THE NATURE OF STOCK RETURN ON THE NIGERIAN STOCK EXCHANGE

RAJI NAZIR OLATUNJI

International Business
Bachelor's Thesis
Supervisor: Rannikko Heikki
Date of approval: 9, APRIL 2018

Aalto University
School of Business
Bachelor’s Program in International Business
Mikkeli Campus
Objectives

Review the literature on issues on how to compute stock returns, macroeconomic policies in Nigeria and the recent developments on the NSE and identify knowledge gaps between my study and previous studies on the stocks on the NSE.

Summary

This study aims to examine the three-microstructure issues on the stocks listed on the Nigerian stock exchange. The second microstructure issue, it also covers the dynamism of the market capitalization of the Nigerian stock exchange. This study covers only common equity trades because other such as government and corporate bonds transactions are not frequently traded on the Nigerian stock exchange. The nature of returns of the stocks listed on the Nigerian Stock Exchange (NSE) between 1996-2016 Unlike the Stock exchanges found in developed G7 countries, and in most middle-income countries.
Conclusions
My study has enormous implication for businesses. First, business invest excess cash holding in the money and capital market. This study shows the implication of investing in the Nigerian stock market over a long horizon, especially if one takes the macroeconomy into consideration. Also, the dynamics of the transactions and other activities on the stock market often preludes the direction of the economy. Businesses can learn from this study in that regard.

Key words: Nigerian stock exchange, Stock returns, Money supply, Macroeconomic variables, GDP, Informer sector, Nigerian stock market all share Index.
Language: English
1. Introduction

Nigeria is the biggest economy in Africa, it is the most populous country in Africa and a developing Nation. This study presents a good opportunity to study the NSE with these unique attributes. The NSE is structurally different from the exchanges found in the G7 countries. Nigeria is not a wealth country by most standards. Stock market participation rate is very low. Most of the stocks listed on the exchange do not trade daily. Because stock participation rate is low, the NSE is not very liquid. Thus, we can also link these to developmental factors, an issue that will never arise in G7 and middle-income countries if I plan a similar study in these countries.
1.1. Background

This study investigates three broad research questions about the nature of the stock listed on the Nigerian Stock Exchange (NSE) and nexus between national output and other macroeconomic variables and stock returns. I investigate two board research questions in this thesis. The first research question are microstructure issues on the stocks listed on the Nigerian stock exchange, and the second research question is based on nexus between the national economy output and wealth and the Nigerian Stock Exchange (NSE). Breaking down the issues, I want to investigate in this thesis into three separate problems, first I investigate the nature of the stock returns on the Nigeria stock exchange. Second, this study covers dynamism of the market capitalization of the Nigerian stock exchange. Third, I want to investigate if the developments in the stock market such as the nature of the returns and market capitalization on the NSE in recent decades are associated with developmental issues, economic business cycle, and macroeconomic policies in Nigeria.

The nature of stock returns, the main microstructure issue addressed in this study, have been thoroughly researched for stocks and stock markets in G7 countries, and some middle-income countries. But the Nigerian stock exchange is structurally different from the exchanges found in the G7 and middle-income countries in some ways. First, Nigeria is not a wealth country by most standards. Stock market participation rate is very low. Most of the stocks listed on the exchange do not trade daily. But that is beside the point. Since the Nigerian capital market is less developed, a thorough research in these areas can potentially show if the nature of returns in these developed and rich countries can hold in a frictional capital market found in countries like Nigeria. However, high frequency dataset availability proved to be a major setback for this study. Because of this data availability issue, I limit myself to investigating the nature of the returns on the Nigerian stock market and the influence of macroeconomic policies on the nature of these returns.
A research in these areas will shed more light on microstructure issues such as returns, volumes of trades, stock volatilities, and other fringe microstructure issues. By investigating these issues, the nature of the markets found in countries with similar economic indices as Nigeria will be better understood. Also, as far as I know, this is the first study that investigate these microstructure issues.

Stock market participation has recently been linked to developmental issues in recent researches. The nexus between macroeconomic indices and the activities on the NSE can potentially provide an insight into the link between capital market activities and economic development. Stock markets in developing countries are often referred to as engine of economic growth because of lack of vibrant money markets in these economies (Udoka and Anyigang, 2014). The Capital market can provide the need funds for the industrial take-off of these economies. Thus, studying how capital market is linked to the nature economy can give us another clue on reliability of the stock market in performing this important traditional role.

From the foregoing, this study will address some broad questions. These questions include, but not limited to: Is the market return on the NSE sufficiently large enough for high participation in the stock market? This first microstructure issues will answer this question, as well as related questions. Related studies to these questions are generally literature on stock market participation, wealth creation in the real sector of the economy, culture, and attitudes towards the stock market itself. It is my hope that the first microstructure questions would provoke the debate about the link between stock market returns and other developmental issues in Nigeria.

The second microstructure issue is also linked to the national economy. But unlike the first one, this topic has not been thoroughly researched for a developing economy like Nigeria. Specifically, I want to focus on the dynamism of the growth of the stock market. Here, the questions that I want to answer include when does the stock exchange market perform best and worst in at any given year? I plan to replicate and stretch the time to a decade. When does the stock market perform the worse? Was it during economic business cycles? These are some of
the thought provoking questions I want to answer with the second microstructure issue. Here, I focus on the link between some broad stock market index and macroeconomic variables such as the growth rate of the GDP, business cycles and their nature, inflation rate, and money supply. Like the first research question, I plan to take this study stretching back at least a decade. Broadly, I plan to juxtapose the development in the stock market returns and market capitalization with business cycle and macroeconomic policies in Nigeria.

