Asset Prices and Macroeconomic Volatility- Empirical Linkage: Nigerian Experience

Agbam, Azubuike Samuel & Anyamaobi, Chukwuemeka
Department of Banking and Finance
Faculty of Management Sciences
Rivers State University, Nkpolu-Oroworukwo,
Port Harcourt, Nigeria
azubuikesamuelagbam@yahoo.com
chukwuemeka.anyamaobi@ust.edu.ng

Abstract
This study tests the relationship between asset prices and macroeconomic variables in Nigeria Equity Market. The study employed the Ross (1976) arbitrage pricing model and adopted the Chen, Roll and Ross (1986) approach. The Augmented Dickey Fuller Unit Root Test was employed to examine the behaviour of the set of selected macroeconomic variables. The first and second pass ordinary least squares regressions were used to estimate the relationship between the stock returns (from January 2002 to December 2016.) and seven macroeconomic variables. The results reveal that the macroeconomic variables risk premium strongly affects the stock prices/returns in the Nigerian equity market. .Hence the model has empirical applicability. We recommend that investors taking investment decisions should consider macroeconomic factors that are very sensitive and negative determinants of average return.

Keywords: *Asset prices, macroeconomic variables, investments, stock returns, arbitrage pricing model, Nigerian Stock Market*

1. Introduction

Analyses of past data suggest that macroeconomic variables and stock market index are related (Quayyoum, Hassan and Zoltan, 2015; Venkatraja, 2014; Mohammad, Ali and Jalilr, 2009; El-Neder and Alraimony, 2012; Tangjitprom, 2012; Izedonmi and Abdullahi, 2011; Abraham, 2011; Ozcan, 2012) and, hence long-run equilibrium relationship exists between them (Abraham, 2011; Majid and Yusuf, 2009; Esmaeili and Gholami, 2013; Ozcan, 2012; Kuwornu, 2012; Humpe and Macmillan, 2007; Khalid, 2012; Hassani, 2014; Naik and Padhi, 2012).

The issue which is of interest to both the academics and the practitioners is whether stock prices are influenced by macroeconomic variables. Researchers use factor analysis technique to determine the factors affecting asset prices (Hassani, 2014; Quayyoum, Hassan and Zoltan, 2015, Agbam and Anyamaobi, 2018).

Many academicians have used macroeconomic variables to explain stock prices/returns and found that changes in some macroeconomic variables are associated with risk premium (Sanvicente and Ales de Carvalho, 2012; Grant and Quinggin, 2001; Dumodaran, 2014; Kizys and sencer, 2008; Fuers, 2004; Ogbulu, et al, 2014; Imran and Zakaria, 2013). They interpreted the observations to be a reflection of the finding that changes, e.g. rates of inflation are fully reflected in interest rate. The focus of the macroeconomic approach is to examine how sensitive stock prices are to changes in macroeconomic variables. The approach

maintains that the performance of stock is influenced by changes in factors like inflation rate, interest rate, exchange rate, money supply, oil price, gross domestic product, etc.
Series of attempts have been made to identify or study the factors that affect stock prices. Some researchers have also tried to determine the correlation between selected factors (internal and external, market and non-market factors, economic and non-economic factors) and stock prices (Nishat and Shaheen, 2004; Aggarwal, 1981; Chen, 1991; Mukherjee and Naka, 1995; Haroon and Jabeen, 2013). The outcomes of the studies vary depending on the scope of the study, the assets and factors examined. The capital assets pricing model (CAPM) developed by Sharpe (1964) assumes that asset price depends only on the market factor. Hence, it is tagged a one factor model.

On the other hand, the Arbitrage Pricing Theory (APT) technique/model developed by Ross (1976) which could be taken as a protest of CAPM believe that the asset price is influenced by both the market and non-market factors such as inflation, exchange rate, unemployment rates, etc. It is a statistical-based multifactor mathematical model used to describe the relationship between the risk and expected return of securities in financial markets. The model seeks to calculate the appropriate price of an asset while taking into account systematic risks common across a class of assets.

Ross (1976, 1977), Roll (1977), and Roll and Ross (1980) developed the arbitrage pricing model (APM) in order to show that multiple factors (multiple beta models) can explain stock prices/returns. And there had been a lot of tests of APT in different countries. While there is no formal guidance choosing the right macroeconomic variables to the APT model, we shall limit ourselves to systematic factors with considerable ability to explain security factors; and factors that seem likely to be important risk factors, i.e factors that concern investors sufficiently that will demand meaningful risk premiums to bear exposure to those sources of risk.

