction in *div* and V_t which is associated with an increase in P_t. This strictly adheres to the conditions expounded by Mishkin (2007) on monetary effects on stock prices. This analogy also corroborates rational expectations theory and the approximate efficient market hypothesis that postulates the dependence of future expectations on the maximum likelihood estimate of past performance.

In view of the above theoretical underpinnings it is obvious that stock price movements can be determined by changes in monetary variables and inflation consequences, therefore our analysis of the statistical relationship of these variables on stock prices can be established hitherto.

4.0 Methodological Issues: Model Specification and Analytical Framework.

The model of analysis will follow a linear combination of explanatory time series variables, and the dependent variable which is an estimate of stock market performance. The all share index has been chosen as the appropriate measure of stock market performance because it gives an estimate of the price movements at the stock exchange. Although the all share index is calculated based on the movement of prices of 93 out of 175 companies listed on the exchange, it is still the most appropriate measure of stock price movements in Nigeria. The market capitalization measures the monetary value of the entire capital market, whereas the all share index captures the daily price movements of equities, which is of interest in this study.

Nigeria has an emerging capital market, which commenced operation in 1980.The data for the all share index is obtained from the annual "Factbook" of the Nigerian Stock Exchange, though it is available on a monthly basis, we shall use the quarterly data to correspond with the range of the other variables under consideration. The computation of the all share index of the Nigeria Stock Exchange took effect from January 1984, hence the dataset for this study is for the period 1984:1 to 2007:4.

To estimate the effect of monetary policy on stock market performance, we have identified several monetary policy variables that could capture the impact of the various transmission channels. For monetary aggregates we have employed broad money (M2) as a proxy for money supply. To capture the exchange rate transmission channel of monetary policy we have included the data of official exchange rate of the Nigeria Naira vis-à-vis the United States dollar. For the estimate of the impact of inflation, we have chosen the Consumer Price index, which is the basis for determining inflation rate. To capture the impact of monetary transmission through the interest rate channel we have chosen the minimum rediscount rate recently christened monetary policy rate in Nigeria. It is the rate at which the central bank in Nigeria lends money to banks to meet their immediate cash calls. It is a penalty rate and most times it is the anchor of bank lending rate.

We have selected the Treasury bill rates as a proxy for the interest rate of money market instruments that is an alternative to stocks and can possibly capture the opportunity cost of investing in the capital market. The Central Bank uses treasury bills to effect open market operation – a major market determined monetary instrument for regulating the quantity of money in circulation. It is generally seen as an alternative to investing in the capital market. To capture the impact of deregulation and financial market liberalization in the Nigerian Economy we have included a dummy variable that will assume a zero value for the years before the Structural Adjustment Programme of 1986, and one thereafter. The data for all the monetary policy variables were as published by the Central Bank of Nigeria in the Statistical Bulletin for various years.

The structural model to estimate the relationship between monetary policy variables and stock market performance is stated thus:

SMI = F (MS, EXR, CPI, MRR, TBR, DMY) ……………….(10)
+ + + - - +

The a priori of the explanatory variables are as indicated.
Where SMI is the dependent variable and is an estimate of the all share index of the Nigerian Stock Exchange.
MS denotes broad money supply that determines the level of liquidity in the economy.
EXR is the exchange rate variable.
CPI is the consumer price index as a proxy for inflation rate.
MRR is the minimum rediscount rate.
TBR is the Treasury bill rate.
DMY is a dummy variable to capture the impact of financial liberalization and deregulation as stated.