1.2 Research Problem

I want to address two microstructure issues on the Nigerian stock exchange (NSE). The first one is about listed common equities (stocks) on the NSE. The second issue covers the Stock exchange. I attempt to link these issues to fringe developmental issues. While linking these issues to developmental issues is not a research goal, nevertheless it is going to be almost impossible to discuss a research topic in Nigeria without linking it to developmental issues facing the country. First, I investigated the microstructure questions of the nature of returns across all the stocks on the Nigerian stock exchange. Do stocks listed on the exchange generate adequate return to investor when we take the cost equity into consideration? Are these returns correlated across stocks? Are they correlated across sectors of the economy? Can we replicate a representative portfolio from sample stocks listed on the NSE? Are returns on the NSE linked to stock market participation and income of Nigerians? Second, does the performance of the NSE follow a pattern over the years? When the stock market performs well, is it link to a specific event like national elections? Or is the performance linked to normal business cycle? Or is the performance linked to sound macroeconomic policies?

1.3. Research questions

Sub-Saharan African standard, the NSE is a large and old institution. But has the NSE lived up its name in terms of performance of the individual stocks listed on the NSE and the performance of the NSE itself?

After serious and proper consideration, I arrived at my research questions;

1. What is the nature of returns of the stocks listed on the Nigerian Stock Exchange (NSE) between 1996-2016?
2. How has the NSE’s market capitalization developed over the years between 1996 – 2016?

3. Is the development in the stock market returns and market capitalization associated with developmental issues, economic business cycle, and macroeconomic policies in Nigeria?

1.4 Research objectives:

To study the proposed research, I will

- Review the literature on issues on how to compute stock returns, macroeconomic policies in Nigeria and the recent developments on the NSE
- Identify knowledge gaps between my study and previous studies on the stocks on the NSE
- Form research questions
- Collect data
- Analyze the data
- Make conclusions

2. Literature Review

Like stock exchanges all over the world, the Nigerian stock exchange (NSE) brings together two or more parties who want to trade stocks and other assets at arms’ length. But the NSE is still undeveloped relative to execution qualities and general trading rules on stock exchanges in developed countries. Some of these rules include the nature of trades, quotations, display rule and other typical regulations that regulate daily trading. Another example of inefficiency on the Nigerian Stock exchange is the lack of trading arrangements found in developed economies such as overnight trading, standard exchange rules tick size rule, and so on (Mishkin, 2015). These trading rules are virtually non-existent or unenforceable on the NSE. Unlike the Stock exchanges
in developed economies, countries, and in most middle-income countries, the Nigerian stock exchange is still sufficiently illiquid (Udoka and Anyingang, 2014). Several stocks are not daily traded on the market. The trading rules are not clear in some cases. And data availability to traders and research is very limited.

Also, the NSE is still sufficiently illiquid. Several stocks are not daily traded on the market. The trading rules are not clear in some cases. And data availability to traders and research is very limited. Given this unique feature of the Nigerian stock exchange, I looked up a couple of past studies on stock exchanges in countries on the same developmental level as Nigeria. These studies guide me in terms of the methodology, data management technique, and a general approach to follow in this thesis.

However, I begin a review of past studies on the trading rules on exchanges that operate in countries that share economic features with Nigeria. Then, I review the overall nature of the Nigerian economy. I also analysis the history and operations of the Nigerian Stock Exchange. After these introductions, I then analyse the impact of trading rules and related ancillary rules on liquidity.
2.1 Introduction to the Nigerian Economy

2.1.1 The Informal Sector

The bulk of the economic activities in Nigeria emanates from informal sector. The informal sector is that sector of the economy that is not taxed by the government, and it is unregulated. At least three-quarters of the informal economic activities constitute the national economy and outputs in most developing countries (Odife, 1984). According to the world Bank (2015) estimate, the informal sector accounts for about 65% of the Nigerian economy. From World Bank (2015) estimates, the size of Nigeria’s informal sector is close to 65% of her GDP. Economic activities in the informal sector are difficult to observe. Examples of economic activities in the informal sector includes handcraft jobs like black smith, carpentry, fishing, small scale farming, and so on. The technical know-how of some of these professions are handled down across generations.

Another feature of the Nigerian informal economy is that most of the economic transactions in this sector are carried out in cash. But carrying out economic activities in cash undermines the financial intermediation process, and subsequently stock market participation.

More than 65% of the labor force is employed in this informal sector (World Bank, 2015). Thus, the informal sector is an important source of labor supply for the economy. Economic activities in the informal sector are mostly excluded from the Gross Domestic Product (GDP), a measure of national output. Excluding these output from the GDP makes sense because it is very difficult to measure economic activities in this sector. In summary, the informal economy dominates the Nigerian economy, and the dominance of this sector undermines the financial system which in turns affect stock market activities. I will expatiate this point later.
2.1.1 Is the Nigerian Economy Developed?

I briefly discussed the performance of the stock markets in developing economies versus those in developed economies. I also allude to the fact the literature on performance of stock exchanges create a dichotomy between stock exchanges of stock exchanges in developed economies versus the stock exchange exchanges found in developing countries. Some of these differences borders on liquidity, standard exchanges rules, adoption of technology to enhance trades on the exchange and so on. It makes sense, therefore, for one to know the strength of the economy whose stock exchange(s) one is studying. Nigeria is a developing country. But using the latest time series economic data to drive home this point makes one’s job easier. To judge the strength of an economy, some standard macroeconomic indicators are handy.

To get a snapshot of the Nigerian economy, certain variables are used as standard macroeconomic indicators. These indicators show the general health of an economy. Here, I use macroeconomic indicators like the Real Gross Domestic Product (Real GDP), inflation rate, money supply and the per capita Real Gross Domestic Product (Per capita Real GDP). GDP is the value of goods and services produced in an economy.

