Nigerian Stock Returns and Macroeconomic variables: Evidence from the APT Model

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ABSTRACT

The study empirically investigates the relationship between the macroeconomic variables that affect the stock returns during the years between 2005M1- 2010M1 for the Nigerian Stock Exchange (NSE). The Arbitrage Pricing (APT) modeling framework is conducted by assuming the risk factors in the model as observable macroeconomic variables to explain the stock return variations. A multifactor regression model in this framework is employed to show the relevant macroeconomic variables namely: industrial production, interest rate, inflation, exchange rate and money supply. The Ordinary Least Square (OLS) technique is applied to test the validity of the model and the relative importance of different variables which may have an impact on the Nigerian Stock returns within the Nigerian economy. Based on the empirical results estimated, explanatory power supports the view that macroeconomic variables explain a significant part of the observed variations in Nigerian Stock Market returns for the sample period. Namely Consumer price index, short-term interest rate, and money supply have a big influence on Nigerian Stock Market returns.

Keywords: APT, CAPM, OLS Analysis, Nigerian Stock Exchange, Nigerian Economy

ÖZ

Yapılan bu tez çalışması ampirik olarak Nijerya menkul kıymetler borsasındaki hisse seneti getirisi ile makroekonomik değişkenler arasındaki ilişkiyi aylık (2005-1- 2010-1) veriler kullanarak ölçmüştür. Bu ilişkiyi ölçerken Arbitraj fiyat teorisi çercevesinde endüstri/sanayi üretim endeksi, kısa dönemli faiz oranı, enflasyon, döviz kuru ve para arzı endekslerinin ne kadar anlamlı olup olmadığına bakılmıştır. En Küçük Kareler tekniği uygulanarak yukarıda belirtilen ilişkinin rolü ölçülmeye çalışılmıştır. Çalışma, ayni zamanda kullanılan ilgili modelin doğruluğunuda ortaya koymaya çalışmıştır. Elde edilen ampirik sonuçlar ışığında, makroekonomik değişkenlerin büyük bir çoğunluğu Nijerya menkul kıymetler borsasındaki hisse seneti getirisi anlamlı bir şekilde açıklamıştır. Ampirik sonuçlar ayni zamanda enflasyon, kısa dönemli faiz oranı, ve para arzı endekslerinin Nijerya menkul kıymetler borsasındaki hisse seneti getirisi üzerinde büyük etkisi olduğunu belirtir.

Anahtar Kelimeler: Arbitraj fiyat teorisi, Sermaye Aktif fiyat Teorisi, En Küçük kareler yöntemi, Nijerya menkul kıymetler borsası, Nijerya ekonomisi,

Dedicated to my parents with love

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LIST OF ABBREVIATIONS

APT:	Arbitrage Pricing Theory
CAPM:	Capital Asset Pricing Model
NSE:	Nigerian Stock Exchange
GDP:	Gross Domestic Production
IMF:	International Monetary Fund
IFS:	International Financial Statistics
OECD:	Organization for Economic Co-operation and Development
OLS:	Ordinary Least Square
SML:	Security market line

Chapter 1

INTRODUCTION

1.1 Overview

A financial system carries out the vital role of channeling funds to those individuals or organizations that have lucrative investment opportunities. In order to achieve this, participants in financial markets must be able to make correct decisions about which investment opportunities are more or less creditworthy. Thus, a financial system is required to tackle problems of asymmetric information, in which one party to a financial agreement has much less accurate information than the other party.

The financial theories suggest that unanticipated movements in systematic economy-wide factors suggested by the financial theory affect financial asset returns such as common stock returns. It is generally agreed that, the future profits of many or all firms, and the prices of their equities are usually considered as responding to economic news. So, the prices of their equities are likely to react to a greater or lesser extent to changes in expectations concerning the prospective state of economy. There is however, no asset pricing model in which the underlying macroeconomic variables relevant to asset pricing are clearly specified.

The Arbitrage Pricing Theory (APT), first derived by Ross (1976) is one of the asset-pricing models in financial economics that attempts to describe how individual risky assets are priced in equilibrium. It is based on the notion that there are number of factors that determine asset returns in equilibrium and it assumes that returns are

generated by a factor model. As the tests for the APT rely on factor analysis, the questions concerning the number of factors and identification of the systematic economy-wide factors in determination of stock returns do not seem to have been settled yet.

Despite the absence of an asset pricing model that identifies systematic economic-wide factors to determine the stock returns, the relations between macroeconomic variables and stock returns have been examined in recent years. A number of studies such as Chen, Roll and Ross (1986) and Poon and Taylor (1991) used an alternative methodology that does not rely on factor analysis for testing the APT. Their purpose is to determine the pervasive state factors that affect security returns based on economic theory. However the economy-wide factors that are priced in security markets vary from study to study and may not be identical in every country. In addition to this, some previous empirical studies such as Wasterfallen (1989) concludes that only small proportion of the observed variation in stock returns can be estimated by a number of economic factors.

1.2 Structure of Study

Chapter 1 is introductory part. Chapter 2 explains the literate review of the concept of the CAPM and the APT that relates macroeconomic variables to stock returns. Chapter 3 contains an overview of Nigerian economy and Nigerian stock market. In Chapter 4, Data and methodology are described. Chapter 5 presents the regression model and empirical results. In Chapter 6, concluding remarks, some recommendations and suggestions for further studies are presented.

1.3 Background of Study

A broad consensus has emerged in recent decades emphasizing the idea that stock markets occupy a strategic position in both developing and industrialized nations; it

has become a significant component of a country's financial system and a common feature of a modern economy (Van-Treek, 2009; Obstfeld, 1986). The price of shares and other assets is an important part of the dynamics of economic activities and can influence or be an indicator of social mood and business performance. History has shown that the performance of a stock market is perhaps the most potent instrument for measuring social or economic developments in any economy. Drabenstott and Meeker (1999) call it a barometer for the economy. The stock market facilitates all the key prospects of the financial system, such as capital mobilization, investing opportunities, risk distribution and exerting corporate control. The strategic importance of a stock market cannot be overemphasized; it was rightly captured in an allegory which said that the hitting of the Unites States World Trade Centre by Al Qaeda was considered an error, because it did not substantially affect the US economy as much as it would have if the Wall Street had been hit. According to the great historian Fernand Braudel, the history of stock trading and trading associations can be traced as far back as the 11th century, when Jewish and Muslim merchants set up trade associations. After centuries of evolution, stock markets have become the symbol of commerce in the modern world. They operate in various countries and trade a range of securities, and the major stock exchanges in the world today include the New York Stock Exchange, London Stock Exchange, Frankfurt Stock Exchange, Italian Stock Exchange, Hong Kong Stock Exchange and Tokyo Stock Exchange. The world stock market capitalization is estimated to be about $36.6 trillion.

The Nigerian Stock Market (NSM) is an emerging market in Africa, and is controlled and monitored by the Nigerian Stock Exchange (NSE), which was initially called the Lagos Stock Exchange (LSE) when it was established in 1960. The exchange began operations in 1961 with 19 securities listed for trading; today, there are over 300

securities listed on the exchange. There are approximately 213 companies listed on the NSE, ranging from agricultural through manufacturing to services. In the last ten years, Nigeria has witnessed significant economic reforms such as privatization, recapitalization, consolidation etc., which has ushered her into the league of emerging markets. These reforms, which encompassed practically all sectors of the Nigerian economy, led to remarkable developments. The result of these developments was the emergence of a more robust private sector with considerable investment opportunities in equities, debt, real estate and other asset classes. The primary and secondary segments of the Nigerian equity market witnessed more profound growth than any other sector during 2006 and 2007, and attracted unprecedented awareness and a huge influx of capital flow, which can be traced back to some previously enforced regulations such as:

- The banking and insurance sector consolidation.
- The pension sector reform.
- Improved macro-economic environment including external debt cancellation, foreign reserve build-up and favorable sovereign credit rating.
- Improved public awareness and consequent speculative activities.
- Increased foreign investor interest.
- Easy access to credit and subsequent consolidation, especially by stock brokers.

As a result, the NSE Index posted a return of 38% and 75% in 2006 and 2007 respectively. These outstanding results placed the NSM as one of the best yielding equity markets in the world, when compared with the 19%, 36% and 6% recorded by South Africa, emerging markets and G7 countries respectively. The NSM also became the best-performing market in the Next Eleven (N-11) equity markets, a

diverse group of emerging and frontier markets that include Bangladesh, Egypt, Indonesia, Iran, Korea, Mexico, Nigeria, Pakistan, the Philippines, Turkey and Vietnam. After attaining the position of one of the most profitable, efficient and fastest growing equity markets in the world, with a high rate of return on investment, the NSM was seen as an investment haven. However, towards the end of the first quarter of 2008, the situation in the NSM took a reversal and began to plunge.

1.4 Scope and Objectives of Study

The Stock market is affected by various macroeconomic variables present in the economy. In order to do justice my enquiry, this study aims to investigate empirically and examine the relationship between Nigerian stock market (NSM) returns and its determinants (i.e., several macroeconomic variables) under the multivariate Arbitrage Pricing Theory (APT) framework.

1.5 Methodology of Study

Ordinary Least Square (OLS) technique was applied to determine the effects of the relevant variables (i.e., inflation, oil price and money supply) on the Nigerian stock returns employing monthly data over the period of January 2005 and January 2010 based on Chen, Roll and Rose (1986) APT model.

1.6 Findings of Study

The finding of this thesis can be summarized as such: while inflation or change in consumer price index, short term interest rate and money supply M2) have significant effects on stock returns, exchange rate and production index are not found to be closely related to the stock returns of Nigerian stock market. First, inflation issue can be formulated in a way that it should be compatible with the nature of the Nigerian economy. Second, oil production is estimated as insignificant and should be developed further to improve the Nigerian economy. Especially, policy makers

should take oil production industry into consideration as guidance in the formulation of future Nigerian economic polices because this is comparative advantage of the Nigerian economy.

1.7 Significance of Study

There have been many empirical investigations, analyses and studies in relation to how common factors can contribute to the economic growth of the economy and how these factors affect the stock market index. This thesis will examine the Nigerian stock market and its relationship to macroeconomic variables; other factors have been associated with the changes in the NSM. This thesis will examine each variable and analyze its impact on the NSM in order to acquire a better understanding of the situation. This study will identify the efficiency of NSE in the market. This study is also an opportunity to highlight the importance of macro-economic factors and how significant they are in the marketplace. It will enlighten decision-makers or regulatory authorities on how best to rebuild confidence in the market.