The estimation technique of time series data has increasingly moved to issues of unit roots, co-integration and error-correction modeling. Hence this study follows that direction. The importance of testing for the existence of unit roots is now generally accepted following the study of Granger and Newbold (1974) that regression analysis between two non stationary series could lead to a spurious result. This means that one could observe a good fit from regression results whereas the series are almost independent. Therefore it is necessary to test for the stationarity or the presence of a unit root before any regression analysis is conducted. It has been observed that many time series variables are stationary after first or second differencing. The idea of differencing may sometime imply eliminating seasonal influences on the variable but it eliminates very valuable information in the long-run which may be peculiar to the characteristics of the variable. Therefore the need to integrate short-run dynamics with long-run equilibrium gave rise to the Co-integration technique by Granger (1981), Engle and Granger (1987) and Mills (1990). Basically, the idea of co-integration is predicated on the thesis that even though two time series may not themselves be stationary, a linear combination of the two non-stationary time series may be stationary. If this is the case, the two original non-stationary time series are said to be 'co-integrated'. Usually, for co-integration, the two time series have to be stationary after the same number of differencing. If a given time series becomes stationary after first differencing, it is said to be integrated of order one **I**(1). If the time series becomes stationary after second differencing, it is integrated of order two **I**(2). If the original time series is stationary, it is integrated of order zero **I**(0). However, a linear combination of two **I**(1) series is also **I**(1). Hence when a linear combination of two **I**(1) series is stationary, then the two time series are co-integrated. Then there is a long – run relationship between them. This implies that the short run adjustment dynamics can be usefully described by the error correction model (ECM). The ECM involves using the lagged residual to correct for deviations of actual values from the long-run equilibrium values.

Consider the structural econometric model in Equation (10) above, first to be transformed to a stationary model:

$$D^{k0}LSMI = \beta_0 + \beta_1 D^{k1}LMS + \beta_2 D^{k2}LEXR + \beta_3 D^{k3}LCPI + \beta_4 D^{k4}LMRR + \beta_5 D^{k5}LTBR + \beta_6 D^{K6}DMY + \mu_t \quad \text{.........................(11)}$$

Where D is differencing, L is the natural logarithm to base 10.
ko, k_1, ….,k_5, k_6 is the order of integration for $k_0 \neq k_1$, k_2, k_3, k_4, k_5, k_6
μ_t is the random error term, and β's are the intercept and the slope coefficients respectively.

To check for the order of integration we follow the Dickey-Fuller (DF) (1979) test for unit roots stated thus;

$$\Delta Y_t = \alpha_0 + \alpha_1 t + \alpha_2 Y_{t-1} + \mu_t \text{ ....(12)}$$

Or the Augmented Dickey-Fuller (ADF) (1981) tests;

$$\Delta Y_t = \alpha_0 + \alpha_1 t + \alpha_2 Y_{t-1} + \sum_{i=1}^{k} \alpha_i \Delta Y_{t-i} + \mu_t \text{ ....(13)}$$

In the above case it can be said that the process has a deterministic trend. A substantial weakness of the original Dickey-Fuller test is that it does not take account of possible autocorrelation in the error process μ_t. If μ_t is auto-correlated (that is, it is not white noise) then the ordinary least squares estimates of the equation and of its variants are not efficient. Therefore the simple solution is to apply ADF by using the lagged dependent variable as explanatory variables to approximate the autocorrelation. The ADF is generally regarded as the most efficient test from among the simple tests for integration and is at present the most widely used in practice (see Charemza and Deadman, 1997).

The ADF can be restated thus:

$$\Delta Y_t = \delta Y_{t-1} + \sum_{i=1}^{k} \delta_i \, \Delta Y_{t-i} + \mu_t \text{ .... (14)}$$

The testing procedure follows an examination of the student-t ratio for δ. The critical values of the test are all negative and larger in absolute terms than standard critical t-values, so they are called DF and ADF statistics. If the null hypothesis cannot be rejected then the series Y_t cannot be stationary and it may be **I**(1) or **I**(2) or have an even higher order of integration.

The usual properties of the least squares estimator in a regression using time series data depend on the assumption that the time series variables involved are stationary stochastic processes. A stochastic process (time series) y_t is stationary if its mean and variance are constant over time, and the covariance between two values from the series depends on the length of time separating the two values, and not on the actual times at which the variables are observed.
Consider that the series $\Delta y_t = y_t - y_{t-1}$ is stationary if, as assumed the random error v_t is purely random. Series like y_t, which can be made stationary by taking the first difference, are said to be integrated of order one, and denoted **I**(1). Stationary series are said to be integrated of order zero, **I**(0). In general, if a series must be differenced *d* times to be made stationary it is integrated of order *d* or **I**(*d*).