The absolute value of real GDP is not enough to establish whether a country is wealth or not. One needs to compute the real GDP to determine if a country can be regarded as developed or not. To make meaningful comparison, I plot the real GDP for G7 & countries (the USA, France, the United Kingdom, Japan, Canada, Italy, and Germany) and the MINT countries (Mexico, Indonesia, Nigerian and Turkey) from 1960 to 2016 in Figure 1 below. A comparison between these countries shows that the G7 & have real GDP of roughly the same values, while the MINT countries also have real GDP of roughly the same values. But, Nigeria has the lowest real GDP of all the MINT countries. It is not by coincidence that Nigeria has the lowest real GDP of all the countries in
Figure 1. Thus, Nigeria is a developing country. Methodologies of this study should correspond to the nature of Nigerian Stock Exchange.

Figure 2 shows the Real GDP of the G7 and MINT countries from 1960-2017. Again, the real GDP of Nigeria is the least. Nigeria’s GDP fell in the 2\textsuperscript{nd} quarter of 2015, and until the 2\textsuperscript{nd} quarter of 2017. During these quarters, the Nigerian economy went into an output decline or recession. Thus, the result of any study on the Nigerian economy during this recession period should be interpreted with caution. Alternatively, the recession period should be control for in the quantitative or multivariate analysis.
I show other macroeconomics indicators- Money supply (broad money as a percentage of GDP) and inflation rate in Figures 3, and 4, respectively. Money supply as a percentage of GDP also show that Nigeria has the least money supply as a percentage of GDP. Since money supply is linked to the volume of economic activities, Nigeria has the least value of economic output. Thus, Nigeria is relatively poorer than all the countries in Figure 3 according to the money supply criteria.
Finally, inflation rates of all the countries in recent times are in single digits, the exception being Nigeria. The current inflation rate on Nigeria is 15.7%. Nigeria’s inflation rate climbed to double digits during the period 2015 and 2016. This period is coincident with the recessionary.

Next, I turn my attention to history and the operations of the Nigerian Stock Exchange.

2.2 The Nigerian Stock Exchange: Brief History and Operations.

The Nigerian Stock Exchange (NSE) is a registered company founded in September 15, 1960, but it began operations on June 5, 1961. The NSE was founded under the Investment and Security Act (ISA) of 1960. The Security and Exchange Commission (SEC) provides an oversight function for the activities of the NSE. The governing council of the NSE designed the operational policy of the NSE. The Central bank, the Nigerian Enterprise promotion, and Nigerian ministry of finance also have influence on the running of the Nigerian Stock Exchange (Udoka and Anyingang, 2013).
Market participants on the NSE include commercial banks, pension funds, institutional investors, discount houses, stock broking firms, Federal and state governments, and so on.

The trading hour on the NSE is between 9:30am to 2:30pm, West Central African standard. According to the exchange’s website, the services rendered by the NSE includes listing service, trading service, data solutions amongst others. The main instruments trades on the NSE are equities, government bonds, mortgage loans, exchange traded funds, and derivative instruments (NSE Q3 2017 Fact Sheet). Over 70% of the assets listed and trading on the NSE is equity. All the equities on the NSE are under one of eleven sectors, including financial services, agriculture, and so on.

The NSE creates 12 indices which track the performance of the stocks on the exchange. However, the prominent of these trackers are the All share index (ASI) and the NSE 30 index. The NSE 30 tracks the best 30 equity performers on the NSE, while the ASI is the index of all listed firms. The NSE 30 was created on February 9, 2009. As January 26, 2018 the ASI and NSE 30 are 43,773.76 and 2,023.31 respectively. Figure 5 below shows the trend of ASI from 1994 to 2014. The ASI peaked in 1998.

![Figure 5: Trend of All Share Index on the Nigerian Stock Exchange, 1994-2016](image_url)
The NSE 30 index is shown below in Figure 6. Juxtaposing Figures 5 and 6, the NSE 30 index mimics the ASI very well.

![Figure 6: Trend of NSE 30 Stocks on the Nigerian Stock Exchange, 1998-2017](image)

The Nigerian Stock Exchange (NSE) operates a hybrid market, allowing both quote-driven and order driven market (NSE, FAQs and E-Brochure, 2018) by market makers. Market making is a process whereby a broker/dealer can submit a two-way continuous quote. These quotes are called bid and ask price. The bid price is the price the market maker is willing to buy a security, while the ask price is the price the market maker is willing to sell the same security. The difference between the bid and ask price is called the spread. The spread is an index of liquidity in the market, amongst other measures.

A market maker is a licensed broker-dealer who is allowed by the exchange to quote bid-ask price and execute trades on the floor of the exchange. There are ten market makers on the Nigerian Stock Exchange (NSE FAQs and E-Brochure, 2018) as at January 31, 2018. These ten market makers are: Capital Bancorp, CSL Stockbrokers, ESS/Dun Loren Merrifield, FBN Capital, Future
View Securities, Greenwich Securities, Renaissance Capital, Stanbic IBTC, Vetiva Capital, and WSTC. The market makers are obligated to provide the bid-ask price within a pre-defined margin. A quote-driven market is one in which only the quotes of market makers are displayed, the quotes of unlicensed dealer-brokers are not displayed in the market. In an order-driven market, all the orders of buyers and sellers in the market are displayed on the floor of the exchange. By operating a hybrid market like the one found on the New York Stock Exchange (NYSE), the NSE takes full advantage of the merit and of each type of order, while avoiding their demerits.

2.3. The Stock Market as an Engine of Growth

The stock market provides a platform for economic agents to channel their savings into the economy. In this way, the stock exchange performs a similar function as financial intermediaries. That is, the stock market facilitates allocation of resources from the surplus sector to the deficit sector of the economy. In this sense, a well-functioning stock market align with the macroeconomic objectives of a central authority, including economic growth, price stability, and low unemployment. The efficiency of the stock market is very crucial for economic growth; hence stock markets are known as engine of economic growth.