1.2 Statement of the Problem

The factors influencing stock prices have evolved into a formidable area of research in behavioral finance. The influx of research interest not-withstanding, there are indications that the issues involved in stock prices determination are yet to be resolved. The research findings with regard to the suitability of the Arbitrage Pricing Models (APM) in explaining stock prices have shown conflicting results across countries (Shanken, 1982; Carr and Madan, 2005; Kristjanpoller and Morales, 2011; Dobarati and Chawla, 2012; Nkechukwu, et al. 2013; Inyiania and Nwoha, 2014), and this has brought to question the fairness of the empirical application of the models in Nigerian Equity Market. Specifically, findings of some research on developing economies have been inconsistent (Pooya, et al. 2011; Ouma and Muriu, 2014). Furthermore, there are also divergences with regard to which among the macroeconomic variables exerts significant influence on stock prices (Chen et al., 1986; Naka, Mukherjee and Tuftee 1998; Maghayereh 2002; Bundoo, 2006; Humpe and Macmillan 2007).

1.3 Purpose and Objectives of the Study

The purpose of this study is to investigate whether volatility in pre-specified macroeconomic factors affect the stock prices or not; examine the validity of the systematic risks in pricing of stocks.
The study intends to achieve the following specific objectives:

1. To investigate if the arbitrage pricing models are empirically applicable in Nigerian equity market.

2. To investigate if the pre-specified macroeconomic variables have significant effect in stock prices.

In an attempt to resolve the foregoing controversies, this study therefore considered 50 stocks, randomly selected (see appendix 1A) and seven (7) macroeconomic variables: Inflation rate (INFLR), Market Capitalization, Exchange Rate (EXCHR), Treasury Bills Rate (TBR), Deposit Rate (DR), Lending Rate (LR), Interest Rate Differentials (IRD); and their interaction with equity risk premium; and relate changes in equity risk premium to shifts in these variables, (i.e., link the changing equity risk premium to shifting volatility in real economic variables in Nigeria). The risk factors are selected a priori according to the unique features of the Nigerian economy. Thus, this study addresses the need and attempt to fill the gap in empirical literature on the applicability of the Arbitrage Pricing Models in determining stock prices in Nigerian equity market.

1.4 Research Question

The research questions are as follows:

1. Is the arbitrage pricing model empirically applicable in Nigerian equity market?
2. To what extent have the macroeconomic variables – inflation rate, exchange rate, market capitalization, treasury-bill rate, deposit rate, lending rate and interest rate differential – affected stock prices in the Nigerian Equity Market using the arbitrage pricing model?

1.5 Hypothesis

The hypothesis of this study is stated in null form as follows:

1. The arbitrage pricing model is not empirically applicable in Nigerian Equity Market.
2. There is no significant relationship between the macroeconomic variables (inflation rate, exchange rate, market capitalization, treasury-bill rate, deposit rate, lending rate and interest rate differential) and stock price.

1.6 Significance of the Study

Investors and Financial Analysts: A study focusing on the identification of return generating factors and to the extent of their influence on share prices, the outcome will be a tool for investment analysis in the hands of investors, portfolio managers and mutual funds who are mostly concerned with changing share prices.

Government: Since the study takes into account the influence of microeconomic variables on variations in prices, by using the outcome the government can frame out suitable policies on long term basis and that will help in nurturing a healthy economy and resultant stock market.

Policy makers/Corporate governance: As every company management tries to maximize the wealth of the shareholders, a clear idea about the return generating variables and their influence will help management to frame various policies to maximize the wealth of the shareholders.

Researchers: The study will provide more insight into the effects of various macroeconomic variables on stock returns in anticipation of increasing the conclave of empirical evidence in this regard. The result of this empirical research will help the reader to understand whether the movement of stock prices of the Nigerian Stock Exchange is subject to the volatility of some macroeconomic variables.

1.7 Scope of the study

This study looks at the impact of changes in some selected macroeconomic variables (inflation rate, treasury-bill rate, exchange rate, market capitalization, deposit rate, lending rate and interest rate differential) on stock prices in Nigerian Equity Market using monthly data between 2002 and 2016. The risk factors are selected a priori according to the unique features of the Nigerian economy.

1.8 Limitations of the study

The following are the major limitations of this study:

(1) There is no agreement as to what constitutes the actual macroeconomic factors, hence the use of proxies, which may not capture the actual concept studied.

(2) The data used are secondary, and their validity and reliability may not be within the powers of the author.

(3) The use of historical data may not be a good predictor of future actual prices.

