Determinants of Stock Price Movements in Nigeria: Evidence from Monetary Variables

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Abstract

Most studies conducted on the determinants of stock price movements in Nigeria have been done on theoretical basis with no quantitative empirical evidence to support their postulations. Consequently, this study examined the macroeconomic determinants of stock price movements in Nigeria using detailed econometric framework in order to provide the foundation for evidence-based policies. Both the long-run and short run dynamic relationships between the stock price movement and the macroeconomic variables were analyzed with time series data that spanned from 1985 to 2010 using the Engle-Granger two-step cointegration test. We established that there is no cointegration between the variables, indicating the absence of long run relationship. Results of the regression indicate that the monetary policy variables (real exchange rate, real interest rate and money supply) as well as political instability are not the determinants of stock price movements in Nigeria; however, inflation was found to be a major determinant of stock price movements. The study recommends that the monetary authorities (that is the Central Bank of Nigeria, CBN) and policy makers should pay attention to changes in money supply and inflation in view of their sensitivity to stock price movements in Nigeria.

Key words: Stock Price Movement; Monetary Policy Variables; Cointegration; Inflation, CBN; Nigeria

1. Introduction

The stock market has become an essential market playing a vital role in economic prosperity by fostering capital formation and sustaining economic growth in most economies across the world. Stock markets are more than a place to trade securities; they operate as facilitator between savers and users of capital by means of pooling of funds, sharing risk, and transferring wealth. Stock markets are essential for economic growth as they ensure the flow of resources to the most productive investment opportunities (Udegbunam and Eriki, 2001). Guglielmo et al. (2004) argue that the primary benefit of a stock market is that it constitutes a liquid trading and price determining mechanism for a diverse range of financial instruments. This allows risk spreading by capital raisers and investors and matching of the maturity preferences of capital raisers (generally long-term) and investors (short-term). This in turn stimulates investment and lowers the cost of capital, contributing to the economic growth of a nation in the long term.

It is worth noting that stock price all over the world including Nigeria is characterized by upward and downward movements. Meristem Research of August 2008 describes the Nigerian stock market as a secular market driven by forces that could be in place for many years, causing the price of a particular investment or asset class to rise or fall over a long period of time. While on the one hand, in a secular bear market, weak sentiment causes selling pressure over an extended period of time. On the other hand, in a secular bull market, strong investor sentiment drives prices higher, as there are more net buyers than sellers. Trading volumes (number of shares) in the stock market constantly fluctuated strongly as stock prices change in stock markets on a daily basis. In Nigeria, just like in many other countries of the world, the question of what determines stock price movements (upward and downward) is seen to provoke diverse answers from different circles. The known efficient market theory believe that stock prices reflect everything that is known about a company and hence can be predicted based on fundamental analysis, while proponents of technical analysis attempt at forecasting future security prices based on historical data.

The factors driving stock price movements have become issue of concern to both researchers in academics and professional portfolio managers. While few researchers have approached the determinants of stock price movements from the micro perspective, few others approached it from macro perspective. Incidentally, few studies in Nigeria have attempted to provide empirical evidence of the determinants of stock price movements (for instance Udegbunam and Eriki, 2001), while few others have done that at theoretical level (for example Meristem Research, 2008). While the study by Udegbunam and Eriki (2001) is lagging behind in time especially in the face of the recent global financial crisis, Meristem Research (2008) only provides a theoretical exposition that lacks quantitative empirical evidence. Again, at the different countries level, studies conducted on the determinants of stock price movements showed divergent outcomes, even though it seems that some determinants commonly appeared for all stock markets. However, it is difficult to generalize the results due to the various conditions that surround each stock market environment. This is because each market has its own

rules and regulations, country peculiarities, type of investors, and other factors that provide the basis of its uniqueness.

Consequently, this study provides quantitative evidence on the factors that determine the stock price movements in Nigeria. The policy relevance of this study cannot be over stressed since Nigeria has increasingly become an investment destination for most foreign financial investors as a result of the recent financial sector reforms. Therefore, studying the determinants of Nigerian stock price movement is very germane for financial investment decision so that the country-specific factors influencing the upward and downward movements of stock prices can be identified. Herein lies the purpose and significance of this study.