High savings and investment rates are required for economic growth. Since the stock market provides an avenue for economic agents to save their excess or surplus cash, savings mobilization at a higher rate is entrenched in the economy. Beyond savings mobilization and higher savings rate functions, a stock exchange is a platform for business firms to raise capital. By providing an efficient intermediary system through which individuals can raise capital, the stock exchange provides a much-needed investment expenditure to boost real Gross Domestic Product.

In a developing country like Nigeria, the role of a stock exchange in promoting economic growth cannot be overemphasized. Nigeria, like most developing countries, has underdeveloped financial
system. Most of the economic activities are concentrated in the informal sector. Since cash is the main instrument of transaction in the informal economy, most of the activities in this sector take place outside the financial system. Consequently, the ability of financial intermediaries to provide bank loans and other facilities to business firms are greatly undermined. A well-functioning stock exchange can fill this void.

2.4 Past Studies on the Nature of Stock returns
Early literature on the nature of stock return are based on the random walk hypothesis. Random walk hypothesis implies that change in stock prices between two successive periods are unpredictable. Early works on the nature and determinants of stock returns includes Sharpe (1964), Litner (1965), Stattman (1980), Kiem (1983), Breeden et al. (1989), Bassu (1983), Banz (1981), Bhandari (1988), Rosenberg, Reid, and Lansten (1985), La Porta (1996). Most of these early works accept the predictability of stock returns and the random walk hypothesis. The random walk hypothesis posit that returns of stock returns is unpredictable. Since these works accept this hypothesis, they focused on the determinants of cross-section and time series of stock returns. Most these earlier studies emphasize the book-to-market and size as one of the determinants of cross-sectional stock returns. However, Fama and French (1970, 1992, 1996) show that book-to-market ratio not only determine cross-section returns of stocks, but these variables also determine the nature of bonds returns.

Apart from Fama and French studies, other relevant literature on predictability of stock returns include Campbell and Yogo (1996); Avromov and Chordia (2006); Bekaert (2007); Stambaugh, Yu, and Yuan (2012); and Welch and Goyal (2008). These studies show that stock returns have unconditional predictability predictable. That is, stock returns are predictable even if one does not
condition on events such as earnings announcements, dividend announcements, stock splits, January effects, and so on.

2.5 Recent Literature on Nature of Stock Returns

The debate on nature of stock returns spills over the debate around predictability of stock returns. If stock return is predictable, two implications are obvious, First, the random walk hypothesis of stock returns does not hold. Second, certain events can make stock returns more predictable. The latter case does not only undermine the assumption frictionless and transaction-costless capital market, it also triggers another wave of literature on the types and importance of these events. Collectively, these literatures are referred to as anomalies (of stock returns and the capital market). Here, the acceptable theories are momentum, underreaction, and overreaction of stock returns (See Jagadeesh and Titman, (1993), Kiem (1983), Fama and French (1970, 1991, 1989), and Lakonishok and smidt (1988), Debondt and Thaler (1985, 1987). The take away from these studies is that stock events are predictable due to certain events. These events include earnings announcement, investors sentiments, dividends announcement and so on.

Although I lacked high frequency data necessary to conduct the research on these grey areas in the literature, but I can still relate this study to the very foundation of the nature of return literature. Apart from the lack of high frequency data, this study is also being conducted for a less liquid market in a developing country. Thus, I contribute to the literature on the nature of returns in an illiquid and developing market.
4. Methodology, Data, and Summary Statistics

This chapter deals with the methodology adopted in this paper. Since the research questions I want to answer all revolve around the activities on the Nigerian stock exchange, I start this chapter by analyzing the returns on the Nigerian stock exchange. Here, I examine the returns of the Nigerian Stock Market All Share Index (NSMASI) and the Nigerian Stock Market 30 Index (NSM30I). I find the contrast between the NSMASI and NSM30I indices because studies have shown that liquid and small capitalized (small cap) stocks are more influential in driving returns than large capitalized (large caps) firms. After examining these indices, I analyze quarterly volumes of stocks traded on the Nigerian stock exchange (NSE) from 2007 to 2017. These analyses give one the general overview of the nature and dynamism on the trading activities on the Nigerian stock exchange.

To get an overview of the link between the capital market economic activities and macroeconomic variable, I analyze the business cycle, economic growth and GDP, and other macroeconomic variables. Some of the univariate analyses of the level data of these macroeconomic variables can be found in Figures 1-4 of the chapter two. But I also represent the growth rates of these variables in this chapter because the growth rates of these variables have substantial interpretation in economic relative terms. I use the three macroeconomic variables namely: growth rate of real GDP, Inflation rate, and money supply (MS) as the main macroeconomic variables in this study.

Finally, I present the summary statistics of all these macroeconomic, NSE and other relevant variables for this study. These summary statistics gives one the glimpses of the interaction and the relationship between macroeconomic and the Nigerian stock exchange activities dynamics.
3.1 Data
This study covers period January 2007 to December 2017. To determine the impact of the activities on the Nigerian stock exchange on macroeconomic variables, I use two main sources of data for this study. One of the source is a proprietary data set from the Nigerian stock exchange. The proprietary dataset is daily capitalization index on the Nigerian stock exchange. I averaged these daily returns in terms of quarterly series to match the macroeconomic data series.

The second dataset is from the world bank, an open source dataset. I also use this dataset to compute the value weighted market capitalization of the All Nigerian Share Index and NSE30 index. The dataset from the Nigerian Stock Exchange also include monthly volume and bid-ask size quotes of stocks listed on the Nigerian Stock Exchange as at December 2017. The macroeconomic dataset is sourced from the World bank, and this dataset is of quarterly series.

3.2 Methods of Analysis
I use univariate and simple regression analysis in this study. In the univariate analysis, I considered each stock market data and macroeconomic data separately. In these cases, I mostly use graphical analysis to show the nature and dynamics of the returns on the Nigerian stock exchange. I also use graphical analysis to show the trend of the three macroeconomic variables namely GDP growth rate, inflation rate, and money supply. All the data series are quarterly.