The unpredictability of trends in the Nigerian Stock Market are unprecedented, hence my compelling interest to fully investigate, document and explain the factors that causes these trends, while underlining the opportunities apparent in the reordering of economic priorities and the opportunities for the investors in the market to learn how to make intelligent investment engagements and decisions. The current downtrend in the NSM is fundamentally different from anything that has been experienced before and there are a lot of lessons to be learned. This research will encourage the stakeholders in the NSM to move away from self-denial and embrace the clear and unique opportunities that this challenge presents, because the NSM is still very promising despite the downward trend it has experienced.

Chapter 2

LITERATURE REVIEW: APT and CAPM Models

2.1 Introduction to Literature Review

The chronological theory of stock price behaviour starts with the Markowitz model (1952, 1959). The Markowitz model (a single-period model), showed exactly how an investor forms a portfolio at the beginning of the period and also, how to reduce the standard deviation of portfolio returns by choosing stocks that do not move exactly together. He worked out the basic principles of portfolio construction, which are the foundations of the relationship between risk and return. The two leading models in financial economics that attempt to explain the relationship between risk and asset returns are the *Capital Asset Pricing Model* (CAPM) and the *Arbitrage Pricing Theory* (APT)The simplest form of the asset pricing models is the one-factor Capital determined by the measure of the market price of risk, namely *beta*. The main parameters that the CAPM depends on are the mean and the variance of the returns. The APT predicts a relationship between the returns of a portfolio and the returns on any risky asset though a linear combination of many independent macroeconomic variables, but it does not explain how many risk factors there are and what the prices of these factors are. However, in the preceding chapter an insight into the two leading models (CAPM and APT) in financial economics that attempts to explain the relationship between risk and asset returns are provided, also the comparison between the two leading financial models (CAPM and APT). This chapter will also

provide an insight into the stock market returns by analysing the relationship between the stock market and macroeconomic variables and the integration of stock market in emerging countries.

2.2 The Capital Asset Pricing Model

The CAPM is a model for pricing an individual security or a portfolio. The CAPM model was developed independently by William Sharpe (1964), and Parallel work was performed by Lintner (1965) and Mossin(1966) these model marks the birth of asset pricing theory. The CAPM suggests that the only variables that we need in calculating the expected return on security are: the risk free rate (a constant), the expected excess return on the market, and the security's vita (a constant). The CAPM model is attractive because of its effectively simple logic and intuitively pleasing predictions relating to how it measures risk and the relation between expected return and risk. Unfortunately, the CAPM simplicity causes the empirical record of model to be poor, poor enough to invalidate the method used in the application of the model. The model's empirical problems may reflect true failings or they may also be due to the shortcomings of the empirical tests, most notably, poor proxies for the market portfolio of invested wealth, which plays a crucial role in the model's predictions.

The CAPM is built on the model of portfolio choice developed by Harry Markowitz (1959). The Markowitz model is often known as a "mean-variance model", it describes the relationship between risk and the expected return of an asset under the conditions of market equilibrium in a capital market where all investors undertake optimal portfolio selection. The model assumes investors are not risk takers and that they care only about the mean and variance of their one-period investment return when choosing among portfolios. As a result this investors tend choose the mean-

variance efficient portfolios, with the logic that the portfolios will minimize the variance of portfolio return given an expected return and maximize the expected return, given the variance.

2.2.1 Derivation of the CAPM

The CAPM is a simple linear model that is expressed in terms of expected return and expected risk. The model states that the equilibrium returns on all risky assets are a function of their covariance with the market portfolio.

Under the assumptions of the CAPM, if a risk-free asset exists, every investor's optimal portfolio will be formed from a combination of the market portfolio and the risk-free asset. The precise combination of the market portfolio and the risk-free asset depends on the degree of investor's risk aversion. Since investors can choose the combination of the market portfolio and the risk-free asset, then the equation of the relationship connecting a risk-free asset and a risky portfolio is:

$$E(Ri) = R_f + \frac{E(Rm) - R_f}{\sigma^2 m} \sigma im \qquad (2.1)$$

Where;

E (Ri) : Expected return on i^{th} portfolio.

R *f* : Return on the risk free asset

E (Rm) : Expected return on market portfolio

σ im : The covariance between asset *i* and the market portfolio

σ2 m : The variance of the market portfolio

Based on the equation (2.1) the original CAPM equation can be derived as follows:

$$E(Ri) = R_f + [E(Rm) - R_f]\beta i \qquad (2.2)$$

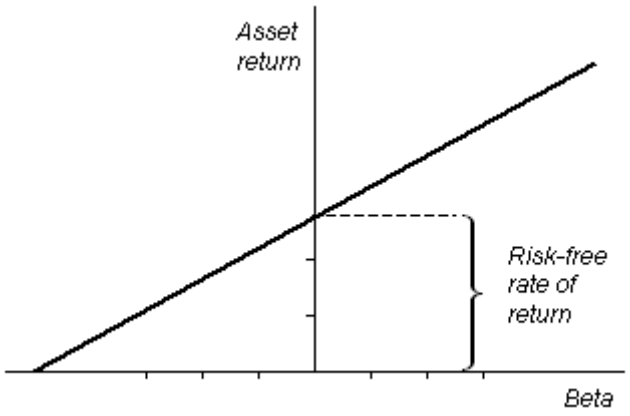

Figure 1.1: The Security Market Line describing a relation between the beta and the asset's expected rate of return.

Equation (2.2) is known as Capital Asset Pricing Model and it could be shown graphically as the security market line (SML) which means the SML fundamentally graphs the results from the capital asset pricing model (CAPM) formula. The *x*-axis represents the risk (beta), and the *y*-axis represents the expected return. The market risk premium is determined from the slope of the SML. The SML model states that a stock's expected return is equal to the risk-free rate plus a risk premium obtained by the price of risk multiplied by the quantity of risk. In a well-functioning market nobody will hold a security that offers an expected risk premium of less than [E (Rm)-R *f*] βi

If we think E (Rm) – Rf as the market price of risk for all efficient portfolios, than, it represents the extra return that can be gained by increasing the level of risk on an efficient portfolio by one unit. The quantity of risk is often called beta,β and it is the contribution of asset *i* to the risk of the market portfolio. In other words, it is the correlation of the asset *i*'s return with the return on the market portfolio.

If everyone holds the market portfolio, and if beta measures each security's contribution to the market portfolio risk, then it's no surprise that the risk premium demanded by investors is proportional beta. According to the CAPM the total risk of

a security could be divided between systematic and unsystematic risk. The systematic risk is the portion of the security's return variance that is explained by market movements such as fiscal changes, swings in exchange rates and interest rate movements. On the other hand, the unsystematic risk is the variability in return due to factors unique to the individual firm, such as R&D achievements and industrial relations problem. The relevant measure of the risk of an asset is its contribution to the systematic risk of an investor's portfolio defined by its beta rather than the inherent variance in the asset's total return.

If the beta of an asset is larger (smaller) than 1, then the standard deviation of an asset changes more (less) than proportionately in reaction to changes in market conditions. Thus, an asset whose beta is greater (less) than 1 has a relatively greater (smaller) contribution to the risk of a portfolio. While beta does not measure risk in absolute terms, it is a crucial risk indicator, reflecting the extent to which the return on the single asset moves with the return on the market.

2.2.2 Assumptions of the CAPM

The CAPM rests on several assumptions. The most important are as follows:

All investors are rationally risk-averse individuals whose aim is to maximise the expected utility of their end of period wealth. Therefore, all investors operate on a common single-period planning horizon.

All investors are price-takers; so that, no investor can influence the market price by the scale of his or her own transactions.

Asset markets are frictionless and information is freely and simultaneously available to all investor

All investors have homogeneous expectations about asset returns, this mean that all investors arrive at similar assessments of the probability distribution of returns

expected from traded securities. This says that investors will not be trying to beat the market by actively managing their portfolios Distributions of expected returns are normal. All securities are highly divisible, i.e. can be traded in small packages. All investors can lend or borrow unlimited amounts of funds at a rate of interest equal to the rate of risk-free securities. Investors pay no taxes on returns and there are no transaction costs entailed in trading securities, so expected return is only related to risk.

2.2.3 The Market Portfolio

The market portfolio is a portfolio that consists of all securities where the amount invested in each security corresponds to its relative market value. Under these assumptions of the CAPM each investor hold an optimal portfolio and the aggregate of all investors is the market portfolio, which is defined as the portfolio of all risky assets, where the weight on each asset is simply the market value of that asset divided by the market value of all risky assets. In theory, market portfolio consist of all risky assets in the world including financial assets, real estate, human capital and the like, which exists in all the countries of the world.

Moreover, the CAMP requires that in the equilibrium the market portfolio must be an efficient portfolio. One way to establish its efficiency is to argue that if investors have homogenous expectations, the set of optimal portfolios they would face would e using the same values of expected returns, variances and co variances. Therefore, the efficiency of the market portfolio and the CAPM are joint hypothesis and it is not possible to test the validity of one without the other (Roll, 1977). If a market is weak from efficiency, then it is impossible to earn abnormal returns by developing a forecasting model based on past returns. In the context of the capital asset pricing

model, an abnormal return in excess of what was expected according to the CAPM equation.

2.2.4 Restrictions and Extensions of the CAPM

Although not all of the assumptions underlying the derivation of the CAPM conform to reality, they are simplifications that permit the development of the CAPM. However, it is important to realise that most of these assumptions are merely mathematical identities and they do not reflect or predict the behaviours of investors. As a consequence, while on the surface the capital asset pricing model appears to be rich in economic content and predictive power, it really makes only one interesting economic prediction: All invests hold portfolios that are on the efficient set, and as a result the market portfolio is itself on the efficient set.

However, most individuals and many institutions hold portfolios of risky assets that do not resemble the market portfolio. Therefore, the incorporation of more realistic assumptions into the model may get better insight into investor behaviour. Alternative versions of the CAPM have been derived to take into account some of the problems such as the non-existence of a risk-free asset or the imposition of some frictions involving the risky or risk-free assets.

2.2.5 Empirical Tests of the CAPM

When the CAPM is empirically tested, the theoretical CAPM is transformed to the model presented below that involves running a regression. The characteristic of this model is it can not have a negative slope.

$$Ri - R_f = a + b\beta i + \epsilon i \qquad (2.3)$$

If the CAPM is correct, then results should find that:

- The intercept a should be Zero
- The slope coefficient b should equal ($Rm-R_f$)

- The relationship should be linear in beta
- Beta should be the only factor that explains the rate of return on a risk asset

The Major empirical tests of the CAPM were published by Black, Jensen and Scholes (1972), Miller and Scholes (1972), Litzenberger and Ramaswamy (1979) and Gibbons (1982).