After determining the order of integration, the next step is to obtain the co-integrating vector in the regression equation as stated in Equation (11), and then test if the residuals μ_t are stationary. If the dependent variable (y_t) and explanatory variable (x_t) are non-stationary **I**(1) variables, then we would expect their difference or any linear combination of them, such as $\mu_t = y_t - \beta_1 - \beta_2 x_t$ to be **I**(1) as well. We can test whether y_t and x_t are co-integrated by testing whether the errors $\mu_t = y_t - \beta_1 - \beta_2 x_t$ are stationary. Since we cannot observe μ_t, we instead test the stationarity of the least squares residuals, $\mu_t = y_t - b_1 - b_2 x_t$, using a Dickey-Fuller test. We estimate the regression

$$\Delta \hat{u}_t = \alpha_0 + \rho \, \hat{u}_{t-1} + v_t \text{ .... (15)}$$

Where $\Delta \hat{u}_t = \hat{u}_t - \hat{u}_{t-1}$, and examine the *t* (*tau*) statistic for the estimated slope (ρ). Because we are basing this test upon estimated values, to test the hypothesis of a unit root, we estimate by least squares and examine the *t-statistic* for the hypothesis that $\rho = 0$. The t-statistic must be compared to special critical values taken from Davidson and Mackinnon (1993). If the *tau* statistic is less than the critical value at either1%, 5% or 10% level of significance, we reject the null hypothesis that the least squares residuals are non-stationary, and conclude that they are stationary. Thus we conclude that the variables are co-integrated, indicating that there is a long-run, equilibrium relationship between the variables.

Given that the residuals are stationary, and that the variables are co-integrated, the next step is to estimate the error correction representation. The error correction model (ECM) captures the extent of disequilibrium between the dependent and explanatory variables. For **I**(1) variables, the error-correction model relates changes in a variable, say ΔY_t, to departures from the long-run equilibrium in the previous period ($y_{t-1} - \beta_1 - \beta_2 x_{t-1}$). The ECM can be stated thus;

$\Delta y_t = \alpha_1 + \alpha_2 (y_{t-1} - \beta_1 - \beta_2 x_{t-1}) + v_t$ ....(16)

Hill, Griffiths and Judge (2001) noted that the changes or corrections Δy_t depend on the departure of the system from its long-run equilibrium in the previous period. The stochastic disturbance v_t leads to short-term departure from the co-integrating equilibrium path; then there is a tendency to correct back toward the equilibrium. The coefficient α_2 controls the speed of adjustment back toward the long-run equilibrium. The sign of α_2 is expected to be negative, so that a positive (negative) departure from equilibrium in the previous period will be corrected by a negative (positive) amount in the current period. Another way to estimate the error correction model is to use least squares to estimate the co-integrating relationship $y_t = \beta_1 + \beta_2 x_t$, and then to use the lagged residuals

$\hat{u}_{t-1} = y_{t-1} - b_1 - b_2 x_{t-1}$ as the right hand side variable in the error correction model, estimating it with a second least squares regression. The error correction model (ECM) for Equation (10) can be stated thus:

$ECM = LSMI_{t-1} - (\beta_0 + \beta_1 LMS_{t-1} + \beta_2 LEXR_{t-1} + \beta_3 LCPI_{t-1}$
$+ \beta_4 LMRR_{t-1} + \beta_5 LTBR_{t-1} + \beta_6 DMY_{t-1})$ .... (17)

The error correction specification becomes

$LSMI_{t-1} = \beta_0 + \beta_1 LSMI_{t-2} + \beta_2 LMS_{t-1} + \beta_3 LEXR_{t-1} + \beta_4 LCPI_{t-1}$
$+ \beta_5 LMRR_{t-1} + \beta_6 LTBR_{t-1} + \beta_7 DMY_{t-1} + \beta_8 ECM_{t-1}$ ....(18)

The error correction specification has been found to have certain advantages over traditional partial adjustment models since it is derived from an over parameterized Autoregressive Distributed Lag model, its lag structure is not as restrictive as the traditional partial adjustment model which imposes one lag (Komolafe 1996).

5.0 Empirical Results and Conclusion.

Having stated the source and method of analysis of the data for this study in the previous section, we shall proceed to the analysis of the model specified above following the estimation technique already established and the econometric assumptions that follow. However before we proceed with the parametric tests stated above, we shall first conduct a multi-collinearity test of the explanatory variables to ensure that none of the variables are collinear and to a large extent understand the relationship of one variable to the other. A basic assumption of the ordinary least squares method of estimation is that the explanatory variables be independent of the other. In which case we shall employ the pair-wise correlations method and a commonly used rule of thumb is that a correlation coefficient between two explanatory variables greater than 0.8 or 0.9 in absolute value indicates a strong linear association and a potentially harmful collinear relationship. A major consequence of collinearity is that collinear variables do not provide enough information to estimate their separate effects on the model, even though economic theory may indicate their importance in the relationship.