2 Literature Review

2.1 The Theory

Most researches in financial economics have been the behaviour of assets prices and especially the forces that determine the prices of risky assets. There are also a number of competing theories of asset pricing. These include the original capital asset pricing models (hereafter CAPM) of Sharpe (1964), Lintner (1965) and Black (1972), the inter-temporal models of Merton (1973), Long (1974) Rubinstein (1976), Breeden (1979), and Cox et al. (1985), and the arbitrage pricing theory (hereafter APT) of Ross (1976).

Probably the most famous multi-factor model is the Ross's APT which was developed in the year 1976. The capital asset pricing theory begins with an analysis of how investors construct efficient portfolios and the theory has its basis in mean-variance analysis (Markowitz, 1952, 1959). The APT comes from an entirely different family. It does not ask which portfolios are efficient. Instead, it starts by assuming that each equity's return depends partly on pervasive macroeconomic influences or factors and partly on noise (Brealey et al., 2006). The APT has been widely discussed in literature (e.g., Connor & Korajczyk (1986); Berry et al. (1988); Groenewold & Fraser (1997); Sharpe,(1984).

Arbitrage pricing theory does not rely on measuring the performance of the market. Instead, APT directly relates the price of the security to the fundamental factors driving it. The extant literature suggests that a wide range of factors may be relevant. However, Bilson, et al., (2000) stressed that in emerging markets, there is argument that not all of these variations are either appropriate or relevant.

In the world of APT, each asset can be affected by each risk factor. That is, each firm has its own set of "factor betas", and each risk factor is associated with a risk premium. For example, if fluctuations in the price of Premium Motor Spirit (PMS) represent a source of systematic risk, then stocks that are sensitive to that factor will have to pay investors higher returns as compensation. This relationship can be summarized as follows:

$$R_i - R_f = \beta_{i1}(R_1 - R_f) + \beta_{i2}(R_2 - R_f) + \beta_{i3}(R_3 - R_f) + \cdots + \beta_{in}(R_n - R_f) \qquad (2.1)$$

The left-hand side of this equation represents the risk premium on a particular asset. The betas reflect that particular asset's sensitivity to each of the factors, and the terms in brackets stand for the risk premium associated with each factor.

APT does not ask which portfolios are efficient. Instead, it starts by assuming that equity's return depends partly on pervasive macroeconomic influences or factors and partly on noise (Brealey et al., 2006).

The APT model tries to capture some of the non-market influences that cause securities to move together. APT gives a characterization of expected returns on assets based only on the weak assumptions that there are no arbitrage opportunities, returns follow a factor structure and there are homogenous expectations (Gilles & Leroy, 1990). Multi-factor models allow an asset to have not just one, but many measures of systematic risk. Each measure captures the sensitivity of the asset to the corresponding pervasive factor. If the factor model holds exactly and assets do not have specific risk, then the law of one price implies that the expected return of any asset is just a linear function of the other assets' expected return. If this were not the case, arbitrageurs would be able to create a long-short trading strategy that would have no initial cost, but would give positive profits for sure. This arbitrage relies on a fundamental principle, the law of one price, which, according to Drake and Fabozzi (2004), states that a given asset must have the same price regardless of the means by which one goes about creating that asset. Moreover, testing the APT model does not require identification of the true market portfolio.

2.2 Model formulation

The pre-specified, like the factor likelihood model, assume that market risk can be captured best using multiple macroeconomic factors and estimating betas relative to each. Unlike the factor likelihood, pre-specified do attempt to identify the macroeconomic factors that drive market risk.

The APT requires only four assumptions:

(1) Returns can be described by a factor model.
(2) There are no arbitrage opportunities.
(3) There are a large number of securities, so that it is possible to form portfolios that diversify the firm-specific risk of individual stocks. This assumption allows us to pretend that firm-specific risk does not exist.
(4) The financial markets are frictionless.

Ross (1976, 1977), Roll (1977), and Roll and Ross (1980) developed the arbitrage pricing model (APM) in order to show that multiple factors (multiple beta models) can explain stock prices/returns. If APM holds, then a risky asset can be described as satisfying the following relation:

$$E\ (r_i) = \ r_f + \ b_{i1}RP_1 + \ b_{i2}RP_2 + \cdots + b_{in}RP_n \qquad (2.2)$$

$$r_f = E(r_f) + \ b_{i1}F_1 + \ b_{i2}F_2 + \ \ldots + \ b_{in}F_n \ + \epsilon_i \qquad (2.3)$$

Where

$E\ (r_i)$ is the risky asset's expected return,
RP_k is the premium of the factor
r_f is the free risk
F_k is the macroeconomic factor
b_{ik} is the sensitivity of the asset to factor k, also called factor loading, and;
ϵ_i is the risky asset's idiosyncratic random shock with mean zero (the the error term, assumed to be uncorrelated with the factor). This is also the (uncertain) security-specific return.