Moreover, Fama and French (1992) find no evidence for the correct relationship between security returns and beta over the period 1963-1990 in MYSE.

2.3The Arbitrage Pricing Theory

The Arbitrage Pricing Theory (APT) is another model of asset pricing based on the idea that equilibrium market prices should be perfect, in such a way that prices will move to eliminate buying and selling without risks (arbitrage opportunities).

The basis of this theory is the analysis of how investors construct efficient portfolios and offers a new approach to explaining the asset prices and also states that the return on any risky asset is a linear combination of various macroeconomic factors that are not explained by this theory. Therefore unlike CAPM model this theory specifies a simple linear relationship between assets, returns and the associated k factors. There are two empirical testable versions of the APT, the statistical APT and the macro variable APT. However, the macro variable model differs from the statistical factor model mainly because the factors are specified in advance and they are interpretable.

The APT equilibrium rests on investors, ability to construct an arbitrage portfolio by simultaneously holding a short and a long position in two different portfolios which offers positive expected return with zero risk and zero net investment. Asserted risk-expected return relation is known as the Arbitrage Pricing Theory, Which is formulated by Ross (1976).

2.3.1The Derivation of the APT

The APT can be seen as a *multi-factor* model in which the returns generating process of the portfolio is a function of several factors. Such a model specifies a simple linear relationship between asset *i*'s returns and the associated *k* factors, which influence its returns, and takes the general form:

$$Ri = E(Ri) + \Sigma\, \sigma\, j\beta ij + \epsilon\, I \qquad (2.4)$$

Where,

Ri : The random rate of return on security *i* at the end of the period, *i* = 1… n

E(Ri) : The expected Rate of return on security I at the beginning of the period,

σj : The Zero mean *j*th factor common to the return of all assets under consideration,

βij : The ith security's return to the *j*th common factor or asset *i*'s factor loading f or factor j,

$\epsilon\, i$: A random Zero mean noise term for security *i*.

The model says that, at the end of the period asset *i*'s realized return is a linear combination of its expected return, plus realized factor returns, with asset *i*'s specific factor loadings weighted, plus asset *i*'s specific risk component. This is assumed for all assets, *i* = 1…n. The theory requires that the number of assets under consideration, n, be larger than the number of factors, *k*, and the noise term, $\in i$, be the unsystematic risk components of risk. The derivation was based on the intuition that in an efficient market, and consistent with market equilibrium, not risk-free arbitrage profit opportunities can exist and only a few common factors are priced for large, well-diversified portfolios. The resulting pricing relation expressed the expected return on an asset *i* in a linear relationship with the k-factor risks follow:

$$E(Ri) = \lambda 0 + \Sigma\, \lambda\, j\beta ij \qquad (2.5)$$

Where,

$\lambda 0$: Expected return on an asset with zero systematic risk,

λj : Risk Premium for the *j*th factor in equilibrium.

Roll and Ross (1980) states that "this pricing relationship is the central conclusion of the APT and it will be the cornerstone of our empirical testing".

2.3.2 Assumptions of the APT

Asset markets are perfectly competitive and frictionless; all investors have homogeneous expectations that returns are generated randomly according to a k-factor model (equation 2.3). Investors have monotonically increasing concave utility functions; the number of assets existing in the capital market from which portfolios are formed is much larger than the number of factors. There are no arbitrage opportunities. (Because their is no arbitrage conditions holding for any subset of securities, it is unnecessary to identify all risky assets or a market portfolio to test the APT) There are no restrictions on short selling. (This assumption is crucial to the equilibrium, as it constitutes one side of the arbitrage portfolio; equally important is the requirement that the proceeds from short selling are immediately available.)

2.3.3 Empirical Tests of the Arbitrage Pricing Theory

There are two empirically testable versions of the APT, the Statistical APT and the Macro variable APT. The Statistical APT first tested by Roll and Ross (1980) involves identifying priced common risk factors and this version of the APT is also known as the factor-loading model.

2.3.3.1 The Number of Risk Factors in the APT

After the initial development of the APT by Ross (1976), the first empirical test of the model is done by Roll and Ross (1980), who use a two-step testing procedure. They examine daily data on 42 groups of 30 securities for the period 1962-72. They

employ the maximum likelihood factor analysis to estimate the expected returns and the factor coefficients from time series data on individual asset returns. Then, they use these estimates to test a cross-sectional pricing relationship. They found that at least three but not more than six factors were significant in explaining most of the joint variability in the returns on this group shares.

Dhrymes, Fried and Gultekin (1984) re-examine the techniques employed by Roll and Ross (1980) and point out several limitations. First of all, they note that the results for a small portfolio differ from the results for a large portfolio. Second, they assert that the methodology that RR (1980) uses for determining confirmatory evidence about the number of factors is not appropriate. They find that as the number of securities increases, the number of factors determined also increases, at a 5% level of significance, they find two factors for a group of 15 securities, three factors for a group of 30 securities, four factors for group of 45 securities, six factors for group of 60 stocks, and nine factors for a group of 90 securities.

Beenstock and Chan (1986) test the APT using 220 securities in the UK and find that the explanatory power of a twenty factors APT model is significantly greater than a four-factor model. As can be seen from the result of above empirical studies, there is no consensus about the number of factors in the APT, The contents of factors are examined in the next section, which also deals with the empirical testing of the APT.

Kryzanowski and To (1983) test the assumption that security returns are characterized by an explicit underlying factor structure. They use US and Canada stock price data to test the APT. Their study concludes that the number of relevant factors is an increasing function of the size of the group being factored. They observed that while five factors are sufficient to represent the US security returns, Canadian securities required 18-20 factors.

Roll and Ross (1984) reply to the criticism of Dhrymes, Fried and Gultekin (1984) about the number of factors. They assert "one would expect the number of factors to increase with the sample size because one would expect more potential relationship to arise among the stock but the important point is how many factors are significantly priced by the market in a diversified portfolio".

Cho, Elton and Gruber (1984) support the Roll and Ross study by examining the number of factors in return-generating process that are priced. They note that there are definitely more priced factors influencing stock returns than implied by the CAPM. By employing the same factor analysis, they found five priced factors.

2.3.3.2Factor Identification

Chen, Roll and Ross (1986) test the APT by using macroeconomic data series to explain stock returns. They employ seven macroeconomic variables as the source of systematic risk according to the dividend discount model, which assumes that prices of assets are determined through their expected discounted dividend payments. These variables are industrial production, inflation, risk premium, term structure, market returns, consumption and oil price especially for a country such as Nigeria. Their evidence suggests that consumption; the financial market does not price oil prices and the market index. They note that the market returns explain much of the movements in portfolios but the market betas do not explain cross-sectional differences after the betas of the state variables are included. They concluded Stock returns are exposed to systematic news, that they are priced in accordance with their exposures, and that the news can be measured as innovations in state variables whose identification can be accomplished through simple and intuitive financial theory.

Similar results have been reported by McElroy and Burmeister (1988) who use variables very similar or identical to Chen, Roll and Ross's variables. Chen and

Jordan (1993) compare the factor loading model and the macroeconomic variable model, and also test the validity of the APT. They conclude little is lost in moving from the factor loading model to the macroeconomic variable model and the macroeconomic variable model may turn out to be better when the two are tested against a holdout sample or against a test period. This finding is very promising because the macroeconomic variable model has several advantages, including economically interpretable factors. In addition, no attempt is made in this study to determine the best set of macroeconomic variables or how to best measure the ones selected, so the possible performance of the macroeconomic variable model is probably understated".

2.4 Comparing the CAPM and the APT

In comparison Ross (1976) argues that the APT is "substantially different from usual mean variance analysis and constitutes a related by quite distinct theory". He suggests there are two main differences between these two models in comparison. First, instead of the explicit modelling of the factors affect actual and expected returns of assets in APT; CAMP focuses on the market portfolio. Second, the fact that in the APT the equilibrium relationship is derived based on a no-arbitrage assumption.

Brealey and Meyer (1999) suggest that the market portfolio that plays such a central role in the capital asset pricing model does not feature in arbitrage pricing theory. Likewise Roll and Ross (1980) argue, "In CAPM, it is crucial to both the theory and the testing that the entire universe is an available asset to be included in the measured market portfolio. By contrast, the APT, in principle, is tested by examining only subsets of the set of all returns."

Proponents of the APT argue that the APT was superior to the original CAPM in regard to the following arguments. While both theories make the realistic assumption that investors prefer more wealth to less and that they are risk averse, the quadratic utility assumption of the original CAPM is much more restrictive. The APT dose not requires the assumption of multivariate normal distribution of returns. The APT dose not require the existence of the market portfolio therefore the difficulties such as identification of the market portfolio or a suitable proxy and the requirement that it be mean-efficient, are avoided. The APT does not require the existence of risk-free asset and a risk less rate at which lending and borrowing are undertaken.

Moreover, Bower and Logue (1984) use utility portfolio returns in the period of 1971-1979, and estimate expected returns by the CAPM and the APT. They state that the APT tends to predict returns better than the CAPM, and this is seen in the explanatory power of the models. The APT shows higher R2 and fits closer to actual returns.

Chen (1983) also performed a direct comparison of the APT and the CAPM. His results show that the CAPM is misspecified and the missing priced information is picked up by the APT factors.

As a result, if investors are sensitive to more than one type of risk when choosing among portfolios of equal return, then the APT is superior to the CAPM because the CAPM is one-dimensional in risk.

Furthermore, although there are various theories that propose links between macroeconomic variables and stock returns [Mandelker and Tandon (1985), Chen, Roll and Ross (1986), Boudoukh and Richardson (1993)], macroeconomic variables are often used to proxy for pervasive risk factors in the context of APT models. It is

important to mention that APT model will be used in my study due to the strengths mentioned above.

