

STOCK PRICES IN NIGERIA: THE MACRO-ECONOMIC VARIABLES INVOLVED

SANNI, MICHAEL ROTIMI

ABSTRACT

A lot of literature has been written on the four schools of thought on stock price behaviour. These are; the technical school, the fundamental school, the Efficient Market Hypothesis (EMH) school and the macro-economic school. What are the macro- economic variables that affect stock prices in the Nigerian market? What is their overall effect on stock prices? How does each of them affect stock prices and in which direction? In finding answers to these and other similar questions, the study made use of secondary data of twenty two (22) years (198 2005) obtained from various sources on the macro-economic variables involved. Using multi-linear regression analysis, it was found that interest rate (represented by Minimum Rediscount Rate (MRR), but lately changed to the Monetary Policy Rate by the Federal government), inflation rates, money supply (represented by M2) and exchange rate (Naira/Dollar) collectively account for 96% of stock prices in Nigeria. Though each of the variables affects stock prices differently, the findings here confirm previous works on the topic while it recommended that government should at all times be mindful of the implications of its macro-economic policies on the generality of the people.

Key words: Stock prices, Money supply, Inflation, Exchange rate, Interest rate and Macro-economic variables.

INTRODUCTION

Government's commitment to its fiscal responsibility and its strong determination to address the major economic problems of the country poverty alleviation, unemployment, the inefficient public utilities and to shore up agricultural and industrial production-may provide a powerful stimulant to the economy. If the GDP increases at a healthy pace, stocks will rise due to the potential for higher profits resulting from a health climate (Akintola-Bello, 2004). Federal and State governments budget large sums for public construction and housing. If efficiently executed, this will affect the building, construction and associated sector of the economy and impact positively on the stock market. And if the proposed government employment programme leads to moderate job growth without igniting inflation, the economy and industrial production, capacity utilization, and personal income increase, stock prices will rise.

Stock and bond indexes are becoming increasingly popular in securities market globally. This popularity is a result of poor and inconsistent performance of active investment management. Since investors rarely hold one stock in a portfolio consisting of few stocks or bonds will find it

cumbersome to follow each stock or bond individually to determine the overall performance of the portfolio.

There is the general perception that prices of many companies' stock move together (Akintola-Bello, 2004). During some periods, almost all securities listed on an exchange will rise in prices, while during other periods all will fall in prices. Therefore, if the overall market rose, an individual's portfolio probably also increased in value. Market indexes were introduced to supply investors with composite report on market performances. They are also used to measure the general performance of an economy. It is unusual to have a stock market that is sharply rising if the economy is sharply falling.

But what determines stock prices? Those who price these stocks look at where the country is going. We are talking about inadequate housing, inadequate food, clothes and so on, observes Ebulu (2007). As these things are being produced locally, the stocks' prices respond accordingly. The hunger in the stomach of the market or the population in the country is what determines share prices (Ebulu, 2009).

Ebulu (2007) went further to explain that stock prices are determined by the market. A stock's price, he believes, should have some element of consistency based on the economy of the nation and the overall performance of the company concerned. But market determination in itself should not be taken in isolation. The performance of the stocks on the trading floor of the Nigerian Stock Exchange (NSE) is reflection of the performances of the company in terms of good competent management, corporate governance and profit making. These factors according to Ebulu (2007) help influence stock prices in the market.

Having discussed stock prices and the economy and how they affect each other the next questions are what other macro-economic variables apart those already mentioned? How does each of them affects stock prices? It an attempt to answer these and other questions that motivated this study.

The study is divided into five sections. Section one is on introduction. Section two discusses related literature. Section three treats research methodology and model specification. Results and discussions are treated in section four while section five concludes the study.

CONCEPTUAL ISSUES

Economists have long considered stock to be one of the best indicators changes in economic activities (Amadi et al, 2000). Moore (1975), Notes that the stock index is a major component of the index of leading economic indicator which consistently provides a warning about changes in economic activities. Smi (1990) in his stock price behaviour in the American economy observes that stock prices usually decline shortly (on averages, four months) before a recession begins and rise shortly before a recession ends.