To establish the quantitative relationship between the Nigerian stock exchange returns and macroeconomic variables in the Nigerian economy between 2007 and 2017, I use the ordinary least square regression model and time series estimation method. Again, I would have considered a longer time series data in the study, but the proprietary data is a limitation on the scope of the
duration of this study. The full scope and specifications of these estimation methods are shown in Chapter 4.

### 3.3 Summary Statistics

I present the summary statistics of this dissertation in Table 1 below. The summary statistics table includes the variables that I introduced in sections XXX, and XXX above. These variables include the Nigerian Stock Market All Share Index (NSMASI), the Nigerian Stock Market 30 Index (NSM30I), and volume of stocks traded. I also include growth rate of GDP, Money supply and inflation rate in the summary statistics table.

**Table 1: Summary Statistics**

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria Stock Market All Share Index (NSMASI)</td>
<td>43</td>
<td>32646</td>
<td>10733</td>
<td>19851</td>
<td>63147</td>
</tr>
<tr>
<td>Nigeria Stock Market All Share Index (NSMASI, %)</td>
<td>42</td>
<td>2.81</td>
<td>14.444</td>
<td>-36.871</td>
<td>32.226</td>
</tr>
<tr>
<td>(NSM30I, % Change)</td>
<td>42</td>
<td>6.84</td>
<td>40.27</td>
<td>-28.29</td>
<td>172.08</td>
</tr>
<tr>
<td>Volume (% Change)</td>
<td>42</td>
<td>5.531</td>
<td>25.01</td>
<td>-37.001</td>
<td>71.57</td>
</tr>
<tr>
<td>Real GDP (% growth)</td>
<td>42</td>
<td>4.455</td>
<td>2.799</td>
<td>-2.44</td>
<td>8.12</td>
</tr>
<tr>
<td>Inflation Rate (%)</td>
<td>42</td>
<td>11.21</td>
<td>2.939</td>
<td>5.3</td>
<td>16.3</td>
</tr>
<tr>
<td>Money Supply ($’billion)</td>
<td>42</td>
<td>14,874</td>
<td>3.371</td>
<td>-3.13</td>
<td>5.01</td>
</tr>
</tbody>
</table>

The number of observation reported for these variables depend the variable in question. For example, Nigeria Stock Market All Share Index (NSMASI), the only level variable in Table 1, has 43 observations. For obvious reasons, Variables specified as percentage changes or percent growth have 42 observations. There are no missing variables in the dataset.

In terms of levels, the Nigeria Stock Market All Share Index (NSMASI) has a minimum and maximum values 63147 and 19851 respectively. The mean value of this variable is 32646. The minimum and maximum values of the percentage change in NSMASI is -36.84 and 32.22 respectively. This implies that the extreme values (or outliers in this case) can have a huge swing on the mean values.
These extremes are removed in the computing the quarterly average returns of the NSMASI index. In terms of percentage change, the NSMASI average 2.81% percentage over the ten-year period. This implies an overall positive quarterly return of 2.81% on the Nigerian stock exchange between 2007 and 2017.

The Nigerian Stock Market 30 Index (NSM30I), a smaller but equally important index of the Nigerian stock exchange, has higher returns compared to NSMASI. NSMASI has minimum and maximum values of -28.29 and 172.08, and it averaged 6.84% over the period under study. This higher NSM30I is not surprising because the stocks in this basket are the bluest of the blue chips on the Nigerian stock exchange. The standard deviation of the NSM30I is 40.27, suggesting a highly volatile index. However, computation of the volatilities of these indices is outside the scope of this thesis. In terms of volume, the growth rate of stocks traded on the Nigerian stock exchange averaged 5.51% over the ten-year period, implying that the volume of stock traded on the Nigerian stock exchange grows by 5.51% over the 10-year period. The macroeconomic variables summary statistics are also shown in Table 1. These values averaged 4.46%, 11.21% and NGN 21,415,420 for real GDP growth, inflation rate, and the M2 money supply respectively.
4. Findings

I present my findings in this chapter. Following the structure that I laid out in the Chapter 3, I am first present the univariate analysis for this study. I then follow these univariate analyses with multivariate analysis using OLS and time series regressions. I also present the summary statistics in Table 1. The univariate analysis in section 4.2 provides the answers to the first research question on the nature of returns on the Nigerian Stock Exchange. To answer the second research question about the link between macroeconomics and capital market activities, I use time series and OLS regression analysis in section 4.3 to provide the answer to this research question.

4.2 The Nigerian Stock Market All Share Index (NSMASI) and the Nigerian Stock Market 30 Index (NSM30I)

The Nigerian Stock Market All Share Index (NSMASI) was created in January 1984. The index started with a base of 100, and it is computed daily. It is a representative of all the stocks listed on the Nigerian stock exchange (NSE). The NSMASI is a value weighted index designed to keep track of the general price and volume movements of all the equites listed on the NSE. That is, the stocks in the basket of NSMASI are weighted according their market capitalizations, even though the NSMASI does not reflect the market capitalization of each stock in its computation. In other words, the NSMASI is created to track the overall movement and the direction of the market. Some bullish or bearish bets on a few stocks by investors is not likely to swing the NSMASI. All equites listed on the Alternative Security Market are also included in the computation of the NSMASI.

The Nigerian Stock Market 30 Index (NSM30I) was created in December 2006. This index is computed the same way as the Nigerian Stock Market All Share Index. The only difference is that the NSM30I is designed to track the bluest of the 30 blue chip stocks on the exchange. That is, the
component and sample size of the NSM30I is far less than that of the NSMASI. However, the general of both indices should be in the same direction if they are both representatives of the stocks on the NSE.