Notice that if the macro factor has a value of 0 (zero) in any particular period (i.e. no macro surprises), the return on the security will equal its previously expected value, $E(r_i)$, plus the effect of firm-specific events only. The nonsystematic components of returns, the $e_i's$, are assumed to be uncorrelated among themselves and uncorrelated with the factor F.
All of the models described begin by thinking about market risk in economic terms and then developing models that might best explain this market risk. All of them, however, extract their risk parameters by looking at historical data.

2.3 The Concept

2.2.2 Pre-specified Macroeconomic Variables Arbitrage pricing Model (PMVAPM)

The assumption behind the Pre-specified Macroeconomic Arbitrage Pricing Model is that securities prices/returns are generated by a small number of common factors, but our challenges are:

(1) To identify each of the factors affecting a particular stock;
(2) The expected return for each of these factors; and
(3) The sensitivity of the stock to each of these factors.

And the model did not give us any formal theoretical guidance on choosing the appropriate group of macroeconomic factors to be included in the model, rather left the identification of these factors to us as empirical matter.

The primary advantages of using macroeconomic factors as stated by Azeez and Yonoezawa, (2003) and DeFusco, et al. (2001) are: (1) the factors and their prices in principle can be given economic interpretations, while with factor analysis approach it is unknown what factors are being priced; and (2) rather than only using asset-prices to explain asset-prices, observed macroeconomic factors introduce additional information, linking asset-price behaviour to macroeconomic events.
Groenewold and Fraser (1997) opined that this is both its strength and its weakness. It is strength in empirical work since it permits the researcher to select whatever factors provide the best explanation for the particular sample at hand. It is weakness in practical applications in contrast to the CAPM; it cannot explain variations in asset returns in terms of limited and easily identifiable factors, such as equity's beta.

While there is no formal guidance choosing the right macroeconomic variables to the APT model, Chen et al. (1986) suggest a discounted cash flow approach for their selection. They argue that because current beliefs about these variables are incorporated in price. It is only innovation or unexpected changes that can affect returns. Almost all the published studies of testing the APM through macroeconomic variables have used these macroeconomic variables, or very close related to these (Chen et al., 1997). Studies that have implemented this macroeconomic APM for other countries find that the same types of variables as used by Chen et al. (1986) are priced as well as other more country-specific variables. For example, the growth rate of money supply, oil, gold, and exchange rates with various countries [van Rensburg (1999) for South Africa, Groenwold and Fraser (1997) for Australia, and Antoniou, et al. (1998) for the United Kingdom]. Sadorsky (1999) studied the relationship of oil prices change and stock return for the U.S. and found out that oil price changes and oil price volatility play important roles in affecting equity returns.

Bodie, et al. (2009), outline two principles that guide us when we specify a reasonable list of factors. One, we limit ourselves to systematic factors with considerable ability to explain security factors. If our model calls for many explanatory variables, it does little to simplify our description of security returns. Two, we choose factors that seem likely to be important

risk factors, that is, factors that concern investors sufficiently that they will demand meaningful risk premiums to bear exposure to those sources of risk.

Berry et al. (1998) gave good and simple instructions of what kind of variables qualify as legitimate risk factors in the APM framework. They state that legitimate risk factors must possess three important properties:

1. At the beginning of every period, the factor must be completely unpredictable to the market.
2. Each APM factor must have a pervasive influence on stock returns.
3. Relevant factors must influence expected return; i.e. they must have nonzero prices.

There had been a lot of tests of the APT in different countries, Chen et al. (986) for the United States, Beenstock and Chan, (1988); Poon and Taylor, (1991); and Clare and Thomas, (1994) for the United Kingdom. It is well known that the macroeconomic variables chosen by Chen et al. (1986) have been the foundation of the APT. They were the first to study macroeconomic variables to estimate US stock returns and apply the APT models. They employ seven macroeconomic variables namely: term structure, industrial production, risk premium, inflation, market return, and consumption and oil prices in the period of January 1953 to November, 1984. During the tested period in their research, they found a positive relationship between the macroeconomic variables and the expected stock returns. They noted that industrial production, changes in risk premium, twists in the yield curve, measure of unanticipated inflation of changes in expected inflation during periods when these variables were highly volatile related to expected returns. Consumption, oil prices and market index are not priced by the financial has been discovered. They concluded that asset prices reacted sensitively to economic news, especially to unanticipated news.