The relationship between stocks and the economy can be a reversil model, viz: the stock market may influence the economy, or ine economy may influence the stock market (Amadi et al, 2000). The belief that stock market predicts the economy stems from the fact that decisions made by microeconomic indices affect macroeconomic fluctuations. In other words, business cycles reflect aggregate economic units. On the other hand, the believe that the economy may influence stock market changes stems from the effect of macroeconomic policies.

For instance, a tight monetary policy would have the effect of reducing investments and vice versa. However, there is a thin divide between the two arguments. Four schools of thought were identified by Amadi et al (2000) on stock price behavior. These are technical school, the fundamental school, the random walk hypothesis school, and the macroeconomic hypothesis school. Akintola-Bello and Joko (2002) added the Efficient Market hypothesis (EMH) School.

Technical analysis is the study of the internal stock exchange inform: as such. The word "technical" implies a study of the market itself and not of the external factors, which are reflected in the market. The relevant factors, whatever they may be, can be reduced to the volume of the stock exchange transaction and the level of share prices, more generally, to the sum of the statistical information produced by the market (Rosenfield, 1975). Technical analysis uses past movements of the stock market and individual stocks to develop technical trade rules (Akintola-Bello and Jokomba, 2003).

Fundamental analysis requires that investment selection process should be based on certain fundamental economic, industry and company variables to determine the investment (Akintola-Bello & Jokomba, 2003). To the fundamentalists, the value of a corporation's stock is determined by expectations regarding future earnings and by the rate at which those earnings are discounted. The fundamentalists apply present value principles to the valuation of corporate stock, using dividend, earnings, assets and interest rate to establish the stock price (Amadi et al, 2000).

Both the 'technical' and 'fundamental' analyses have been challenged by scholars who subscribe to the random walk hypothesis, which sees stock price movements in term of a probability distribution of different possible outcomes (Amadi et al, 2000). The random walk hypothesis is based on efficient market assumption that investors adjust security rapidly to reflect the effect of new information. Empirical tests of the random walk hypothesis have been carried out by scholars like Moore (1962) and Fame (1965).

The macroeconomic approach attempts to examine the sensibility of stock prices to changes in macroeconomic variables. The approach posits that stock prices are influenced by changes in money supply, interest rates, inflation and other macroeconomic factors (Amadi et al, 2000). It employs a general equilibrium approach, stressing the interrelations between sectors as central to the understanding of the persistent and co-movement of macroeconomic time series, based on the economic logic which suggest that everything does depend on everything else. Kaplan (2002) identifies other variable like earnings growth; magnitude of dividends paid and market forces.

Efficient Market Hypothesis (EMH) on its own believes that all historical information on prices and volumes are already reflected in current market prices (Akintola-Bello and Jokamba 2007-51) Therefore past performances have no influence on future performances or market values. The EMH is about the way the market processes information and how the information influenced security prices. This study is opting for the macroeconomic approach because its postulations command a strong appeal for empirical verification and is in line with a recent work by Amadi et al (2000).

Money supply, according to Boom (2001) is the amount available to an economic or market system. In reference to the economy, this amount is typically referred to as the money supply (M2). It measures the total amount of currency, cheque deposits, savings deposits and certificates of deposits (CDs). An increase in the money supply is expected to create excess supply of money balances and, in turn, excess demand for share prices is expected to rise as a result (Sharnam, 1993).

Inflation is collective increases in the supply of money, in money incomes or in prices. It is generally thought of as an inordinate rise in the general level of prices. Steven (1999) examines the effect of inflation on stock prices and the expected long-run using the Campbell-Shiller dividend-prices ratio model. It was found that there is a negative relation between equity valuation and expected inflation. The effect of inflation on required long-run real stock is also substantial.. Stock prices are inversely related to market interest rate (Kaplan, 2002). Thus, if market rate falls, the prices of outstanding stocks will rise and if market interest rate increase, the prices of stocks will fall.