A. TEST FOR MULTICOLLINEARITY.

Table 1: Correlation Matrix between variables

	LSMI	LMS	LEXR	LCPI	LMRR	LTBR	DMY
LSMI	1.0000	0.9874	0.9362	0.9918	0.2237	-0.0801	0.5808
LMS	0.9874	1.0000	0.9512	0.9817	0.2306	-0.0916	0.5576
LEXR	0.9362	0.9512	1.0000	0.9422	0.4196	0.1326	0.7030
LCPI	0.9918	0.9817	0.9422	1.0000	0.2545	-0.0387	0.5961
LMRR	0.2237	0.2306	0.4196	0.2545	1.0000	0.8535	0.6317
LTBR	-0.0801	-0.0916	0.1326	-0.0387	0.8535	1.0000	0.4454
DMY	0.5808	0.5576	0.7030	0.5961	0.6317	0.4454	1.0000

From the above table we observe that there is a presence of collinear relationship between EXR and MS, CPI and MS, EXR and CPI, MRR and TBR following a correlation greater than 0.8. This implies that exchange rates, consumer price index and money supply is associated, hence we shall drop at least two of the variables and choose one. Secondly, minimum rediscount rate and treasury bill rate is equally associated hence we shall also drop one of the explanatory variables. However, since in the literature we have observed that there exists a theoretical relationship between these variables, there is need for the variables to be included in the model. Despite the fact that a classical ordinary least squares estimate of this model with these collinear explanatory variables may be spurious (Granger and Newbold, 1974), in order to demonstrate the importance to our study we shall correct for the inclusion of these collinear variables by regressing there difference as illustrated in Equation (11).

B. TESTS FOR STATIONARITY OR UNIT ROOT.

From the illustration in Section 3 we know that most economic time series data are fraught with stochastic disturbances, hence are not stationary at level. Therefore to obtain stationarity of the series we must apply either one or all of Augmented Dickey-Fuller, Phillips-Perron or Kwiatkowski, Phillips, Schmidt, and Shin test. Since all of these tests produce similar results, we shall adopt the most commonly used Augmented Dickey-Fuller test that is practically available on E-views econometric package.

Table 2: Augmented Dickey-Fuller Unit Root Test for Variables.

variable	@level	@1st Difference
LSMI	-0.33136	-5.340292*
LTBR	-2.120428	-7.135242*
LMS	0.342839	-10.60980*
LEXR	-2.135967	-6.979049*
LMRR	-2.956937**	-6.718613*
LCPI	-0.884487	-6.131847*
DMY	-2.966850**	-5.5377*

**Significant at 5 per cent.
*Significant at 1 per cent.
MacKinnon Critical Values @ Level,

1% = -3.5007, 5% = -2.8922, 10% = -2.5829.
Mackinnon Critical Values @ 1st difference;
1% = -3.5015, 5% = -2.8925, 10% = -2.5831.

The results in Table 2 suggest that all the variables are integrated of order one **I**(1). We shall ascertain whether the residuals are equally integrated by conducting a unit root test of the residuals accordingly. To do this, we shall first take the static Ordinary Least Squares estimate of our structural equation (10).

Table 3: Results of OLS Static Regression of Equation (10)
Dependent Variable is LSMI

Variable	Coefficient	Standard error	t-statistic	Probability
C	-1.690970	0.347599	-4.864721	0.0000
LMS	0.583693	0.095069	6.139687	0.0000
LEXR	-0.170804	0.065524	-2.606746	0.0107
LCPI	0.720635	0.074940	9.616134	0.0000
LMRR	-0.274940	0.235329	-1.168322	0.2458
LTBR	0.076475	0.156373	0.489054	0.6260
DMY	0.128292	0.047336	2.710235	0.0081

R^2	0.990484	
R^2-Adjusted	0.989842	
F-stat (Prob.)	1543.868	(0.0000)
DW statistic	0.425648	