Several a-priori guidelines as to the characteristics required by potential factors are, however, suggested by Bhat (2008) are:

1. Their impact on asset prices manifests in their unexpected movements.
2. They should represent un-diversifiable influences (these are, clearly, more likely to be macroeconomic rather than firm-specific in nature).
3. Timely and accurate information on these variables is required.
4. The relationship should be theoretically justifiable on economic grounds.

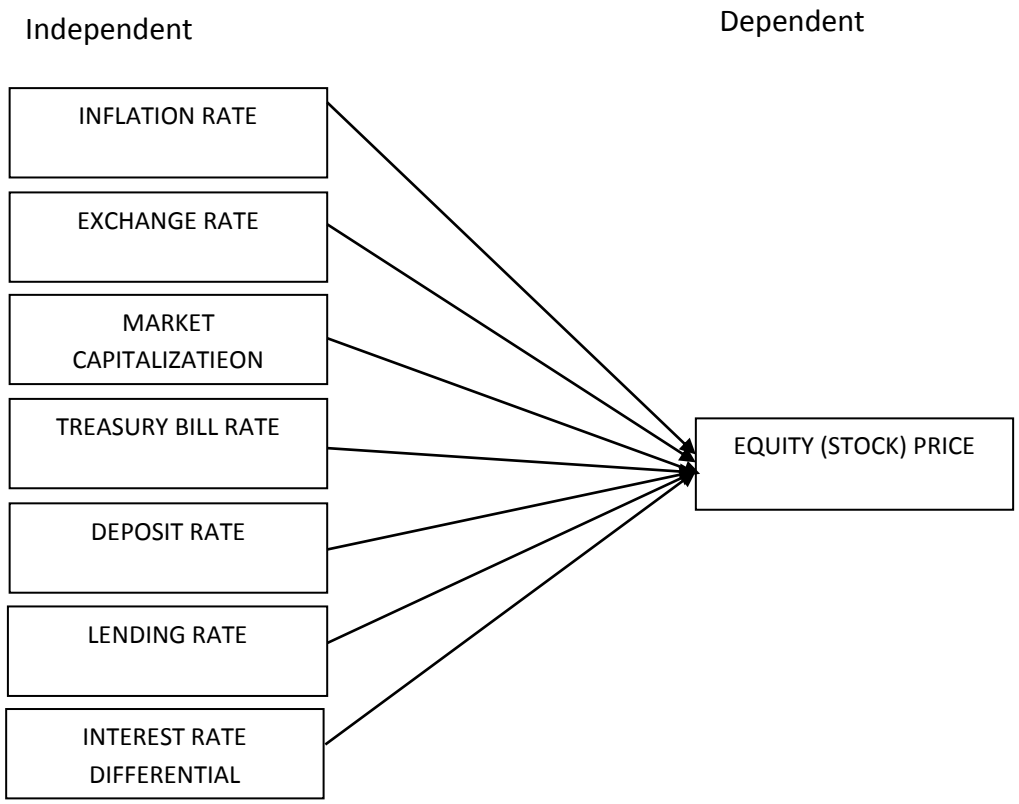

Figure 2.3.1: Concept Mapping: Pre-specified Macroeconomic Variables

According to Paavola (2006), it is worth pointing out why these variables could affect equities' prices:

1. Inflation impacts both on the level of the discount rate and the size of the future cash flows.
2. The term structure of interest rates: Differences between the rates on bonds with a long maturity affect the value of payments far in the future relative to near-term payments.
3. Industrial production: Changes in industrial production affect the opportunities facing investors and the real values of cash flows (Elton et al. 2003).
4. Risk premium: Differences between the return on safe bonds (AAA) and more risky bonds (Baa) are used to measure the market's reaction to risk.

The equity risk premium (ERP) – the expected return of stocks (individual stock or the overall stock market) in excess of risk-free rate – is a fundamental quantity in all of asset pricing, both for theoretical and practical reasons. This excess return compensates investors for taking on the relatively higher risk on the equity market. The size of the risk premium will vary as the risk in a particular stock or in the stock market as a whole changes. High-risk investments are compensated with a higher premium. It is a key measure of aggregate risk-aversion and an important determinant of the role of capital for corporations, saving decision of individuals and budgeting plans for government.

The equity risk premium reflects fundamental judgments we make about how much risk we see in an economy/market and what price we attach to that risk. In the process, it affects the expected return on every risky investment and the value that we estimate for that investment.

Consequently, it makes a difference in both how we allocate wealth across different asset classes and which specific assets or securities we invest in within each asset class.