A well-balanced component index not only reflect the overall trend of a stock market, it also forms the basis for individuals and institutional investors’ portfolio formation and return predictability. Individual and institutional investors rely on these indices in less liquid and less-traded capital markets. Although stock momentum, underreaction, overreaction and value strategy are outside the scope of this study due to lack of data, the quality of the construction of general market indices like the NSM30I and NSMASI are often watched by funds manager and institutional investors. However, lack of tick-by-tick data generally limit the scope of this study. A review of the studies in these areas have been discussed in chapter 2.

Figures 7 and 8 shows the percentage change in the NSMASI index and volumes. In Figure 7, the percentage change in the all share index stays positive for about 65% of the entire period. Between the years 2007 and 2017, the highest ever recorded percentage increase was 40% in the last quarter of 2009. In contrast, the lowest ever recorded downturn in the all share index was -30% in the last quarter of 2008 during the period under investigation. The NSMASI index averaged 2.8% return over the 10-year period on the stock exchange. If one removes the outliers in the last quarters of 2008 and 2009, the overall returns changes to 6.8%. Generally, Figure 7 shows that the Nigerian stock exchange made steady gains between 2007 and 2017. One of the research questions in this thesis is the contribution of stable macroeconomic environment to these positive returns on the Nigerian stock market.

Figure 8 shows the quarterly percentage change in the volume of the stocks traded on the Nigerian Stock Exchange between 2007 and 2017. From Figure, the number of advances and declines in
the volume of stocks on the Nigerian Stock Exchange are reminiscent of the trend in Figure 7. Figure serves to confirm that the constituent portfolio in the NSMASI is well-balanced. Apart from the occasional spikes in Table 7 below, the trend of the NSMASI behaves like a random walk hypothesis trend. A formal test of this random walk hypothesis is conducted in section 4.4 of this chapter.
To establish that the nature of the returns seen in Figures 7 and 8 is also applicable to the most liquid and traded stocks on the Nigerian stock exchange, I also consider nature of the returns and volume traded in the 30 of the most liquid and capitalized stocks on the Nigerian Stock Exchange.

A well constituted and balanced stock index should not show much variations between the entire universe of liquid stocks (or stocks traded often) and a sample from that universe.

Figure 9 below is analogous to Figure 7 above. Here, Figure 9 shows almost identical trend as Figure 7, including two outliers in the last quarters of 2008 and 2009. In fact, the values of the outliers are very similar to the ones in Figure 7 (37% and -31.5% respectively). Figure 10 is analogous to Figure 8, and these figures have almost identical trends, just like the trends of Figures 7 and 9.
Figure 9: Percentage Change in the Nigerian Stock Market 30 Index

Figure 10: Percent Change in the Volume of NSM30I Stocks
So far, I have shown the nature of he returns on the Nigerian stock exchange using Nigerian stock market all share index (NSMASI) and the Nigerian stock market 30 index (NSM30I). From these analysis, there are more advances in stock prices and volumes than declines. Simply put, there is a positive return in the monthly data series between 2007 and 2017. I find that the returns on the Nigerian stock exchange is quite dynamic. The Nigerian stock market record the lowest returns during 2007-2010, and during Q3 2015 to the last quarter of 2016. The average return on the Nigerian Stock market is 2.8% per year for 11 years from 2007-2017. However, if one removes the outliers during the extremely volatile years of 2007-2009, the average return is 6.8% per year. Thus index-weighted return averaged 2.8% per annum between these years. However, if one removes a positive and a negative index outlier in the last quarters of 2008 and 2009 respectively, the returns between these years averaged 6.8% per annum. Given these analysis, one can conclude that the Nigerian Stock Exchange yields positive returns. To establish the driving forces behind the solid positive returns on the NSE, one needs to dig deeper by considering a host of factors like stock momentum, overreaction, underreaction, portfolio formation strategies, macroeconomic variables. However, institutional constraints and data limitations confined the analysis in this study only the macroeconomic economic variable.

4.3 The Macroeconomic Variables and the Nigerian Stock Exchange

Figure 11 below shows quarterly growth in real Gross Domestic Product (real GDP) and the Nigerian Stock Market All Share Index (NSMASI). Except the years 2007-2010, the two variables follow the same trend. For example, downward trends in 2014 and 2016 on the two variables follows similar trends. In any case, the quarters of downward trends in the change in the real change in GDP series are mostly followed by similar trends in the NSMASI variable. Also, it is
also a little clear in Figure 11 that lag of GDP seems to predict the NSMASI. I will explore this possibility in the multivariate analysis section.

Figure 12 shows the trend of quarterly inflation rate and the NSMASI. Although the inflation rate trend is relatively flatter, the patterns of the two trends are identical, especially from 2013 to 2017. This graph also shows that the inflation rate in Nigeria was stable from 2011 to 2015, before it jumped from around 10% per annum to 15.69% in the last quarters of 2016.
The Nexus Between Capital Market Activities, and Macroeconomic Variables.

I analyze the nexus between capital market activities and macroeconomic activities in this section. In this manner, I provide quantitative multivariate analysis to answer the second research question. I use ordinary least squares and time series regression analyses for this purpose. Thus, I specify the ordinary least squares (OLS) equations to provide analyses and answers the second research question. I specify OLS as both single and multiple regression models.

I start this section by specifying the percentage change in the Nigerian Stock Market All Share Index (NSMASI) against percentage change in volume traded, time and the macroeconomics variable. That is, I plan to specify the following:

\[ NSMASI = \alpha_0 + \alpha_1 Volume_{t-1} + \alpha_2 Time + \alpha_3 GDP_{t-1} + \epsilon^\alpha \]  
\[ NSMASI = \beta_0 + \beta_1 Volume_{t-1} + \beta_2 Time + \beta_3 Inflation_{t-1} + \epsilon^\beta \]  

\( \epsilon \) are the error terms.
\[ NSMASI = \gamma_0 + \gamma_1 Volume_{t-1} + \gamma_2 Time + \gamma_3 M2_{t-1} + \epsilon^\gamma \]  

(3)

Where all the variables in equations (1)– (3) are as previously descried. \(\epsilon^\alpha\), \(\epsilon^\beta\), and \(\epsilon^\gamma\) are the errors terms. I present the estimates of these equations in Panel A to C of Table 2.