2.5 Stock Returns and Macroeconomic Variables

Different studies have shown the expected and actual stock market returns. One of these major studies analyzed the relationship between the stock market and macroeconomic variables. These present value models asserts that stock prices are determined by the discount rate and dividends, and are thus influenced by macroeconomic variables that influence dividends or the discount rate and proxies. Inconsequentially, the systematic force that has an influence on the stock prices, and returns, are those that control the discount rate factor or dividends. McQueen and Roley (1993) and Jarvinen (2000) studied the impact of macroeconomic news on the stock market conditioned on the state of the economy for the US and Finland correspondingly. They argue during a depression, a higher unexpected economic growth might indicate the end of the recession, which influences the stock market positively. Alternatively, higher than expected economic growth in an economic growth might bring about fears of an overheating economy, which might prompt monetary authorities to raise the interest rates and thus be bad news for the stock market. Their results were supportive of asymmetric relationships between the stock market and macroeconomic variables conditional on the state of the business cycle. Most studies on the modelling of stock prices or stock returns use data for developed countries.

Fifield, Power and Sinclair (2002) the study tested the influence of domestic variables (GDP, money supply inflation, short term interest rate, exchange rate and trade balance) as well as global variables (world industrial production, world return, oil price US interest rates world inflation and commodity prices) using cross-

sectional data for thirteen emerging markets in explaining the stock market. Their results showed that interest rates domestic GDP, money supply and inflation as well as the world production and inflation, can explain the variability in equity returns in up coming markets. The significance of these factors is that they vary between countries. The results highlighted the importance of empirically modelling the emerging stock markets. The NSM, which functions in an emerging economy, will be determined by different factors that affect stock markets in developed countries.

Probably the relationship between stock prices and macroeconomic variables is well illustrated by Miller and Modigliani (1961) Dividend Discount Model (DDM) than any other theoretical stock valuation model. According to the model the current prices of an equity share is equal to the present value of all future cash flow to the share. Therefore any economic factors which influence the expected future cash flow and required rate of return in turn influence the share. Arbitrage price theory by Ross (1976) hypothesizes the relationship between stock prices and certain macroeconomic variables. Since the fundamental value of stocks equals the expected present value of the firm's future dividends, stock price (return) performance is expected to be a product of the features of macroeconomic factors. In literature; real activity (GDP), interest rate, money supply, and inflation are considered as the main factors affecting the behaviour of the stock market. Madura (1995) took three of these factors into consideration namely differential inflation rates, differential interest rates and government intervention. Due to the expected positive impact of real economic activity on the firm's future profits and consequently on its future dividends, GDP is expected to exert a positive impact on stock return (Fama, 1981, 1990).

2.5.1 Exchange rates

The exchange rate variable in this thesis will capture the changes in the Nigerian Naira value which link the US Dollar to the other currencies such as: German Mark, Japans Yen, and British Pound. The European Euro has become the most important currency to evaluate but it only started recently and the available data are with the other currency. For this reason, I will disregard the Euro from the thesis.

The theory of Purchasing Power Parity (PPP) involves the relationship between inflation and exchange rates. It suggests that the exchange rate will, on average, change by a percentage that reflects the inflation differential between the two countries concern. Consequently, the purchasing power of customers when purchasing goods in their country will be similar to their purchasing power when importing goods from a foreign country. Economic globalisation results from the effects of the international activities among all types of businesses.

Brown and Otsuki (1992) examine the effect of exchange rate changes on stock returns in the context of a multi-period APT model of global equity markets. Using monthly data for 21 national stock markets and employing the non-linear seemingly unrelated regression analysis; they find that exchange rate risk exposure commands a significant risk premium in stock markets. They also indicate that this risk premium changes in a predictable fashion through time.

According to Fang (2002) exchange rates can also influence the stock prices. His results showed and confirmed that the depreciation of currency has badly affected stock returns and increased market instability during the period of the Asian crises (1997-1999).The increased market instability caused investors to evaluate how stable the foreign exchange markets before investing in the stock markets.

However, according to Madura (1995) exchange rates do not always change as suggested by PPP theory because other factors that influence exchange rates can distort the PPP relationship. Added to these effects will change the price of the stocks of a firm either it is a multinational company or a domestic firm. Consequently, the effect of changes in exchange rate is more direct in multinational firms rather than domestic firms. According to perfect purchasing power parity conditions, exchange rates will adjust to reflect relative inflation levels. Since there has been a considerable increase in economic globalization, all businesses are now affected directly or indirectly from international activities. As a result, Changes in exchange rates affect both multinational firms and domestic firms. The effects on multinational firms are more direct, since a change in exchange rates will be reflected in foreign operations resulting in a loss or a profit if the firm dose not hedge. Besides this, the value of the monetary assets of these firms may be affected indirectly by the exchange rate movements through the changes on aggregate demand or the changes on relative competitiveness of their products with imported goods. All these effects will change the value of the firm, hence the price of its stock.

Jorion (1991) examines the relationship between exchange rates and stock prices using monthly data in the APT framework. He tested whether the currency exposure of US firms was priced in the sense of Ross's APT. in spite of using relatively powerful statistical techniques; there was little evidence that US investors require compensation for bearing exchange risk.

2.5.2 Inflation

The Consumer Price Index is used in this thesis to measure inflation rate in the Nigerian economy. CPI will be used to index (i.e., adjust for the effect of inflation) the real value of wages, salaries, pensions, for regulating prices and for deflating monetary magnitudes to show changes in real values of Nigerian economy.

The rate of inflation in an economy has a great impact on investors; the investors are faced with the decision as to whether to make investments or not. Increase in inflation rate can cause the real income to declines, when this happens, the investor end up selling their assets, including stocks to improve their buying power. When the inflation rate is low, the reverse is the case; investors would like to purchase more assets with stocks not exclusive.

Spyrou (2001) studied the relationship between stock returns and inflation for the emerging economy of Greece. Spyrou (2001) in consistent with Kaul's results, found that inflation and stock returns are negatively related till the year 1995, after which the relationship became insignificant. Spyrou accredited the change in the relationship to the increased role of monetary fluctuations in line with Marshall's (1992) argument, which states that the negative relationship between stock returns will be less pronounced during the periods when inflation is generated by monetary fluctuations. Ralph and Eriki (2001) conducted an empirical study on Nigerian stock market and found that a negative relationship exists between stock prices and inflation. However, they also showed that the stock prices are also strongly motivated by the level of economic activity measured by interest rate, money stock, GDP and financial deregulation.

Chen, Roll and Rose (1986) define three variables related to inflation, which are expected inflation, the change in expected inflation and unanticipated inflation. They

use monthly data and include the change in expected inflation and unanticipated inflation as the explanatory variables on stock returns besides other variables in their model. Significantly negative relation is found for both inflation variables. Chen and Jordon (1993) find similar results for the same variables.

Boudoukh, Richardson and Whitelaw (1994) investigate the cross-sectional relation between the industry sorted stock returns and expected inflation. Using monthly data from 1953-1990 and sorting the firms into 22 industry sectors, they find that the direction of relation between expected inflation and industry groups in linked to cyclical movements in industry output, and specifically, stock returns of cyclical industries co-vary negatively with expected inflation while the noncyclical industries co-vary positive. They also point out the negative relationship at short horizons and the positive relationship at long horizons.

Fisher (1930) asserts that the nominal interest rate consists of a real rate plus the expected information rate. There is a belief that stocks might prove to be a good hedge against inflation (Fama and Schwert, 1977), since stocks represent claims to real asset. Moreover, stocks are widely assumed to be an attractive investment in an inflationary environment, because they are based on real assets. If rates of return on common stocks move directly with the rate of inflation, investors would be fully compensated for the erosion in purchasing power. This is because common stocks represent a claim to real resources and their value would increase with inflation. However, empirical results show a negative impact of inflation on stock returns; this result may reflect the fact that inflation has a negative impact on real economic activities and consequently on stock returns due to the positive impact of real economic activities on stock returns (Fama, 1981).

Kaul (1990) studied the relationship between expected inflation and the stock market in the US. According to the proxy hypothesis of Fama (1981) the relationship between expected inflation and the stock market should be negatively related, since the expected inflation is negatively correlated with the expected real activity, which, in turn, is also positively related to returns on the stock market. Instead of using the short-term interest rate as a proxy for expected inflation as Lee (1997), Kaul (1990) instead explicitly modelled the relationship between expected inflation and stock market returns. His results show that the relationship between stock returns and expected inflation in the US is both significant and negative.

2.5.3 Industrial Production

In this thesis the percentage change in the oil price index is used to measure the crude oil price changes in the Nigerian market instead of Industrial Production index in this case because production in the Nigerian economy is mostly based on oil production industry.

Investment with higher expected rates of return than the cost of capital in finance theory is the main determinant of a firm's value. As firms create such investment opportunities, they increase in value, thus the prices of their stocks will increase. Since security prices are a function of the future cash flow stream, changes in investments with positive net present value of assets.

Industrial production represents the real economic activity. It is widely accepted that stock price are positively related to the level of real economic activity. Fama (1981) investigates the relation among stock returns, real activity, inflation and money. The results of his equations on an annual data showed a positive relationship between real economic activity and stock returns. Moreover, Fama (1990) simultaneously regressed the monthly, quarterly and annual growth rate of industrial production and

the real stock returns was lagged quarterly. He suggested that for longer return horizons the real activity explains more of return variation.

James, Koreisha and Partch (1985) are using a Vector Autoregressive Moving Average (VARMA) model, and Lee (1992) using a multivariate Vector Auto Regression (VAR) analysis find evidence that stock returns are strongly positively correlated with real activity measured by the growth rate of industrial production, and stock market rationally signals or leads changes in real activity.

2.5.4 Interest rate

The interest rate variable employed in this thesis is the short-term interest rate rather than long-term interest on due to the modeling criterion conducted. The APT model was developed to determine the influences in the short-run period; hence short-term interest rate is much more convenient to be used rather than long-term one.

The opportunity cost for investing in a stock is represented by the interest rate. Interest rate is known as one of the most important factor moving the attitude of investors in the stock market. As interests rises bonds turn out to be more attractive given their risk-return features; this encourages investors to switch from the stock market to the money market by buying bonds and selling stocks, hence depressing stock prices. The relationship between short-term and long-term interest rates or rates of return particularly in the stock market in the efficiency of pricing of company securities shows how we can rely on the stock market being able to correctly value a company's shares. When interest rate is reduced, this encourages demand for cash for tentative purpose which may improve the stock market activities. Furthermore, the rise in interest rates raises equity capitalization rates, which also leads to lowering stock prices. Accordingly, interest rate is expected to have an inverse effect on stock price

The relationship between stock prices and interest rates has received considerable attention in the literature. A distinction has to be made between the influence of long-term and short-term interest rates, since the rationale for their relationships with the stock market differs. The proxy hypothesis of Fama (1981) argues that expected inflation is negatively correlated with anticipated real activity, which, in turn, is positively related to returns on the stock market. Therefore, stock market returns should be negatively correlated with expected inflation, which is often proxied by the short-term interest rate. On the other hand, the influence of the long-term interest rate on stock prices stems directly from the present value model through the influence of the long-term interest rate on the discount rate.