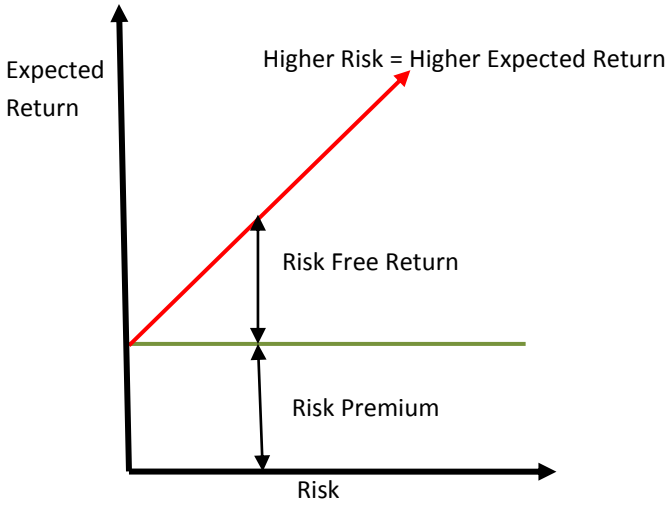

Figure 2.3.2: The Trade-off between Risk and Expected Return

There is a fundamental relationship between the degree of risk associated with a project and the expected return from the project, that is, if the risk is high, the return should also be high. When risk is low, the return may also be low. The relationship is shown in figure 2.3. The equations (2.12 and 2.13) in capital asset pricing model may be stated below:

$E(R) = R_f + \beta(R_M - R_f) + e$ (2.17)

Where R_f is risk-free while R_M is the market return.

The risk-free investment represents an investment in the government securities. If such securities are held to maturity, they do not offer any risk of default on either interest or principal. Accordingly, one can get this return at a zero risk free. For a rational company, this is the minimum acceptable return for any investment. We also notice that the rate of return is dependent upon the degree of risk in a proposal. Thus, risk is an independent variable and return, a dependent variable.

Market return is the expected return on the market portfolio. As, for example, suppose the Nigeria Stock Exchange securities in total showed an 18 per cent annual return last year. An investor holding a portfolio of, say, 3 per cent of every stock on the Exchange would also receive an 18 per cent return. The size of the risk premium increases as the risk of the market portfolio increases. The return on the market portfolio can be determined by taking into consideration the dividend and capital gain (or loss) in relation to a share price at the beginning of the period (Banerjee, 2010).

As an indicator of future activity, a high ERP at short horizons tends to be followed by higher GDP growth, higher inflation and lower unemployment, thus informing both fiscal and monetary decisions. Bloom (2009) and new research by Duarte, Kogan and Livdan (2013), point to large effects of the ERP on real aggregate investment. Hall (2013) and Kuehn, Petrosky-Nadeau and Zhang (2012) have proposed that increased risk-aversion has prevented firms from hiring as much as would be expected in today's macroeconomic environment. From the perspective of financial instability, the so-called 'great rotation' from bonds to stocks could be exacerbated in speed and magnitude if the ERP is persistently high. A sudden flow of money out of bond market into stock market could spell large capital losses for fixed income investors. Low returns in other asset classes could provide incentives for investors to

engage in potentially unsafe "reach for yield" either through excessive use of leverage or through other forms of risk-taking. The ERP is also important from the perspective of unconventional monetary policy: a high ERP may make the portfolio channel of Large Scale Asset Purchases more effective because it further increases the demand for risky assets.
Building on the theme that the equity risk premium is the price for taking risk, it is a key component into the expected return that we demand for a risky investment. This expected return, is a determinant of both the cost of capital, essential inputs into corporate financial analysis and valuation.

The risk in equities as a class comes from more general concerns about the health and predictability of the overall economy. Put in more intuitive terms, the equity risk premium should be lower in an economy with predictable inflation, interest rates, and economic growth than in one where these variables are volatile (Damodaran, 2014). Cornell (1999) summed it up when he stated in equity risk premium that "… the information that is predictable is worthless because it is already reflected in stock prices. The information that is valuable and can be used to make money is that information which cannot be predicted".
Lattau, Ludwigson and Wachter (2008) link changing equity risk premium in the United States to shifting volatility in the real economy. In particular, they attribute that the lower equity risk premiums of the 1990s (and higher equity values) to reduced volatility in real economic variables including unemployment, consumption and gross domestic product growth.