After specifying and estimating an OLS regression equation for each of the macroeconomic variable, I then specify a full model comprising of all the macroeconomic variables, time and volume. Lastly, to test the dynamics of the nexus between the macroeconomy and the Nigerian capital market, I include a recession dummy variable to capture the impact of recession on returns to the all share index of the Nigerian stock exchange. The specifications I just described is:

\[ NSMASI = \theta_0 + \theta_1 Volume_{t-1} + \theta_2 Time + \theta_3 GDP_{t-1} + \theta_4 Inflation_{t-1} + \theta_4 M2_{t-1} + \epsilon^\theta \]  

(4)

\[ NSMASI = \pi_0 + \pi_1 Volume + \pi_2 Time + \pi_3 GDP + \pi_4 Inflation + \pi M2 + \pi Dum + \epsilon^\pi \]  

(5)

All the variables in equations (4) and (5) are just as described. Dum is a dummy variable that is equal to 1 during recession, and 0 otherwise. I present these results of these estimates in Table 3, Panels A and B. A recession which lasted 5 quarters starting from the last quarter of 2015 till the first quarter of 2017 occurred during the period covered by this study.

Table 2 shows the OLS estimates of the equations (1) – (3). In Panel A, Volume is positively related to the level of value of the activities on the Nigerian stock exchange. This estimate is significant, and a 1% change in volume results in 0.112% change in returns. Time is not significant, thus implying that passage of time does not influence the returns on the Nigeria stock exchange. Since the time variable is not significant, we cannot reject the random walk hypothesis of stock returns.

Lagged GDP is positively related to the overall returns on the Nigerian stock exchange (NSE). A 1% increase in GDP increases returns on the stock exchange by 3.01%, and this result is significant. Turning to Panel B, the lag value of inflation rate is negatively relatively to returns on
the NSE, and this result is significant. Panel C in Table 2 shows that money supply is positively related to returns on the stocks on the Nigerian and hold. Thus, an increase in money supply by the monetary authorities leads to an increase in returns on a representative basket of the stocks on the NSE.

Table 2: Regression Result

<table>
<thead>
<tr>
<th>Variables</th>
<th>NSMASI (%) Panel A</th>
<th>NSMASI (%) Panel B</th>
<th>NSMASI (%) Panel C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lag Volume (%)</td>
<td>0.112***</td>
<td>0.282***</td>
<td>0.172***</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.069)</td>
<td>(0.022)</td>
</tr>
<tr>
<td>Lag Time</td>
<td>0.244</td>
<td>0.401</td>
<td>0.311***</td>
</tr>
<tr>
<td></td>
<td>(0.314)</td>
<td>(0.502)</td>
<td>(0.102)</td>
</tr>
<tr>
<td>Lag GDP</td>
<td>0.0301</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.016)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lag Inflation</td>
<td></td>
<td>-0.0314***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.009)</td>
<td></td>
</tr>
<tr>
<td>Lag M2 Supply</td>
<td></td>
<td>0.147***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.031)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>2.142</td>
<td>2.845</td>
<td>6.128</td>
</tr>
<tr>
<td></td>
<td>(0.288)</td>
<td>(0.212)</td>
<td>(0.280)</td>
</tr>
<tr>
<td>Observations</td>
<td>41</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.147</td>
<td>0.184</td>
<td>0.374</td>
</tr>
</tbody>
</table>

Table 3 below shows the OLS estimates of the equations (4) – (5). From equations (4) –(5), all the macroeconomic variables are included in the panel A of Table 3. Here, a dummy variable for recession period is included Panel B of Table 3. In Panel A, all the macroeconomic variables are now significant. With an R-squared of 0.572, the model explains 57.2% of the total variation in the NSMASI. Thus, macroeconomic policies are one of the level of activities on the stock exchange. Expectedly, while real GDP and money supply positively influence capital market activities, inflation rate negatively influence these variables. Thus, the signs of all the
macroeconomic variables conform to expectation. The policy implication of this is that past macroeconomic policies are fully priced into today’s stock market returns.

**Table 3: Regression Result**

<table>
<thead>
<tr>
<th>Variables</th>
<th>NSMASI (%) Panel A</th>
<th>NSMASI (%) Panel B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lag Volume (%)</td>
<td>0.093***</td>
<td>0.102***</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Time</td>
<td>0.201***</td>
<td>0.123***</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.051)</td>
</tr>
<tr>
<td>Lago GDP</td>
<td>0.002**</td>
<td>0.015***</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>Inflation</td>
<td>-0.014***</td>
<td>-0.003**</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.0015)</td>
</tr>
<tr>
<td>M2 Supply</td>
<td>0.127***</td>
<td>0.101***</td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.011)</td>
</tr>
<tr>
<td>DUM</td>
<td>-0.036***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>1.132***</td>
<td>1.765***</td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Observations</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.572</td>
<td>0.633</td>
</tr>
</tbody>
</table>

In Panel A, Volume is positively related to the level of value of the activities on the Nigerian stock exchange. This estimate is significant, and a 1% change in volume results in 0.093% change in returns. Time is significant, thus implying that passage of time does influence the returns on the Nigeria stock exchange relative to then estimate in Table 2. Lagged GDP is positively related to the overall returns on the Nigerian stock exchange (NSE) just like the estimate in Table 2, Panel A. Here, a 1% increase in GDP increases returns on the stock exchange by 0.02%, and this result is significant. Turning to inflation rate, the lag value of inflation rate is negatively relatively to
returns on the NSE, and this result is significant. Panel A of Table 3 also shows that money supply is positively related to returns on the stocks on the Nigeria stock exchange. Thus, an increase in money supply by the monetary authorities leads to an increase in returns on a representative basket of the stocks on the NSE.