The OLS static regression result in Table 3 shows the long-run relationship between the dependent and independent variables. A dynamic modeling using the variables at levels such as the partial adjustment would result in a spurious regression as it is confirmed by the high R-squared and very low Durbin-Watson statistic (Granger and Newbold, 1974). The spurious result may be due to the collinear association between the explanatory variables. The next step is to determine the stationarity and the order of integration of the residuals from the static OLS equation. The unit root test of the residuals obtained from the Ordinary Least Squares (OLS) estimation of structural Equation (10) is given as:

$$\Delta\mu_t = a + \rho\, \Delta\mu_{t-1}$$
$$= 0.001977 - 1.034738\, \Delta\mu_{t-1}$$

ADF (tau) (-6.970212)

Since the tau statistic is less than the critical value -3.5015 for the 1% level of significance, we reject the null hypothesis that the least squares residuals are non-stationary and conclude that they are stationary. Thus we conclude that LSMI and the explanatory variables are co-integrated, indicating that there is a long-run, equilibrium relationship between the variables.

Having established that stock market index and the explanatory variables are co-integrated, we shall proceed to obtain the error correction model (ECM) that will relate short – run changes in the dependent variable to departures from the long-run equilibrium in the past or lagged periods.

C. ERROR CORRECTION SPECIFICATION.

The error correction model estimation follows Equation 17 and 18.

Table 4: The General Error Correction Model.

Dependent Variable: DLSMI

Variable	Coefficient	Std. error	t-statistic	Probability
Constant	-0.680252	0.128981	-5.274059	0.0000
DLSMI(-1)	0.463255	0.047250	9.804296	0.0000
DLMS	0.251859	0.037391	6.735907	0.0000
DLEXR	-0.049200	0.021776	-2.259347	0.0264
DLCPI	0.413820	0.045486	9.097671	0.0000
DLMRR	-0.093678	0.075609	-1.238985	0.2188
DLTBR	-0.024765	0.049999	-0.495306	0.6217
ECM(-1)	0.551470	0.049467	11.14824	0.0000
DMY(-1)	-0.097027	0.019329	-5.019851	0.0000

R-squared 0.999052

Adjusted R-squared 0.998963

Durbin Watson stat 1.897326

F-statistic (Prob.) 11199.54(0.0000)

Akaike info.criterion -4.328657

Table 5(a): Parsimonious Error Correction Model.

Dependent Variable: DLSMI

Variable	Coefficient	Std. error	t-statistic	Probability
Constant	-0.717398	0.145763	-4.921668	0.0000
DLSMI(-1)	0.540300	0.050586	10.68082	0.0000
DLMS	0.275661	0.041984	6.565896	0.0000
DLEXR	-0.084004	0.023368	-3.594909	0.0005
DLCPI	0.315155	0.046435	6.787074	0.0000

DLMRR	-0.174858	0.083607	-2.091429	0.0394
DLTBR	0.017288	0.055798	0.3098833	0.7574
ECM(-1)	0.399804	0.044338	9.017272	0.0000

R-squared 0.998771
Adjusted R-squared 0.998671
Durbin Watson stat 1.566988
F-statistic (Prob.) 9985.988(0.0000)
Akaike info.criterion -4.090298

Table 5(b): Parsimonious Error Correction Model.
Dependent Variable: DLSMI

Variable	Coefficient	Std. Error	t-statistic	Probability
Constant	-0.705329	0.139730	-5.047810	0.0000
DLSMI(-1)	0.540906	0.050285	10.75684	0.0000
DLMS	0.270509	0.038350	7.053730	0.0000
DLEXR	-0.081757	0.022098	-3.699752	0.0004
DLCPI	0.317029	0.045799	6.922121	0.0000
DLMRR	-0.153714	0.048049	-3.199110	0.0019
ECM(-1)	0.399544	0.044099	9.060217	0.0000

R-squared 0.998770
Adjusted R-squared 0.998685
Durbin Watson stat 1.555571
F-statistic (Prob.) 11772.63(0.0000)
Akaike info.criterion -4.110459