2. Brief Review of the Related Literature

Following Rational Expectation Theory (RET), the price of a stock or bond depends partly on what prospective buyers and sellers believe it will be in the future. Rational Expectation theory is a building block for the 'random walk' or efficient markets' theory of securities prices. A sequence of observations on daily stock price is said to follow a random walk if the current value gives the best possible prediction of future values. The Efficient Markets theory of stock prices uses the concept of rational expectations to reach the conclusion that investors buy stocks they expect to have a higher-than-average return and sell those they expect to have lower returns. When they do so, they bid up the prices of stocks expected to have higher-than-average returns and drive down the prices of those expected to have lower-than-average returns. The prices of the stocks adjust until the expected returns adjusted for risk are equal for all stocks. Equalization of expected returns means that investors' forecasts become built into or reflected in the prices of stocks. More precisely, it means that stock prices change so that after an adjustment to reflect information like dividends, bonuses, the time value of money, and differential risks, they equal the market's best forecast of the future price. Therefore, the only factors that can change stock price are random factors that could not be known in advance (Sergeant and Wallace, 1975).

The Efficient Market Hypothesis posits that the most direct influence on a stock's price is a change in the fundamentals of the business. According to them, if revenues and profits are continuously increasing, one can expect the share price to rise as investors bid to buy into the increasing fortunes of the company. On the other hand, if the profit is flat or declining with no change in sight, investors begin to abandon the stock and the price will fall. The theory however argues that changes in the underlying business have a direct impact on the share price. Smart investors spot a subtle change before they become price-movers and take the appropriate action. Another factor which the theory identified is what is referred to as sector changes; the theory maintains that changes in the stock's sector can have positive or negative effects on its price. Some sectors or industries are cyclical in nature and that should be expected to affect the stock price (Mukherjee and Naka, 1995; Maysami and Koh, 2000).

Mukherjee and Naka (1995) argue that market forces such as demand and supply affect stock price movements. Any change in demand and supply, both of which can change at different rates causes fluctuation in share prices. If demand for a stock rises, its price tends to rise. An increase in supply depresses the stock price. Demand and supply are however related to other factors. Investment returns or company profitability is another potential factor. This factor is however dependent on profitability as there is no company that can pay good investment returns in terms of dividends and/or bonus issues to its share holders without a solid profitability report. However no company is by law compelled to declare dividends. It is only when such company makes profit that it can declare dividend and/or bonus issues. An impressive investment returns will attract more investors to the company; in other words, if returns on investment are attractive, there will be high demand for its stock and the price moves up. The reverse is the case when a company's investment returns is unattractive. Ordinarily, if a company is performing well in the area of profitability, investors will be interested to invest in such company and this will influence the share price of the company. On the other hand, a poor profitability will not attract investors as they will not like to put their monies at risk. In essence, impressive profitability of a company leads to increase in demand of the company's shares and subsequently increase in its share price (Meristem Research Report, 2008).

Apart from specific company characteristics, other external factors such as government rules and regulations, inflation, exchange rate, money supply, growth in gross domestic product and other economic conditions, investor behavior, market conditions, competition, uncontrolled natural or environmental circumstances directly affecting the production of the company, behavior of market participants, strikes, and so on, could be very important influencing factors in determining stock price movements.

Inflation and interest rate are key external factors identified as determinants of stock price movement. Maysami and Koh (2000) using cash flow valuation model maintains that an increase in expected inflation rate is likely to lead to economic tightening policies that would have negative effect upon stock prices. A rise in the rate of inflation increases the nominal risk free rate and raises the discount rate. DeFina (1991) however argues that the cash flows does not rise at the same rate as inflation, and the rise in discount rate leads to lower stock prices. A

report by dynamic portfolio limited shows that if the inflation rate is high, the tendency is that as the real income declines, the investors end up selling their assets, including stocks to enhance their purchasing power. The reverse is the case when the inflation rate is low, investors would like to acquire more assets. In essence, the era of high inflation rate negatively affects stock prices while low inflation rate boost stock prices.