Establishing the relationship between share prices and exchange rates is important for a few reasons. First, it may affect decisions about monetary and fiscal policy (Desislava, 2005). Garvin (1989) shows that a booming stock market has a positive effect on aggregate demand. Second, the link between the two markets may be used to predict the path of the exchange rate. Third, currency is more often being included as an asset in investment funds' portfolio. Last, the understanding of the stock price-exchange rate relationship may prove helpful to foresee a crisis. Khalid and Kawai (2003) as well as Ito and Yuko (2004) among others, claim that the link between the stock and currency markets helped probate the Asian Financial Crisis in 1997.

METHODOLOGY

The study made use of secondary data obtained from Stock Exchange Commission: Annual Reports and Accounts for 2004, Central Bank of Nigeria: Annual Report and Accounts for various years, Central Bank of Nigeria: Statistical Bulletin Volume 11, No. 2 of December, 2002, Central Bank of Nigeria: Major Economic, Financial and Banking indicators (2004), and Nigeria Statistical Sheets and Social Development (1950-2005) published by the Federal Office of Statistics in 2004. The data obtained for a period of twenty-two (22) years are: Stock Price

Index, Money Supply (M2), Interest Rates as represented by Minimum Rediscount Rate (MRR), Inflation Rate and Exchange Rates (Naira/Dollar),

The statistical model employed for the test of the hypothesis takes a cue from Amadi et al (2000) and Oloyo (2001) to establish the effects of one or more independent variables on one dependent variable. The problem of using the method according to Fagoyinbo (2004) is when more than two independent variables are highly correlated. To overcome the normality problem, transformation of the data by logarithm or square root is undertaken. For the multi co-linearity, factor analysis of principal components can be employed. The multivariate specification is as follows:

Model Specification

Hypothesis to be tested:

Ho: Stock price index does not depend on money supply, interest rates (MRR), inflation rates and exchange rates.

Hi: Stock price index depends on the above macroeconomic variables.

Stock Price Index = f (Money Supply, MRR, Inflation and Exchange rates). Stock Price Index $a + b_1(\text{Money Supply}) + b_2(\text{MRR}) + b_3(\text{Inflation rates}) + b_4(\text{Exchange rate}) + U$.

Where:

a = The intercept of the regression line on the y-axis. -The marginal effects of money supply on stock price index.

b_1 - The marginal effect of interest rates, represented by Minimum Rediscount Rate (MRR) on stock price index.

b_2 , The marginal effects of inflation rates on stock price index. b_4 - The marginal effects of Exchange rate (Naira/Dollars) on stock price index.

U=The random error which is normally distributed.

RESULTS AND DISCUSSION

In addition to the normal multiple regression analysis, a backward analysis is done in order to remove non-significant predictors in a stepwise factor (Alistair et al, 2002). The result when all the independent variables are used shows that the four Independent Variables (IVs) collectively account for .956 or 95.6 percent of share prices in Nigeria. But using the adjusted R squared as suggested by Carver and Nash (2000), this is slightly reduced to .946 or 94.6 percent. The calculated F-value is 93.381 with 0.000 significant level, which is less than 0.05 significant level

thereby making it significant. By this, H_0 cannot be accepted thereby making the study to conclude that the four macroeconomic variables affect share prices in Nigeria.

How has each variable affected the dependent share prices? Only money supply is significant with 0.000 significant level and a positive beta coefficient of 1.308. All other (IVs) are not significant.

The model equation:

Stock Price Index = $a + b_1(\text{Money Supply}) + b_2(\text{MRR}) + b_3(\text{Inflation Rates}) + b_4(\text{Exchange Rate}) + U$.

This becomes:

Stock Price Index = $182.786 + 1.512E-026 + 41.084b_2 + 15.033b_3 - 49.187b_4 + U$.

This means that a unit increase in money supply and inflation rate will increase share price index by 1.512E-02 and 15.033 respectively while a unit increase in interest rate and exchange rate will reduce stock price index by 41.084 and 49.18 respectively.