Zhou (1996) also studied the relationship between interest rates and stock prices using the regression analysis. Zhou (1996) found that interest rates have a significant impact on stock returns, but the hypothesis that expected stock returns move one-for-one with ex-ante interest rates is rejected. His results show that long-term interest rate explains a major part of the variation in price-dividend ratio. He also proposed that the high volatility of the stock market is related to the high volatility of long-term bond yields which may be accounted for by hanging the future forecasts of discount rates. Campbell (1987) analysed the relationship between the yield spread and stock market returns instead of using either short-term or long-term interest rates. He argued that the same variable that was used in predicting excess returns in the term structure also predicts excess stock returns, deducing that a concurrent analysis of the returns on bills, bonds and stock should be beneficial. His results supported the effectiveness of the term structure of interest rates in predicting excess returns on the US stock market.

Madura (1995) suggests that one of the most prominent economic forces driving stock market price is the risk-free interest rate and the relation between interest rate and stock price is not constant over time.

Another theory on the interest rate differential is International Fisher Effect, which depends on the particular time period examined. According to the study of Madura and Nosari on the interest rate differential International Fisher Effect (IFE) is if this theory holds, than a strategy of borrowing on one country and investing the funds in another country should not provide a positive return on average. The reason is that exchange rates should adjust to offset interest rate differentials on the average. Discounted cash flow model is one of the most widely used stock valuation approaches which are based on the concept that the value of a stock is equal to the present value of the cash flows expected to be received from the stock. Clearly, the discount rate that is related to the interest rate in the market is one of the most important parameters of these approaches. When interest rates change, investors will incorporate these changes in their stock price valuation; therefore, a rise in interest rates will reduce the present value of future cash flows, which investors expect to receive in the form of dividends and capital gains.

2.5.5 Money Supply

The Money supply variable used in this thesis is M2 which will capture the percentage rate of changes in Nigerian money. M2 is the broadest form of money supply currently reported by the Federal Reserve and it was found that large changes in it (what we call M2 Volatility) coincide with stock market volatility.

The level of money supply available in an economy can contract, due to inflation. When this happens, the value of Stock prices are negatively affected, on the other hand, a steady rate of expansion in money supply with low inflation has a tendency

to boosts stock prices. For this reason, easing the level of Federal Reserve requirements in banks and that of stock market prices can be driven to heights. The tightening of short-term interest rates such as the rediscount rate or treasury rates can hurt the stock market and the economy. The impact of money supply can be explained in two hypotheses namely Monetary Portfolio Hypothesis (MPH) and Efficient Market Hypothesis (EMII). The MPH expects that an increase in money supply will result in an increase in almost all-economic activities including the stock market (friedman, 1988). While EMH assumes that the impact of the change of money supply on share price reaction is limited and the speed of adjustment does not leave a room for traders to obtain abnormal returns because stock prices incorporate all relevant information.

Najand and Rahman (1991) use the GARCH model to examine the relationship between volatility of stock returns and volatility of macroeconomic variables for four countries, and find statistically significant positive coefficients for the monetary base.

According to Brunner (1961) the changes in money supply results in the equilibrium position of money with regard to other assets in the portfolio of investors. Therefore a new equilibrium is reached through both adjustments of proportions of asset portfolios and changes in the prices of various assets.

Asprem (1989) approach to the relation between stock price and macroeconomic variables in ten European countries is providing relation of money supply to stock returns.

According to Cooper (1974) Monetary Portfolio Theory suggests that changes in money supply alters the equilibrium position of money, thereby altering the composition and price of assets in an investors portfolio. Additionally change in

money supply in real economic variables, such as a decrease in money supply will raise short-term interest rate and decrease expenditures and capital investments, thereby having a lagged influence on stock returns (Rogalski and Vinso, 1977).

Chapter 3

AN OVERVIEW OF THE NIGERIAN ECONOMY AND STOCK MARKET

3.1 An overview of the Nigerian Economy

Nigerian is a West African Economy with a long coast line in the gulf of guinea which is the part of the Atlantic Ocean. The country shares international borders with Chad, Cameroon Benin and Niger. Nigeria ranks 32 in the world in terms of total area. The terrain of the country consists of southern lowlands and plateaus in the central region. The south east region has a mountainous surface, while the north consists of plains. Nigeria is the federal constitutional republic, with 36 states and 1 federal capital territory (FCT). Nigeria is recognized as the most populated nation in Africa. According to the 2009 estimates, the country has a total population in excess of 154 million, of which almost 70% live below the international poverty line.

Nigeria's economy is overly dependent on the petroleum sector; it is the largest oil producer in Africa. The petroleum industry is central to the Nigerian economic profile; it is the 12th largest producer of petroleum products in the world. The industry accounts for almost 80% of the GDP share and above 90% of the total exports. It is blessed with the high quantities of tin, iron ore, zinc, coal and some uranium. Nigeria is highly rich in terms of coal and natural gas which are untapped. Half of the population is earning their livelihood from the agriculture and allied activities and is producing rice, maize, groundnuts, rubber etc.

Nigeria is a middle-income nation with developed financial, communication and manufacturing sectors. Nigeria’s manufacturing sector includes areas like vehicle production, textiles, pharmaceuticals, paper, cement etc. It is recognized as the eminent member of the OPEC. Nigeria is also one of the fastest growing economies in the international arena as the International Monetary Fund has projected its growth to be 9 per cent in 2008 and 8.3 per cent in 2009. It has the second largest stock exchange in the continent.

3.2 The Nigerian Economy

Nigeria's economy depended more on petroleum in the 1980s compared to the 1970s. The Nigeria's economy dependence on petroleum accounted for 77 percent of the federal government's current revenue and 87 percent of export receipts in 1988. In the 1980s declining oil production and prices contributed to another facet of the economy. The decline in per capita real gross national product (GNP) persisted until oil prices began to rise in 1990. GNP per capita per year decreased 4.8 percent from 1980 to 1987, which led to Nigeria's classification by the World Bank as a low-income country in 1989 (based on 1987 data) for the first time since the annual World Development Report was instituted in 1978. In 1989 the World Bank also affirmed that, Nigeria is poor enough to be eligible (along with countries such as Bangladesh, Ethiopia, Chad, and Mali) for concessional aid from the International Development Association (IDA).

The Nigerian economy had a chain of rapid changes in the government's share of expenditures. As a percentage of gross domestic products (GDP), national government expenditures rose from 9 percent in 1962 to 44 percent in 1979, but fell to 17 percent in 1988. Nigeria's government became more centralized as a result of the 1967-70 civil wars. This oil boom in the 1970s provided the tax revenue with the

ability to strengthen the central government further. With Expansion of the government's share of the economy, the government did small to enhance its political and administrative capacity, but did raise incomes and the number of jobs that the governing elites could distribute to their clients.

Figure 3.1: Nigerian GDP Composition by Sectors

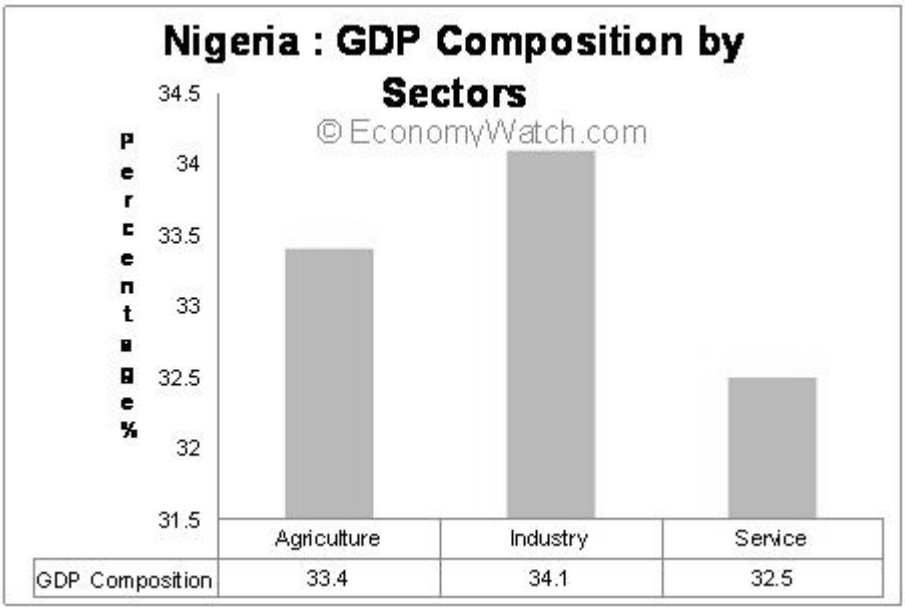

Table 3.1 Nigeria Economy: Statistical Snapshot[1]

Here are some of the vital statistics related to the Nigerian economy:

Labor force	47.33 million (2009 est.)
Labor in agriculture	70%
Budget revenues	$10.49 billion
Budget expenditures	$18.08 billion (2009 est.)
Industrial production growth rate	-1.8% (2009 est.)
Current account balance	-$9.394 billion (2009 est.)
Exports	$45.43 billion (2009 est.)

[1] Source: CIA World Factbook

Imports	$42.1 billion (2009 est.)
Foreign exchange reserve	$46.54 billion (December 2009 est.)
External Debt	$9.689 billion (December 2009 est.)

The economic crumpled in the late 1970s and early 1980s contributed to substantial disgruntlement and disagreement between ethnic communities and nationalities, which added to the political pressure to drive out more than 2 million illegal workers (mostly from Ghana, Niger, Cameroon, and Chad) in early 1983 and May 1985. The lower spending of the 1980s to a certain extent resulted in the structural adjustment program (SAP) which upshot from 1986 to 1990, first founded by the International Monetary Fund (IMF) and carried out under the patronage of the World Bank, which emphasized privatization, market prices, and reduced government expenditures. This program was based on the principle that, as GDP per capita falls; people would demand relatively fewer social goods (produced in the government sector) and relatively more private goods, which tend to be essential items such as food, clothing, and shelter. Widespread poverty and lack of industrial resources are the biggest challenges for Nigeria. The country ranks 151 out of 177 on the UN Development Index. During 2003-07, the government initiated strategic economic reforms to eradicate poverty and bring economic equality. However, corruption has been the main barrier to the success of any such effort.