On the effect of monetary policy variables on stock price moments, Udegbunam and Eriki (2001) examination of the relation between stock prices and inflation in the Nigerian stock market provides a strong support for the proposition that inflation exerts a significant negative influence on the behavior of the stock prices. Moreover, the study shows that stock prices are also strongly driven by the level of economic activity measured by GDP, interest rate, money stock, and financial deregulation. On the other hand, the findings of the study show that oil price volatility has no significant effect on stock prices.

A rise in interest rate may encourage investors to switch from the stock market to the money market. Reduced interest rate encourages demand for cash for speculative purpose and therefore may boost stock market activities. There is a relationship between bond yield, the level of stock prices and the price earnings ratio. The lower the yield on debt instruments, the higher the stock prices as well as the price earnings ratio. On the other hand the higher the yield on bonds, the lower the stock prices. Ologunde et al (2006) examined the relationship between stock market capitalization and interest rate. Using an ordinary regression analysis they showed that the prevailing interest rate exerts positive influence on stock market capitalization.

Exchange rate is another factor pointed out in the literature as a key determinant of stock price movements. Adam and Tweneboah (2008) argue that the instability of exchange rate can cause speculation in foreign exchange market, disrupt international credit operations and international stock market operations. The instability can also lead to crisis of confidence that could cause capital flight, or a large-scale withdrawal of short-term credit facilities. If there is high exchange rate it would encourage round tripping and discourage stock market investment. It will cause operating cost upward movement and lower corporate profit in the real sector: The higher the operating cost the lower the profit. When the value of the currency is dropping, the incentive to invest by foreign investors in the domestic economy is lost. This can affect the stock market and stock prices.

Adam and Tweneboah (2008) employed Johansen multivariate cointegration test and innovation accounting techniques from Vector Error Correction Model (VECM) to study the effect of macroeconomic variables and stock price movements in Ghana. They used quarterly data covering the period from the first quarter 1991 to the last quarter 2006. They established that there is cointegration between macroeconomic variables identified and Stock prices in Ghana, indicating long run relationship. The result also shows that interest rate is the key determinant of the share price movements in Ghana.

Money supply and country GDP are also seen as potential determinants of stock price movements. Contraction in money stock is expected to have a negative impact on stock prices, while an upward movement in GDP could raise stock prices due to the potential for higher profits arising from a healthy business climate. However, when the GDP is on the downward trend, there is likelihood of stock prices dropping. Chaudhuri and Smiles (2004) test the long run relationship between stock prices and changes in real macroeconomic activity in the Australian stock market in the period 1960 to 1998. The real macroeconomic activities include real GDP, real private consumption, real money supply, and real oil price. The results of their study indicated that there is a long run relationship between stock prices and real macroeconomic activity.

3. Methodology
3.1. Model Specification
This study employed an econometric methodology, specifically a single linear regression model. The merit of using a single linear regression according to Koutsoyianis (1977) is due to its theoretical plausibility, explanatory ability, accuracy of parameter estimates, simplicity and forecasting ability.
Guided by the research objectives, we formulated the implicit form of our model as follows:

$$SPR = F\left(EXCR, PIS, INTR, MS, INF\right) \dots\dots\dots\dots(1)$$

Where:

SPR = Stock price in Nigeria
EXCR = Exchange Rate
MS = Money Supply
INTR = Interest Rate
INF = Inflation Rate
PIS = Political Instability

We used the turnover ratio as proxy for stock prices, where turnover ratio is computed as total value of total shares traded divided by market capitalization. This is so because the price of the shares determines how much an individual investor can spend on shares, and the amount an individual invests also determines the rate of

turnover. In addition, political instability was used as proxy for capturing civil unrest. Specifically, dummy variable that takes the form of 0 and 1 was applied, where 1 stands for military regime and 0 for civilian regime. The explicit form of the model in equation (1) above is now presented as follows:

$$SPR = \beta_0 + \beta_1 EXCR + \beta_2 PIS + \beta_3 MS + \beta_4 INTR + \beta_5 INF + \varepsilon \ \ldots\ldots\ldots\ldots\ldots.. \ (2)$$

Where

β_0 = Constant;

β_1 to β_5 = the parameters to be estimated;

ε = the random error term.