Table 5(c): Parsimonious Error Correction Model.
Dependent Variable: DLSMI

Variable	Coefficient	Std. error	t-statistics	Probability
Constant	0.730373	0.148428	-4.920712	0.0000
DLSMI(-1)	0.561419	0.050520	11.11285	0.0000
DLMS	0.250929	0.041058	6.111625	0.0000
DLEXR	-0.082481	0.023805	-3.464895	0.0008
DLCPI	0.309757	0.047253	6.555249	0.0000
DLTBR	-0.077965	0.032854	-2.373074	0.0198
ECM(-1)	0.380086	0.044156	8.607859	0.0000

R-squared 0.998709
Adjusted R-squared 0.998620
Durbin Watson stat 1.471945

F-statistic (Prob.)	11214.66(0.0000)
Akaike info.criterion	-4.061965

Since the variables are all integrated of order one **I**(1) and the residuals are equally integrated of order one. Hence the residuals are co-integrated of the same order it means there is a long-run relationship between the dependent and independent variables. It is therefore necessary to treat the error term as the equilibrium error term that is used to adjust short-run behaviour of stock price index to its long-run value and the result is as shown in Table 4.

From Table 4, we observe that the general error correction model is a best fit for the linear combination of stock price index and all the identified explanatory variables, this is not only as a result of the high adjusted R-squared and the acceptable Durbin Watson statistic but for the least Akaike Information Criterion value compared to the other parsimonious error correction specifications. We observe that the equilibrium error term is statistically different from zero, though the coefficient is positive. This implies that changes in the stock market index depend on changes in all the monetary policy variables and the equilibrium error term. Since the error term is non-zero, the model is out of equilibrium. To restore equilibrium, since the sign of lagged ECM is positive therefore changes in all the explanatory variables including the error term must be negative for equilibrium to be restored. The result in Table 4 show that stock prices adjusts to one quarter lagged changes of its own value, broad money supply, exchange rates movement and consumer price index. Secondly, we observe that short run changes in one quarter lagged stock prices, broad money supply, consumer price index have a positive and very significant relationship with stock price movements. On the contrary, we observe that exchange rate movements and minimum rediscount rate and treasury bill rates have negative relationship with stock price movements, though the coefficient of exchange rate movements is significant at the 5% level in explaining variations in stock prices, minimum rediscount rate and treasury bill rate are not significant in the short run. The dummy variable which has been used to indicate the presence of deregulation is significant at the 1% level, but with a negative impact on stock price changes in the short run but positive in the long-run.

One very interesting observation from the short run general error correction specification in Table 4 and the long-run static behaviour of the variables in Table 3 is that the behaviour of the variables did not deviate. All the significant explanatory variables in the short run also remained significant in the long run estimation with the adjustment of the error correction factor. The insignificant explanatory variables – minimum rediscount rate (MRR) and treasury bill rate (TBR) called for further parsimonious modeling to determine whether their behaviour will change in any case. This result became explicit in Tables 5(a), that in the absence of deregulation, minimum rediscount rate became significant at 5% level and with the expected negative sign. When treasury bill rate was dropped from the estimation in Table 5(b), the behaviour of MRR improved in the level of significance and maintained the expected sign. Further in Table 5(c), we observe that when MRR was dropped from the model, the behaviour of TBR improved and became significant at the 1% level of significance with a negative and expected relationship. This implies that both variables – MRR and TBR serve the same purpose and pursue similar policy objective. There is a semblance of mutual exclusivity on the impact on stock price changes.

A major implication of the result in Table 4 is that short-run changes in the explanatory variables have significant effect on the dependent variable and that about 0.55 of the difference in the actual and disequilibrium in stock price changes is adjusted quarterly. The significance of ECM indicates that there exists a long-run equilibrium relationship between changes in stock price movements and the explanatory variables. Another important observation is the significance of current stock market indices and its lagged values which implies that current stock prices is largely dependent on the previous stock prices and this follows rational expectations of market participants.

The positive relationship between money supply and stock market performance observed in this study confirms the findings in Ibrahim (2003), Mukherjee and Naka (1995), Dmitrios Tsoukalas (2003), Udegbunam and Eriki (2001) and the and the underlining theoretic perspective of Mishkin (2007).

The negative relationship between exchange rate and stock price movements show that the depreciation of the local currency (Naira) to the US dollar is a disincentive to investment in the stock market. A depreciating Naira reduces the performance of the stock market. The negative relationship observed here is in tandem with Ibrahim (2003), whereas it contradicts the positive relationship found in Mukherjee and Naka (1995), Dmitrios Tsoukalas (2003) and Kim (2003).