3.3 History of Nigeria Stock Exchange

The Nigeria Stock Exchange is the second largest equities marketplace in Africa and the largest in West Africa. The Nigerian Stock Exchange was established in 1960 as the Lagos Stock Exchange and In December 1977 it became The Nigerian Stock Exchange, with branches established in some of the major commercial cities of the

country. At present, there are eight branches of The Nigerian Stock Exchange. Each branch has a trading floor. The branch in Lagos was opened in 1961; Kaduna, 1978; Port Harcourt, 1980; Kano, 1989; Onitsha, February 1990; and Ibadan August 1990; Abuja, October 1999 and Yola, April 2002. Lagos is the Head Office of The Exchange. An office has just been opened in Abuja. The Exchange started operations in 1961 with 19 securities listed for trading. Today there are 262 securities listed on The Exchange, made up of 11 Government Stocks, 49 Industrial Loan (Debenture/Preference) Stocks and 195 Equity or Ordinary Shares of Companies or private holdings, all summing to a total market capitalization of well above N875.2billion. The year 2007 was quite outstanding for the Nigerian Stock Exchange as it experienced tremendous growth with a 74.7% return on index and market turnover of over 4 times the previous year. It is expected that with a hypothetical forecast of 100% ratio by 2012, that the Nigerian Stock Market would achieve a market capitalization of 29 Trillion Naira. The transactions in The Market are regulated by The Nigerian Stock Exchange which is an autonomous and self-regulatory organization (SRO), and the Securities and Exchange Commission (SEC) on the other hand is vested with the power to administer Investments and Securities according to the investment ruling of 1999.

After the deregulation of the capital market in 1993 by the Federal Government, The Nigerian Stock Market was internationalized in 1995.The capital market was internationalized with the removal of laws that constrained foreign participation in the Nigerian capital market. Due to this removal of the Exchange Control Act of 1962 and the Nigerian Enterprise Promotion Decree of 1989, foreigners can now participate in the Nigerian capital market both as operators and investors. Currently there are no limits any more to the percentage of foreign holding in any company

registered in Nigeria. Pricing and other direct controls have given way to indirect controls by the regulatory bodies, which are the Securities and Exchange Commission of Nigeria and The Nigerian Stock Exchange. Basically on the overall, the competitiveness of the Nigerian market has improved and in addition is more investor-friendly.

3.3.1 Structure of the Nigerian Stock Exchange (NSE)

The market broadly speaking is the arm of the financial market which trades in medium to long term financial instruments such as Loan Stocks, Government bonds and Equity or Ordinary Shares with maturity in excess of usually one year; without this markets investors would not be able to liquidate their investments or adjust their portfolio whenever they aspire to do so and there would be no motivation to invest in securities. Major Companies listed in Nigeria Stock Exchange are:

- A.A.A. Stockbrokers Limited
- AIL Securities Limited
- Alliance Capital Management Company Limited
- BFCL Assets & Securities Limited,
- BGL Securities Limited,
- Calyx Securities Limited
- Capital Assets Limited
- Dakal Services Limited
- Davandy Finance & Securities Limited
- EMI Capital Resources Limited

The stock market is segmented in two units, the primary market and secondary market. In the primary market where stock shares are first sold, Companies raise money for investment projects. Investment bankers specialize in arranging financing

for companies in the primary market. Investment bankers often act as underwriters, buying newly issued stock from the company and then reselling the stock to the public. The primary market is best known as the market for initial public offerings (IPOs). The secondary market is where investors trade securities among themselves; the secondary market enhances the supply of funds to the primary market. If there were no secondary market where investors could cash their investment in listed securities they choose, many investors may not be able to buy new shares in the first place. Secondary market transactions are directed through three channels; directly with other investors and with a dealer or indirectly through a broker. Most common stock trading is aimed at an organized stock exchange. The most organized stock exchange is the New York Stock Exchange (NYSE), in the United State which is known as the Big Board, NYSE is owned by its members also partly by the government. From the perspective of the overall economy, the secondary market is particularly important, as it makes it possible for the economy to ensure long-term commitments in real capital. The Nigerian stock exchange has over two million individual investors and above three hundred institutional investors including NSITF, insurance companies and government parastatals, using the facilities of the stock exchange. In the last frothy years, the NSE has been free from any major fraud, shocks and scandals with the exception of the witnessed fraudulent sale of share certificates relating to Nestle Foods Nigeria Plc that took place recently. In this regard, the listing requirements and code of conduct of members and staff of the NSE have helped to ensure: Disciplined public accountability; persistent survival and improved performance of the quoted companies; Disciplined management of listed companies and market operators; an increasing pool of ingestible funds for economic development.

The implementation of the Automated Trading System has significantly enhanced the trading process and made it easier for ordinary people who struggle with trading technicalities.

3.3.2 Efficiency of Nigerian Stock Exchange

Nigerian Stock Exchange can be mentioned as a recent establishment leading to very few studies investigating the efficiency of this emerging market.

According to Fama (1965) an efficient capital market is a market that is efficient in processing information. The prices of securities at any time are based on correct evaluation of all information available at that time. In an efficient capital market, prices fully reflect available information. In other words, the theory assumes that such information will be properly interpreted by the investors in their investment decisions. Given this fact, it is therefore expected that in an efficient market, information will be quickly and widely distributed and reasonably available to all investors. Price change as a matter of fact will only occur at the break of new information to the market which could affect future profitability of the company and consequently future dividends.

Samuel and Yacout (1981) used serial correlation test to observe weekly price series of 21 companies in Nigerian from July 1977 to July 1979. The results show that the stock price changes are not serially correlated but follow an unsystematic walk, thus accepting the notion of Weak-Form market efficiency.

In 1984, Ayadi tested the price behaviour of 30 securities quoted on the NSE between 1977 and 1980. The Monday closing prices of these shares where used, after adjusting for cash dividends and script issues. The result from these test showed that the share price movements on the NSE followed a random pace.

Anyanwu (1998) investigates the efficiency of the NSE from the perspective of the market's relationship to economic growth of the nation. He used indices of stock market development liquidity, capitalization, market size, among others to create an aggregate index of stock market development and associated it to the long-run economic growth index, emphasizing the GDP growth rate. At the end, results showed a positive relationship between the two indices and as a result concluded that NSE is efficient to the extent that it affects the economic development of the country.

Olowe (1999) examined evidence of Weak-Form efficiency of the NSE using correlation analysis on monthly returns data of 59 individual stocks listed on the NSE over the period January 1981 to December 1992. The results provide support for the work of Samuels and Yacout (1981) and Ayadi (1984), that is, the NSE is efficiency in the Weak-Form.

Akpan (1995) studied the informational efficiency of the NSE including the risk implications of investing in the market, using time series data of stock market price indices covering the period 1989 to 1992. The results show evidence to reject the hypothesis of Weak-Form efficiency of the NSE.

Chapter 4

DATA AND METHODOLOGY

4.1. The Data

I used monthly data for the sample period of January 2005 (M1) to January 2010(M1). The data series are transformed into rates of change by taking the log differences in each of the series in the form dLn (X) to generate the unanticipated components (i.e. the first difference of the variable of interest). I adopted the convention that time subscripts apply to the end of the period. The definition and measurement of macroeconomic factors and stock returns used in this thesis are presented in Table (4.1):

It is important to mention that data are used in differences for two reasons. First, theoretical model of APT tells us that variables should use in return form. Second, economic time series data were assumed to be stationary. However, time series data can be non-stationary (trended) and this kind of data can be regarded as potentially a major problem for applied econometric studies. It is well known that trends may cause some problems (i.e. spurious regression). Some authors have suggested a remedy, namely, to difference a series successively until stationarity is achieved. [2]

[2] Box and Jenkins (1970) emphasize that a non-stationary series can be a stationary one by successive differencing of the series. However, Sargan (1964), Hendry and Mizon (1978) and Davidson et al. (1987) have criticized this specification in terms of differenced variables only for the benefits of the long-run relationship.

Table 4.1: Definition and Measurements of Data Series[3]

Symbol	**Variable**	Measurement
CPI	Consumer Price Index	*DLnCPI*
STIR	Short-term Interest Rates	*DLnSTIR*
OPI	Oil Price Index	*DLnOPI* *
FXD	Exchange Rate: US $	*DLnFXD*
M1	Money Supply	*DLnM*1
M2	Money Supply	*DLnM*2
M3	Money Supply	*DLnM*3
GSI	General Share Index	*DLnGIS*

*Note: *Shows that the variables are in the form of Ln Difference*

4.1.1 Stock Data

Two monthly returns data sets used for this study, namely General share index (GSI) and petroleum share index (PSI), are extracted from the International Financial Statistics (IFS), Statistical Abstract, Monthly Data, 2005M1-2010M1. The rest shown in the table 4.1 are also taken from the International Financial Statistics (IFS).

4.1.2 Macroeconomic Variables

Numerous theoretical models have been used to establish linkages between asset prices and macroeconomic variables. Most of these models assume the basic valuation formula in the form of,

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[3] Source: the data set extracted from International Financial Statistics (IFS) covering the first month of 2005 to first month of 2010, nearly 61 observations. Table 4.1 illustrate the description and the source of the data.

$$P(t) = Et\sum_{k=0}^{\infty} \frac{D(t+k)}{(1+\delta)^{k+1}}, \qquad (4.1)$$

Where,

P(t): Price of a stock at time *t*.

Et : Conditional expectation operator given information available at time *t*.

D (1+k): Net cash flow of the firm available for distribution to shareholders at time *t+k.*

δ : Discount rate.

Any change in an asset's cash flows should have a direct impact on its price. Thus, the assets expected growth rates that influence its predicted cash flows will affect its price in the same direction. Conversely, any change in the discount rate should inversely affect the asset's price. A country's stock index therefore is affected by factors that influence its economic growth or bring about changes in its real rate of interest, expected rate of inflation, and risk premium.

Since my purpose is to find out whether the considered macroeconomic variables are important in explaining the Nigerian stock market return, I employed exogenous macro variables that affect the future cash flow or the risk adjusted discount factors in Equation (4.1). I used five macroeconomic factors, namely, inflation, interest rate, oil price index, exchange rate and money supply as candidates for systematic risk factors (i.e. factors that may carry risk premium in Nigerian stock market. Descriptive statistics of macroeconomic factors are presented in Table (4.1). The rationale to choose these factors stems from the results of previous studies. For example, we specify some of the factors used by Chen et al. (1986) and also include a number of others that shows previous findings in the UK such as Beenstock and Chan (1988), Cheng (1995) and Pristley (1996).