A related strand of research examines the relationship between equity risk premium and inflation, with mixed results. Studies that look at the relationship between the level of inflation and equity risk premiums find little or no correlation.
In contrast, Brandt and Wang (2003) argue that news about inflation dominates news about real economic growth and consumption in determining risk aversion and risk premiums. They present evidence that equity risk premiums tend to increase if inflation is higher than anticipated and decrease when it is lower than expected. Reconciling the findings, it seems reasonable to conclude that it is so much the level of inflation that determines equity risk premiums but uncertainty about the level.
The economic logic underlying these variables seems to make sense. Common stock prices are the present values of discounted cash flows. The industrial production index is obviously related to profitability. The remaining variables are related to the discount rate.

2.4 Empirical Review
The development of Arbitrage Pricing Theory (APT) has led to the conduct of a series of tests using different proxies for APT factors and factor loading. Moreover, testing the APT model does not require identification of the true market portfolio (Drake and Fabozzi, 2010). Early tests include Ross (1976); Roll and Ross (1980), Chen (1983), Chen, Roll and Ross (1986), etc. If a set of variables or characteristics or factors that affect expected price could be specified a priori, then the market price of these characteristics over any period of time could be measured fairly easily. Shanken (1982) raises some doubts about the empirical validity of APT. He showed that the usual formulation of the testable implications of the APT is inadequate, as it precludes the very expected return differentials which the theory attempts to explain.

Much debate has gone on about the number of factors in APT. Although the APT does not provide a clear basis for identifying the macroeconomic factors that are related to stock prices with respect to causality (Isenmila and Erah, 2000), there are, however, several variables that

have been identified in the literature as important determinants of stock prices and we examine them as follows:

2.4.1 Inflation rate

There is no theoretical consensus on the existence of a relationship between stock returns and inflation rate or on the direction of the relationship, and the empirical findings in this regard have been at polarity. In supporting the existence of a relationship, Udegbunam and Oaikhenan (2002) conducted a study on the Nigerian Stock Market by examining the relationship between stock prices and inflation and their results provided a strong support for the proportion that inflation exerts a significant negative influence on the behavior of the stock prices.

Javed, et al (2014) examines the possible impact of macroeconomic variables like fiscal policies and monetary policies (interest rate) and inflation rates on stock market performance in Pakistan. They applied the Pearson correlation and regression analysis techniques. It was found that Pakistan stock market index is significantly affected by the fiscal policy, monetary policy and inflation. The results show that the interest rate and government revenue have a significant negative relationship with the stock market index in Pakistan, whereas the inflation rate and the government expenditures have a significant positive relationship with the stock market index in Pakistan.

Terfa (2011) examines the relationship between the stock market and selected macroeconomic variables in Nigeria. The All-share index was used as a proxy for the stock market while inflation, interest and exchange rates were the macroeconomic variables selected. Employing error correction model, it was found that Treasury-bill and inflation rates were not significant. The results suggest that they were negatively related to the stock market in the short run. Thus, achieving low inflation rate and keeping the Treasury Bill Rate low could improve the performance of the Nigerian stock market.

Li and Wearing (2002), in their study of the effect of inflation on the stock prices on Kuwait Stock Exchange discovered that inflation significantly impacts stock prices negatively. Similar to developed markets, Naka, Mukherjee and Tuftee (1998) for India indicate that inflation is the largest negative determinant of stock prices. Maghayereh (2002) and Adel Al-Sharkas (2004) also show reliable negative relationship between Jordan stock prices and inflation.

Mohammad, Naqvi, Lal, and Zehra (2012) analyzed the variability of Arbitrage Pricing Theory (APT) in case of Karachi Stock Exchange (KSE). The study used monthly data from January 1985 to December 2008 and two econometric methodologies. Johansen co-integration and error correction model were used to check-out the validity of APT in the study. The conclusion of this study illustrates that on the contrary, bullion price and inflation rate are insignificant regarding to KSE 100 index returns.

Mpohamba (1955) used autoregressive distributed lag (ARDL) approach for the case of Germany covering the period 1935 – 1954. The results reveal that in the long-run, inflation and real interest rate exerted positive impact on stock prices. A stable long-run relationship between economic growth and stock prices was found.
Hamao (1988) replicated the Chen, Richard and Ross (1986) study in the multi-factor APT framework. By applying an unbalanced panel data, he showed that the Asian stock returns

were significantly influenced by the changes in expected inflation, and the unexpected changes in both the risk premium and the slope of the term structure of interest rates.
Akmal (1997) investigated the relationship between equity market prices and inflation in Algeria for the period 1971-1996 by employing the autoregressive distributed lag (ARDL) approach to observe co-integration among variables and provided evidence that equity returns are hedge against inflation in the long run.