3.2. Data Sources and Software Package

The data for this study were secondary data sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin 2010. The study covered the period 1985-2010. The choice of this period is strictly based on availability of data. The PC-GIVE econometric software was used for the analysis.

4. Presentation and Analysis of Results

4.1 Unit Root Test

Following the submission made by Engle and Granger (1985) and Dickey and Fuller (1981), there is likelihood of obtaining a spurious regression if the series that generate the results are non stationary. This necessitates our investigation of the time series properties of the data by conducting unit root test for stationarity using Augmented Dickey Fuller (ADF) unit root test. The results are presented in table 1 below:

Table 1: Results of ADF Unit Root Test

Variable	t-adf	5% critical value	1% critical value	Integration Order
DDSPR	6.8783*	-1.958	-2.682	2
DDMS	2.9835*	-1.958	-2.682	2
DINF	4.5738*	-1.958	-2.682	1
DINTR	6.0245*	-1.958	-2.682	1
DREXR	2.7287*	-1.958	-2.682	1

Note: * indicates significance at 5% and 1% level; D denotes number of differencing

Source: Author's computation

The results in Table 1 above indicate that some of the variables were stationary after first differencing (Inflation rate, Interest rate and Real Exchange Rate) while others became stationary after second differencing (Stock Price and Money Supply).

4.2. Cointegration Test

Cointegration implies that if two or more series are linked to form an equilibrium relationship spanning the long run, then even though the series themselves may be non-stationary, they will move closely together over time and their difference will be stationary. Their long run relationship is the equilibrium to which the system converges over time, and the disturbance term can be interpreted as the disequilibrium error or the distance that the system is away from equilibrium at time t. Thus, we used the Engle-Granger two-step procedure for cointegration test and the result is shown in Table 2 below:

Table 2: Engle-Granger Cointegration Test Result

Variable	t-adf	5% critical value	1% critical value	Lag Length
Residual	-1.2988	-1.957	-2.67	2
Residual	-1.4729	-1.957	-2.67	1
Residual	-1.4113	-1.957	-2.67	0

Source: Author's computations

The results in Table 2 above indicate the absence of cointegration among the variables since the residual generated from non stationary series is not stationary using the ADF unit root test.

4.3. Presentation of Regression Results and Discussion of Findings

Table 3: Results of Modeling SPR by OLS

Variable	Coefficient	Std. Error	t-value	t-prob
Constant	0.41163	0.66584	0.618	0.5446
PIS	-0.36693	0.94362	-0.389	0.7022
DINF	-0.064040*	0.030439	-2.104	0.0506
DDMS	7.781207	6.676207	1.166	0.2599
DINTR	-0.12608	0.085762	-1.470	0.1598
DEXRT	-0.038137	0.036486	-1.045	0.3105

Note: * denotes significant at 10%

Source: Author's computation

From the results presented in the Table 3 above, the dummy variable used to capture political instability shows an expected negative coefficient of -0.36693. This means that a given percent increase in political instability holding all other variables constant, causes stock price to decrease by approximate 37 percent. The negative coefficient displayed by political instability conforms to a priori expectation in the sense that political and civil crisis can discourage potential investors from investing their liquid fund as a result of perceived danger of insecurity to their investment. This no doubt would lead to a downward pressure in the demand for stock which will be accompanied by fall in price. Notwithstanding, political instability as captured with a dummy variable is not statistically significant in determining stock price movement over the period estimated judging from its t-value of -0.389 which is less than absolute 2 using t-2 rule of thumb.