The macroeconomic variables used in this thesis differ from the previous literature in term of the definition. Most of the previous studies related expected components of macroeconomic variables to expected returns. However, I used the 'rate of change' methodology to generate the unanticipated components. Took the first difference then enters as an unexpected component in the multi-factor model. The macroeconomic factors used in the model are explained below in more detail.

4.1.2.1 Industrial Production

Industrial Production represents the real economic activity. It is widely accepted that there is a positive relationship between the level of real economic activity i.e. industrial production and stock prices. Here, I use oil price index instead of Industrial Production index in this case because production in Nigerian economy is mostly based on oil production industry. I expect a positive relationship between oil price index and Nigerian stock returns.

4.1.2.2 Interest Rates

The change in interest rates will influence the discount rate in Equation (4.1). It may also influence the numerator on the right-hand side of Equation (4.1) because of a firm's financing requirements and debt structure. In almost all of the previous studies, significant negative relationship between the observed stock market returns and the interest rates has been found. For example, Aspem (1989) investigates the issue in a macroeconomic variable model for ten European countries and, in general, finds a negative relationship between interest rates and stock prices.

I employed Short-term interest rates and hypothesize a negative relationship between Nigerian stock returns and interest rates. In this study, I prefer to use short-term interest rate rather than long-term interest on due to the modelling criterion conducted. The APT model was developed to determine the influences in the short-

run period; hence short-term interest rate is much more convenient to be used rather than long-term one.

4.1.2.3 Inflation

Inflation influences Equation (4.1) through both the expected cash flows and the discount rate. The traditional economic view suggests that the common stocks should serve as hedges against inflation because they represent real assets of firms. The Fisherian (1930) assumption is that real rates of return are independent of inflationary expectations. The change in CPI is considered as the measure of inflation in this thesis. A negative relationship between change in CPI and Nigerian stock returns is expected. Although there is no inflation problem in economy, we use this factor because of our modelling criterion used in this study.

4.1.2.4 Exchange Rates

The future cash flows and discount rates of most firms are significantly influenced by the unexpected changes in exchange rates. In my Thesis, exchange rate variable has been constructed in a way to capture the changes in Nigerian Naira value of U.S. dollar. I hypothesised that an unanticipated rise in the exchange rates will adversely affect Nigerian stock returns.

4.1.2.5 Money Supply

M1, M2, and M3 variables represent money supply in the model used. M1 is a narrower measure, consisting mainly of notes and coin in circulation. M2 consists of notes and coin plus demand deposits and time deposits. Finally, M3 (broader measure) consisting of notes and coin in circulation with demand deposits and time deposits, plus foreign currency deposits. It is important to mention that some of money supply (M1, M2 and M3) in the literature can be dropped from the relevant

equation due to their insignificance. A positive relationship is expected between money supply(M2) variables and stock returns.

4.2 The Method of Estimation

The regression analysis is used to identify the direction and significance of relations between Nigerian stock returns and the macroeconomic factors. The regressions are performed by utilizing the Ordinary Least Square (OLS) and to estimate the regression coefficients. Each regression coefficient estimated by OLS coincides with the true value on the average and they have the least possible variance i.e. they are efficient so that regression analysis can produce best linear unbiased estimates (BLUE).

The reported results from the estimated model are explained using the followings:

Estimated coefficients (βs),

- t-ratios,
- R^2
- F-statistic.

Beta coefficients corresponding to the macro variables are estimated for the dependent variable.

I have one variable for exchange rate, namely FXD and three variables for money supply i.e. M1, M2 and M3 so I estimated a model for general share index. In the regression equation, I included CPI, STR, OPI, FXD, OPI and M2 whilst substituting General share index returns.

The reasoning for doing so is to investigate the effects of different variables in combination with other variables. To test the significance of the individual coefficients, a t-test is performed. If the computed *t* values are larger than the critical value at a given level of significance, then the null hypothesis that the given

regression coefficient (risk premium) is not significantly different from zero is rejected i.e. individual risk premium is significant.

The R^2 is used to get the percentage of total variations in General share index returns explained by the macroeconomic variables employed in the multiple regression equation.

Finally, F-test is used to test the overall significance of the model, that is, whether stock returns are linearly related to macroeconomic factors employed.

Chapter 5

THE REGRESSION MODEL AND EMPIRICAL RESULTS

5.1 The Regression Model

I conducted the model in which Nigerian stock returns lead to a factor model in the following form:

$$GSI = \beta_0 + \beta_1 CPI_t + \beta_2 STIR_t + \beta_3 OPI_t + \beta_4 FXD_t + \beta_5 MS_t + \varepsilon_t \quad (5.1)$$

where,

GSI : Realised return on NSE (Nigerian Stock Exchange) at time *t*.

β_0 : Constant.

β_i : Reaction coefficient measuring the change in portfolio returns for a change in risk factor.

CPI: The change in inflation variable at time *t*.

STIR: The change in interest rates variable at time *t*.

OPI: The change in industrial production variable at time *t*.

FXD: The change in exchange rate variable at time *t*.

MS: The change in money supply variable at time *t*.

ε_t : The residual error term for GSI at *t* time.

5.2 Analysis of the Test Results

The following issues are checked for our model:

- The multicolineartiy between the explanatory variables
- The autocorrelation between error terms
- The normality of error terms
- The heteroscedasticity

5.2.1 Multicolinearity

Multicolinearity refers to the situation where there is either an exact or approximately an exact linear relationship among the X variables. So, in order to identify whether multicolinearity exist among the variables used for this study, I estimated a correlation matrix for the General share index. Estimated correlation matrixes of the relevant dependent variable and prescribed macroeconomic variables are presented in Table (5.1). Here I expect to get a low correlation among macroeconomic variables, whilst, a high correlation between stock returns and macroeconomic variables.

Table 5.1: Estimated Correlation Matrix for General Share Index

	GSI	**CPI**	**STIR**	**OPI**	**FXD**	**M2**
GSI	1					
CPI	-0.52	1				
STIR	-0.71	0.33	1			
OPI	0.49	-0.22	-0.52	1		
FXD	-0.87	-0.32	-0.19	0.38	1	
M2	0.84	-0.44	-0.18	0.41	0.38	1

Table (5.1) shows that the correlation between the relevant share index and other macroeconomic variables is acceptable.

5.2.2 Autocorrelation

The problem of autocorrelation stems from among the residuals when they are not independent of each other. The OLS estimators are efficient (i.e. they have minimum variance) and unbiased only when there is no correlation between error terms.

The most popular test for discovering autocorrelation is developed by Durbin Watson, known as the Durbin-Watson *d* statistic. I performed the first-order autocorrelation by testing the following null hypothesis.

$H_0 =$ No autocorrelation; if $d_U \prec d \prec 4 - d_U$

$H_A =$ Positive autocorrelation; if $d \prec d_L$

Negative autocorrelation; if $4 - d_L \prec d \prec 4$

Although it is popularly used, one of the disadvantages of the *d* test is that if it falls in region of ignorance where results are inconclusive, we cannot conclude whether or not autocorrelation does exist.

$d_L \leq d \leq d_U$ and $4 - d_U \prec d \prec 4 - d_L$ are regions of ignorance.

The critical values used in testing the hypothesis are as follows:

	d_L	d_U
%5	1.37	1.81

(Where n=61, k=6, computed= 1.84)

Here we compare the computed D-W *d* statistics with the tabular values presented above. At 1% significance level all computed DW *d* statistics of our model are in the $d_U \prec d \prec 4 - d_U$ form, 1.81 <d<4-1.81, which indicates no autocorrelation between residuals. Therefore we accept the null hypothesis of H_0 that there is no first-order autocorrelation.

At 5% significance level, the results show no autocorrelation among the successive residuals taking the form 1.81 <d<4-1.81. The computed *d* statistics of the equation is 1.84. In general, the computed results exhibit that there is no first-order autocorrelation among residuals.

5.2.3 Normality

One of the assumptions of the method of OLS is about the probability distribution of residuals. OLS estimators of the regression coefficients are best linear unbiased estimators if the residuals follow the normal distribution with zero mean and constant variance.

To check this assumption we used the Lagrange Multipliers (LM)[4] test employing the following hypotheses.

$H_0 = u_t = 0$ (Residuals are normally distributed),

$H_a = u_t \neq 0$ (Residuals are not normally distributed).

Our computed value of LM version for normality is CHSQ (2) and the tabular value with two restrictions for significance level of 0.05 is $\chi^2(2) = 5.99147$. Since in both equations the computed value of LM version of normality is smaller than the tabular value, the null hypothesis of normality of the residuals are normally distributed is accepted. X_{NORM} for the regression equation is 1.12 (prob= 0.586).

[4] LM has a chi-squared distribution with degrees of freedom equal to the number of restrictions.

5.2.4 Heteroscedasticity

Another important assumption of OLS is that residuals are homoscedastic. If this assumption is violated, there is heteroscedasticity. I did test whether residuals have the same variance or not for the regression model. The hypothesis is conducted as follows:

$H_0 = \sigma^2{}_t = \sigma^2$ (Homoscedasticity),

$H_a = \sigma^2{}_t \neq \sigma^2$ (Heteroscedasticity).

The computed value of LM version for heteroscedascity is CHSQ (1) and the tabular value with one restriction with significance level of 0.05 is $\chi^2 = 3.84146$.

Since in both estimated equations, the computed value of LM version of heteroscedasticity smaller than the tabular value, the null hypothesis of heteroscedasticity is accepted i.e. residuals are normally distributed. X_{HET} for the equation is 1.94 (prob=0.106).

5.3 Empirical Results

The empirical test results have been carried out by using Software-Microfit 4.0 (Pesaran and Pesaran, 1997). Having analyzed the misspecification test results for the serial correlation, autocorrelation, normality and heteroscedasticity, I evaluated the results estimated from the regression equations using:

- *t*- test (i.e. individual significance test of the estimated coefficients),
- F-test (i.e. overall significance test of the coefficients),
- R^2 (i.e. goodness of fit) values.

The regression results for the pricing relationship between the chosen macroeconomic factors and stock returns are presented in Table (5.2) for the relevant Share Indices. The numbers in parentheses in the same table are *t*-values that used to

test the null hypothesis of no significance of the estimated coefficients associated to the macroeconomic variables.