When the first non-significant variable (interest rate) is removed, the three remaining (IVs) still account for 95.6 percent or 94.9 percent (conservatively) of stock price index.

The modified model equation is:

Stock Price Index = $a + b_1(\text{Money Supply}) + b_3(\text{Inflation Rates}) + b_4(\text{Exchange Rate}) + U$.

This becomes:

Share Price Index = $340.887 - 1540E-026 + 12.709b_3 - 53.574b_4 + U$

While a unit increase in money supply and inflation will increase stock prices by 1.504E-02 and 12.709 respectively, a unit increase in exchange rate will reduce stock prices by 53.574. Of the three IVs, only inflation rate is not significant at 0.532 significant level as the remaining two are significant (money supply at 0.000 and exchange rate at 0.020 significant levels). The beta coefficients for money supply and inflation are positive while that of exchange rate is negative. When inflation rate is removed for not being significant, money supply and exchange rates account for 95.5 percent or 95 percent (conservatively) of stock price index in Nigeria. Both variables are significant, money supply at 0.000 and exchange rates at 0.016 significant levels. The model equation:

Stock Price Index = $a + b_1(\text{Money Supply}) + b_4(\text{Exchange Rate}) + U$ This becomes Stock price Index = $35.073 + 1.5350E-025 + 54.443b_4 + U$.

This means that a unit increase in money supply will increase stock price index by 54.443 note also that the beta coefficient of money supply is positive (1.329) while that of exchange rates is negative

(0.382) The test for autocorrelation is inconclusive. This is based on the formula by Kourtsoyiannis (1983):

A test for autocorrelation is inconclusive if

$$(4-du) < d^* < (4-dL)$$

Where:

Du = Upper limit-1.80 in the Durbin-Watson table

DL Lower limit-0.96 in the Durbin-Watson table.

D* = Durbin-Watson calculated-1.443

The equation thus becomes $0.96 < 1.443 < 1.80$.

The weak relationship between money supply and stock is in agreement with the of Des (1074) and Amadi et al (2000) but contradicts Sharma (1993). The negative coefficient of interest rates in the findings tends to corroborate the assertion that a fall in interest rates increases the value of stocks This is consistent with the works of Cagan (1974), Cohn and Lessard (1981), Amadi et al (2000) and Kaplan (2002).

The positive relationship between inflation and stock price index negates the findings of Steven (1999) but is in agreement with Amadi et al (2000). The estimate of the influence of exchange rate on stock price behaviour disagrees with the study of Akinifesi (1978) on the Nigerian economy and that of Amadi et al which used eleven (11) year period (1985-1995) as against twenty-two year period (1984-2005) used in the present study.

CONCLUDING REMARKS

It can be concluded that money supply, inflation rates, interest rates and exchange rates collectively affect stock prices in Nigeria though the degree and direction of each of the variables differ. It is therefore recommended that government should use the four macroeconomic variables wisely in order to encourage investments in stocks because of their influence on the economy.

Table 1: Coefficients

Model	Coefficients		Standardized Coefficients		
	Unstandardized Coefficients				
	B	Std Error	Beta	t	Sig
1. (Constant)	182.786	1752.251		.104	.918
MONEY SUPPLY	1.512E-02	.002	1.308	7.781	.000
INTEREST RATE	-41.084	122.489	.021	-.335	.741
INFLATION RATE	15.003	21.577	.039	.697	.495
EXCHANGE RATE	-49.182	25.389	.069	.074	.000
2. (Constant)	-.304	775.600		-.440	.666
MONEY SUPPLY	1.540E-02	-.002	1.333	9.042	.000
INFLATION RATE	12.709	19.925	.033	.638	.532
EXCHANGE RATE	-53.574	21.047	-.376	-.2.545	.020
3. (Constant)	35.072	496.194		.071	.944
MONEY SUPPLY	1.535-02	.002	1.329	9.167	.000
EXCHANGE RATE	-54.443	20.673	.382	-2.634	.016

a. Dependent Variable: SHARE PRICE

Source: Computations from SPSS

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