The Most important take away from Table 3 is the interpretation of the recession dummy variable in Panel B. The estimate of this dummy variable is negative. Sine this dummy variable is equal to 1 during the recession quarters between the last quarter of 2015 to the first quarter of 2017, and 0 otherwise. The estimate of the dummy variable, DUM, in Panel B of Table 3 implies that a one percent increase in the probability of recession leads to a 3.6% fall in returns on the stocks listed on the NSE. Thus, the estimate of this dummy variable confirms that stock return dips recession periods.

In all, Table 2 and 3 shows that real GDP and money supply are positively related to stock returns on the Nigerian stock exchange, while inflation rate is negatively related to stock returns on the Nigerian stock exchange. Also, stock returns are negative during a recession period. All these estimated results confirm related studies most of which I have cited in Chapter 2 of this thesis.
5. Discussion and Analysis

In this paper, I examine three research question. First, I examine the nature of stock returns on the Nigerian Stock Exchange (NSE) and the link between macroeconomic variable and the returns on the stocks listed on the NSE. The main of data for this study is a proprietary from the Nigerian Stock Exchange and the World Bank dataset. I used univariate analysis to answer the research question on the nature of the returns on the NSE, while I use regression analysis to answer the second question on the relationship between the stock market and the macroeconomy.

I find that stock returns on the exchange is positive for the ten-year period 2007-2017. I adopt two methods of computing the returns on all the stocks on the Nigerian stock. The first method creates a basket of stock, irrespective of market capitalization. This is the Nigeria Stock Market All Share Index (NSMASI). The second method uses selected stocks to compute the NSE index. This is the Nigerian Stock Market 30 index. This index is computed with thirty bluest of the blue-chip stocks on the NSE.

I find that the returns on the Nigerian stock exchange is quite dynamic. The Nigerian stock market record the lowest returns during 2007-2010, and during Q3 2015 to the last quarter of 2016. The average return on the Nigerian Stock market is 2.8% per year for 11 years from 2007-2017. However, if one removes the outliers during the extremely volatile years of 2007-2009, the average return is 6.8% per year. Thus, failing to moderate the trend of the return can lead to downward bias. Given these analysis, one can conclude that the Nigerian Stock Exchange yields positive returns over the ten-year period. To establish the driving forces behind the solid positive returns on the NSE, one needs to dig deeper by considering a host of factors like stock momentum,
overreaction, underreaction, portfolio formation strategies, macroeconomic variables. However, institutional constraints and data limitations confined the analysis in this study only the macroeconomic economic variable.

I use ordinary least squares (OLS) and time series regression to establish the link between the Nigerian macroeconomy variables and the capital market. I focus on three macroeconomic variables namely: growth in real gross domestic product (Real GDP), inflation rate, and the growth in broad money supply (M2). The regression analyses are done in three steps. First, I regress the return index on one lag of volume, time and one lag of real GDP. In this estimation strategy, one lag of volume and time are default dependent variables. I also regress the returns index on one lag of volume, time, and inflation. To complete this first round of estimation, I regress returns on one lag of volume, time, and one lag of M2. Second, I regress the returns index on one lag of volume, time, one lags of real GDP growth, inflation and M2. Third, to find the impact of business cycle on returns, I use dummy variable

In all, analyses of the second research question show that the Nigerian macroeconomy is linked to stock market activities like returns and volume of stock traded, inflation rate real GDP, and money supply. For example, real GDP and money supply positively impacts stock returns, while inflation rate negatively impacts stock returns. The downturn phase of the business cycle also impacts stock returns negatively.
6. Conclusion

6.1 Main Findings
The main finding of this study is that stock returns on the Nigerian stock exchange is quite dynamic. The rate of change of Nigerian stock market all share index (NSMASI) does not follow a specific pattern. This behavior of stock returns is known in the literature as ransom walk hypothesis. Random walk hypothesis simply implies that stick returns are not predictable. The Nigerian stock exchange market exhibit this random walk hypothesis, and this behavior are confirmed in previous chart and Figures in chapters 2 and 3. Percentage change in volume is also unpredictable to a large extent as I have previously shown.

Beyond the random walk hypothesis, the nature of returns on the Nigerian stock exchange (NSE) shows that the average returns between 2007-2017 is 2.8%. However, this variable receives a significant boost to 6.8% returns during the decade under review if one removes two extreme data points from the dataset. Thus, the return from stock holding is positive. Also, I also confirm the return computed from the NSMASI from the Nigerian stock market 30 index (NSM30I). I also show the nexus between the macroeconomy and the Nigerian stock market. While Inflation rate is negatively related to stock returns of the NSE, real GDP and money supply are positively related to it. Also, returns from the NSE are negative during a recession period.
6.2 Implication for Business

My study has enormous implication for businesses. First, business invest excess cash holding in the money and capital market. This study shows the implication of investing in the Nigerian stock market over a long horizon, especially if one takes the macroeconomy into consideration. Also, the dynamics of the transactions and other activities on the stock market often preludes the direction of the economy. Businesses can learn from this study in that regard.

6.3 Future Research

I cannot confirm advanced research like stock momentum, Underreaction, overreaction, earnings announcement drift, tick-size, and so on. However, this study is a good start for the debate on the implication that this study holds for more advanced study. For example, Since I am able to confirm the random walk hypothesis from my graphical and OLS regression, the novel research areas like stock momentum and other grey areas that I mention earlier may also fully or partially hold on the stock market in a developing economy like Nigeria.
7. References


Ayinang


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