We hypothesize that

$H_0 : \beta_s = 0$ (Not significant)

$H_a : \beta_s \neq 0$ (Significant)

As can be seen in Table (5.2), all the variables used in the relevant equation are statistically significant on the basis of the two-tail *t*-tests at conventional levels except exchange rate and oil production index in the regression equation. The impact of money supply (M2) and short term interest rates as well as inflation rates seem to be more important than the others in the equation. The results also tell us that variations in DLM2 are significant factors at 10% level of significance. In addition to this, the estimated coefficients of the relevant variables have right signs, as they would be expected.

The other important issue is to test the overall significance in which I utilized F-test. I tested the null hypotheses that employed macroeconomic variables; together they have an influence on dependent variables as follows:

$H_0 : R^2 = 0$ (Not significant)

$H_a : R^2 \neq 0$ (Significant)

Notes: $F_{k-1,n-k} = F(5,55)$ and the tabulated F-values are as follows: 2.37 at 5% significance level, and 3.34 at 1% significance level.

The calculated F-results are significant (F-cal>F-tab at 1% significance level), i.e., 129.48 which is large (A large F statistic allows one to claim that there is statistically significant evidence to support the alternative that not all of the means are equal, but a large F corresponds to a small p-value.).

I therefore, reject the null hypotheses and accept the alternative hypotheses, which indicate that, the regression equation holds overall significance at 1 percent level.

Having conducted F-test as mentioned above, I did then consider the goodness of fit of estimated multiple regressions (i.e. multiple coefficient of determination R^2). R^2 gives the percentage of the total variation in the dependent variable explained by the explanatory variables in the regression models. The percentage of the total variation in the dependent variable General share index explained by the utilized macroeconomic variables are found reasonably high with the value 98 percent.

Table 5.2: Regression results for the model under inspection

Explanatory variables	**Model 1** **DLGSI**
C	19.93 (42.24)*
DLCPI	-0.40 (-2.19)**
DLSTIR	-0.10 (-6.37)*
DLOPI	0.11 (0.69)
DLFXD	-0.43 (-0.45)
DLM2	0.07 (1.67)***
R^2	0.98
F (5,55)	129.49

Notes: * indicates statistical significance at a 1% (2.66); ** indicate statistical significance at a 5% (2.00), *** indicate statistical significance at a 10% (1.67) and other are not statistically significant at conventional levels.

Finally, in order to get the best model where stock returns can be better explained in Nigerian Stock Exchange, the parsimonious procedure is performed to choose most significant *t* values of the relevant variables in the regression equation (see Table 5.3).

General share index estimation results show that there are all statistically significant macroeconomic variables in determining stock returns in Nigerian stock exchange (NSE) except, exchange rate and oil production index. Therefore, I did run the estimation processes by excluding the two variables and taking other variables in. The results are as follows:

Table 5.3: Second regression model Without OPI and FXD

Explanatory variables	**Model** **DLGSI**
C	19.89 (62.32)*
DLCPI	-0.41 (-2.23)**
DLSTIR	-0.11 (-6.30)*
DLOPI	-
DLFXD	-
DLM2	0.07 (2.63)*
R^2	0.97
F (3,57)	104.29

Notes: * indicates statistical significance at a 1% (2.66), **indicate statistical significance at a 5% (2.00) and *** indicate statistical significance at a 10% (1.67)

As can be shown in Table (5.3) above for General share index, all is significant at 1% or 5% significance levels and their coefficients have right signs, as they would be expected.

Table (5.3) also shows how significant these variables are in explaining stock return variations when other variables are not included in the estimation process. 97% of total variations in General share index explained by utilizing all except exchange rate, and oil production index.

The R^2 value is lower in General share index compared to the previous one. Furthermore, the results of the last equation presented above implying that STIR and M2 as well as CPI seem to have a relatively stronger ability of explaining the stock return variations in the stock market compared to the equation utilizing all variables.

Finally, in order for the test of overall significance, I rejected the null hypotheses and accept the alternative hypotheses at conventional levels which states that the equation holds overall significance since our F-results are higher than the tabulated F-values.

Notes: $F = F_{k-1,n-k}, F(3.57)$ and the tabulated F-values are 2.37 with 5% significance level, 3.34 with 1% significance level.

According to the results in Table (5.2), if consumer price index goes up by 1%, General Share Index (GSI) returns go down by approximately 40 whilst other variables hold constant. Also, 1 percent increase in OPI results in 11% increase in GSI returns. In addition, GSI index increase by nearly 7 when money supply (M2) rises up by 1 percent.

I can conclude that, changes in Exchange rate and oil price index have not significant impact on Nigerian stock returns that are traded on the stock whilst changes in, M2, STIR, and CPI have an influence in explaining the stock return variations in The Nigerian stock exchange.

Chapter 6

CONCLUSION, POLICY IMPLICATION AND RECOMMENDATION

6.1 Conclusion

In this thesis, I aimed to investigate the empirical relations between Nigerian stock return and the changes in a number of macroeconomic variables, namely, inflation, interest rate, Oil production, exchange rate, and money supply using multivariate APT. Some macroeconomic variables are important in explaining the variations in the stock market returns in The Nigerian stock for the period of January 2005(M1)-January 2010(M1). We found that short-term interest rate, money supply M2, consumer price index rate have statistically significant influence on Nigerian stock returns after performed the parsimonious procedure to form best model.

The results from the estimated regression suggest that there is a significant negative relationship between short-term interest rate, consumer price index and stock market returns whereas changes in money supply M2 have a positive impact on the stock market returns. In both models, the relationship between changes in consumer price index (CPI), short term interest (STIR) as well as money supply M2 and stock returns are statistically significant. The results from the parsimonious specification of

the model suggest the relation between OPI and stock returns is very important for Nigerian economy because the economy mostly based on oil production sector to survive. However, this variable was found insignificant.

The results estimated from the parsimonious specification of the model show that the relations between changes of the relevant variables and stock returns are statistically significant at conventional levels for GSI.

Based on the findings for the US, UK and some other countries, my thesis does provide reasonable support for the view that change in consumer price index has an effect on common stock returns for the period. The variable is found to be negatively significant in explaining the variations in Nigerian stock market. This may suggest that my findings do not appear to support the view that the stock markets lead to changes in the real economic activity variables.

As a result, explanatory power reached for the sample period supports the view that macroeconomic variables explain a significant part of the observed variations in Nigerian stock market returns for the sample period. Since the main macroeconomic variables have been taken into account in the model, the estimation results imply that some macroeconomic variables, namely short-term interest rate, money supply, and consumer price index have an influence on Nigerian Stock Market returns.

6.2 Policy Implications

The finding of this thesis can be summarized as such: while exchange rate and production index have no significant effects on stock returns, short term interest rate, money supply M2 and consumer price index or inflation are found to be closely related to the stock returns of Nigerian stock market. First, inflation issue can be formulated in a way that it should be compatible with the nature of the Nigerian economy. Second, oil production is insignificant so it should be developed further to

improve the Nigerian economy. Especially, policy makers should take oil production industry into consideration as guidance in formulation of future Nigerian economic polices because this is comparative advantage of the Nigerian economy.

From my point of view, the insignificancy of oil production in Nigeria to the economy could be due to the fact that a large portion of U.S. exports to Nigeria is believed to enter the country outside of the Nigerian government's official statistics, due to importers seeking to avoid Nigeria's excessive tariffs.

Oil dependency and its attraction generated a great deal of wealth through government contracts and spawned other economic distortions. The country's high propensity to import is roughly 80% of government expenditures recycled into foreign exchange. The Cheap consumer imports, resulting from a chronically overrated Naira, together with an excessively high domestic production costs, in part with unreliable electricity and fuel supply, pushed down the utilization of industrial capacity to less than 30%. Presently a lot of Nigerian factories had to close except for relatively low labour costs (10%–15%) companies. Domestic manufacturers especially pharmaceuticals and textiles, have lost their ability to compete in traditional regional markets.

The oil industry has not been able to lift either the agricultural sector or the manufacturing sector of the Nigerian economy for basic commodities to any appreciable extent over the fifty years of our existence. Instead it has been responsible to a large extent for damaging the viability of other components of the nation’s economic essence.

6.3 Recommendation

The model employed in this study can be developed using the combination of both CAPM and APT models rather than conducting only the one. More advanced time

series techniques such as GARCH and ARCH as well as co-integration techniques can be applied on the same subject for further studies in order to get more accurate results. Nevertheless, due to availability of the relevant data set and the time limitation, I have been confined to do more solid research on the relevant subject. I suggest that those master students who really want to analyze this subject; they can take those points abovementioned into account.

In my thesis on the Nigerian stock market analysis, I can derive a number of implications that may help to improve the performance of the Nigerian economy under the inspection of the Nigerian stock exchange. I am aware of the fact that aggregate analysis cannot be used in policy formulation at the micro level but it definitely provides a general guidance in the formulation of industrial policy and macroeconomic policies.

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APPENDICES

Appendix 1: **Estimated Correlation Matrix of Variables**

	GSI	**CPI**	**STIR**	**OPI**	**FXD**	**M2**
GSI	1					
CPI	-0.52	1				
STIR	-0.71	0.33	1			
OPI	0.49	-0.22	-0.52	1		
FXD	-0.87	-0.32	-0.19	0.38	1	
M2	0.84	-0.44	-0.18	0.41	0.38	1

Note: It is expected to get a low correlation among macroeconomic variables, whilst, a high correlation between stock returns and macroeconomic variables.

Appendix 2: **Ordinary Least Squares Estimation: Original model**

Explanatory variables	Model 1 DLGSI
C	19.93 (42.24)*
DLCPI	-0.40 (-2.19)**
DLSTIR	-0.10 (-6.37)*
DLOPI	0.11 (0.69)
DLFXD	-0.43 (-0.45)
DLM2	0.07 (1.67)***
R^2	0.98
F (5,55)	129.49

Notes: * indicates statistical significance at a 1% (2.66); ** indicate statistical significance at a 5% (2.00), *** indicate statistical significance at a 10% (1.67) and other are not statistically significant at conventional levels.

Appendix 3: **Second regression model Without OPI and FXD**

Explanatory variables	**Model** **DLGSI**
C	19.89 (62.32)*
DLCPI	-0.41 (-2.23)**
DLSTIR	-0.11 (-6.30)*
DLOPI	-
DLFXD	-
DLM2	0.07 (2.63)*
R^2	0.97
F (3,57)	104.29

Notes:*indicates statistical significance at a 1% (2.66), ** indicate statistical significance at a 5% (2.00) and *** indicate statistical significance at a 10% (1.64)