As expected, inflation displayed a negative coefficient of -0.064040, indicating that, all things being equal, a percentage increase in inflation rate would reduce stock price by 6.4 percent. The result however conforms to theory since increase in expected inflation rate under general circumstances is likely to lead to economic tightening polices that would have a negative effect on stock prices. Additionally, a rise in the rate of inflation increases the nominal risk-free rate and raises the discount rate in the valuation model. Since money supply do not rise proportionally with inflation (Defina 1991), the rise in discount rate leads to lower stock prices. Nevertheless, inflation is statistically significant in determining stock price movement. This is consistence with the study of Maysami and Koh (2000) which identified inflation as one of the major determinants of stock price movements. The significance of inflation could be attributed to the fact that economic agents and business units in Nigeria could not adapt to the persistent inflationary spirals that it continues to have long term effect on their decision making.

The positive sign of the money supply variable meets our economic a priori expectation. It shows how frequent changes in the variable unleash deviations on the steady growth rate. Any monetary expansion raises the disposable incomes of economic agents and this increases aggregate demand. To meet the increased demand, business units expand production leading to increased output through the multiplier effect. Consequently, increased demand is expected to exert upward pressure on prices. From the result, a given percent increase in money supply leads to 778 percent increase in stock price, all things being equal. The positive value of the coefficient is consistent with the findings of Dimitrios Tsoukalas (2003), Ibrahim (1999, 2003), Mukherjee and Naka (1995) and Maysami and Koh (2000). However the money supply is statistically insignificant, which contradicts the results of Chaudhuri and Smiles (2004) that indicates that money supply is a major determinant of stock price movement in Australia.

The result also shows negative relationship between real interest rate and stock price. The result suggests that holding every other variable constant, a given percentage increase in real interest rate leads to 13 percent decrease in stock price. The intuition behind the negative relationship is straightforward. Since the rate of inflation is positively related to money growth rate (Fama 1981), an increase in money supply is likely to cause discount rate to increase and lower the stock prices. Real interest rate is not statistically significant, implying that real interest rate is not a major determinant of stock price movement in Nigeria. The result is in line with the study of Ologunde et al (2006).

The coefficient of real exchange rate is -0.038137; that is, a given percent increase in real exchange rate leads to 3.8 percent decrease in stock price. Real exchange rate is not statistically significant in the analysis. This implies that it is not a key determinant of stock price movements in Nigeria. The negative coefficient could be attributed to the instability in the foreign exchange market which can lead to crisis of confidence that could cause capital flight, or a large-scale withdrawal of short-term credit facilities. In essence, high exchange rate is expected to encourage round tripping and discourages stock market investment. This will cause an upward movement in operating cost and lower corporate profit in the real sector. The higher the operating cost the lower the profit. When the value of the currency is dropping, the incentive to invest by foreign investors in the domestic economy is lost. This would no doubt have negative effect on the stock market and share prices.

5. Conclusion

The objective of this study is to provide quantitative evidence on the factors that determine the stock price movements in Nigeria. Previous studies on the determinants of stock price movements in Nigeria have been done on theoretical basis with no quantitative empirical evidence to back their postulations. The findings of this study indicate that monetary variables (which includes real exchange rate, real interest rate and money supply) and political instability are not the determinants of stock price movements in Nigeria. Furthermore, the results show that inflation is a major determinant of stock price movements in Nigeria.

The inherent implication of this study is that monetary policy variables are not the determinants of stock price movements in Nigeria. This finding suggests that micro factors such as individuals' decision to invest which follows rational expectation theory that individuals, in deciding how to act, will make use of currently available information are likely to be the determinants of stock price movements in Nigeria. Finally, it is recommended

that the monetary authorities (that is the Central Bank of Nigeria, CBN) should pay attention to changes in money supply in view of its sensitivity to stock price movements in Nigeria. In addition, the monetary authorities and policy makers should be more concerned about the changes in inflation rate due to its significant negative impact on stock price movements in Nigeria.

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