Another important variable that meets apriori expectation is consumer price index that shows a positive relationship with stock price movements both in the short and long-run estimation. However, many studies have observed negative relationship between inflation and real stock prices Eugene Fama (1981), Benderly and Zwick (1985). This is true because the real value of stocks decreases as the nominal price level is going up. The real value of returns in the upward movement of stock prices is eroded by rapid changes in consumer prices.

The minimum rediscount rate commonly referred to as the monetary policy rate in Nigeria is found here to have a negative relationship with stock price movements both in the short and long-run. This monetary policy variable is the anchor of prime lending rate in the banking system. It meets apriori expectation and concludes Friedman (1956) restatement of the quantity theory. Investors who are unwilling to borrow from the money market due to an increase in interest rate will rather sell existing stocks in the capital market or create new stocks through public offers. The excess supply of stocks will force down the price (see Waud 1970, Bofinger 2001, Bernanke and Blinders 1992 and Kashyap 1997).

The relationship between treasury bill rates and stock price movements has been found to be negative in the short-run and positive in the long-run. Treasury bills are money market instrument and it is acclaimed to be the most risk free asset because it is backed by the federal might. As interest rate in the money market is increasing, investors will be attracted to invest in the money market due to higher expected returns. Treasury bills are largely seen as an alternative investment portfolio to stocks. The negative finding is a corroboration of Friedman (1956), and Mishkin (2007).

Finally, we have observed the effect of deregulation to be positive in the long-run and negative in the short run. This is as a result of the short period of the dummy variable zero for the period under regulation (1984:1 to 1986:4), compared to the deregulation era (1987:1 to 2007:4). Deregulation has a positive impact on stock price changes.

Conclusion

The basic general intuition behind co-integration is that certain economic variables should not diverge substantially in the long-run. While such variables can drift apart in the short-run, economic forces eventually bring them together again. An error-correction specification of stock prices is perhaps particularly appealing with respect to monetary policy, which should have transitory effects on asset prices. In this paper, we have assumed that asset prices such as stocks and treasury securities contain data about expectations for inflation and real activity that might in turn inform monetary policy decisions. Therefore, this paper uses error-correction framework and treats short-run changes in stock prices as endogenous. Co-integration methodology is particularly useful in this regard, as the error-correction model is a useful instrument for estimating endogenous variables.

We have observed in this study that a change in stock market index is largely influenced by monetary policy variables both in the short and long-run. Worthy of note is that broad money supply, consumer price index and exchange rates move in the same direction, this implies that spiral increases in the quantity of money in circulation and the domestic price level is largely attributable to devaluation of the local currency (Naira) relative to major foreign currencies such as the US Dollar. It is very obvious that in Nigeria the liquidity, price level and exchange rate channel of monetary policy are all effective tools of determining changes in the performance of the stock market.

Another major discovery of this study is that minimum rediscount rate (MRR) and treasury bill rate (TBR) exhibit a substitutability behaviour, following the insignificance when both is applied, and significance if applied discriminately. If the Central Bank wishes to decrease (increase) minimum rediscount rate (MRR) in a bid to pursue an expansionary (contractionary) monetary policy aimed at improving the performance of the real sector, there will be no need to buy (sell) treasury bills at the open market simultaneously. Therefore, in the short and long-run the interest rate channel of monetary policy transmission is not supported by empirical evidence in determining the changes in stock market index in Nigeria for the period under study. However, a parsimonious examination of MRR and TBR show that they are mutually exclusive, the use of one should preclude the use of the other to achieve optimum result.

There is ample evidence from this study to accept the fact that stock market investments are a good hedge against inflation in Nigeria. The positive and significant relationship between consumer price index and stock market index for the period under study demonstrates that company's revenue and earnings grow with inflation over time. However, companies can react to inflation by raising their prices, but others who compete in a global market may find it difficult to stay competitive with their foreign counterparts who do not have to raise prices due to inflation. Therefore, the aim of Central Bank will be to maintain inflation at a reasonably low level so that it will not erode the real value of stock gains.

Finally monetary authorities should exercise restraint in the use of policy instruments indiscriminately, because it is clearly evidenced that the use of monetary policy instruments affects the performance of the stock market to a very large extent.

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