Geetha, Mohidin, Chandran and Chong (2011) investigate the relationship between stock market, expected inflation rate, unexpected inflation rate, exchange rate, interest rate and GDP in the case of Malaysia, US and China. They use co-integration test to determine the number of co-integrating vector, which shows the long-run relationship between the variables while the short-run relationship was determined using the Vector Error Correction model. Their results indicate that there is a long run co-integration relationship between stock markets and those variables in Malaysia, US and China. On the other hand, there is no short run relationship between the stock market, unexpected inflation, expected inflation, interest rate, exchange rate and GDP for Malaysia and US using VEC. However, China's VEC result shows that there is a short-term relationship between expected inflation rates and China's stock market.

Many other early studies of Lintner (1973), Jaffe and Mandelker (1977) and Fama and Schwert (1977) examine the relationship between inflation and stock prices. Most of these studies test the Fisher hypothesis which predicts a positive relationship between expected nominal returns and expected inflation and their findings are inconsistent with the Fisher hypothesis. They all report a negative linkage between stock returns and inflation. However, Firth (1979) observes a positive relationship between nominal stock returns and inflation when studying the relationship between stock market returns and rates of inflation in the United Kingdom. However, different countries have different financial and economic structures which need to be estimated using different proxies and methodologies.

2.4.2Exchange Rate

Dornbusch and Fisher (1980) developed a model of exchange rate determination that integrates the roles of relative prices, expectations, and the assets markets, and emphasize the relationship between the behavior of the exchange rate and the current account. Mishra (2004), and Apte (2001), found a significant positive relationship between stock prices and exchange rates. Adjasi and Biekpe (2005) showed that in the long-run exchange rate depreciation leads to increase in stock market prices in some of the countries, and in the short-run, exchange rate depreciation leads to market returns. On the other hand, some studies, such as Choi, Fang and Fu (2008) showed the possibility of a very weak or no relationship between stock prices volatility and exchange rates movement.

Using quarterly data, Adaramola (2011) studied the impact of macroeconomic variables on stock prices in Nigeria between 1985 and 2009. He found that exchange rates had strong influence on Nigeria stock prices.
Granger Causality model was applied after removing the effect of unit root from the data series by Rasool, Fayyaz, and Mumtaz (2012) in assessing the causal relationship between the stock price index of KSE (Karachi Stock Exchange) and Exchange Rate (ER), Foreign Exchange Reserve (FER), Industrial Production Index (IPI), Interest Rate (IR), Imports (M), Money Supply (MS), Wholesale Price Index (WPI) and Exports (X). The relationship between industrial production index, wholesale price index, money supply, treasury bills rates, exchange rates and Indian Stock Index was examined by Naik and Padhi (2012)

applying Johansen's co-integration and vector error correction as well as Granger Causality model. The result, in line with the Arbitrage Pricing Model, reveals that macroeconomic variables and the stock market index are co-integrated and hence, a long-run equilibrium relationship exists between them. Stock prices related positively to money supply and industrial production but negatively relate to inflation while exchange rate and interest rate are insignificant determinants. Granger causality test reveals that macroeconomic variable causes the stock prices in the long-run.

It was revealed that macroeconomics variables and stock prices related even in the long-run as support by Naik and Padhi (2012). Naik and Padhi (2012) applied Johansen's co-integration and vector error correction as well as Granger Causality model. FER, IR, M, MS, and WPI relate positively and significantly with stock prices, while ER and X show a negative and insignificant association with stock prices. IPI has a negative but significant relationship with stock prices. Granger Causality reveals that MS and WPI have bidirectional relation; ER, FER, and M have unidirectional relationship while IPI, IR and X shows no causal relationship with stock prices.

Bhattacharya, et. al. (2001) analyzes the causal relationship between the stock market and three macroeconomic variables in India's case using the Granger non-causality. These macroeconomic variables are: exchange rate, foreign exchange reserves and trade balance. The results suggest that there is no causal linkage between stock prices and three variables under consideration.

In their study based on six Asian countries, Doong, et al (2005) investigates the relationship between stocks and exchange rate using the Granger causality test. According to their results, there is a significantly negative relation between the stock returns and change in the exchange rates for all the included countries except one.

Gay (2008) investigates the relationship between stock market index price and the macroeconomic variables of exchange rate and oil price for emerging countries (Brazil, Russia, India and China) using the Box-Jenkins ARIMA model. He finds no significant relationship between respective exchange rate and oil price on the stock market index prices in any of the emerging countries. He concludes that this result suggests that the market of Brazil, Russia, India, and China exhibit the weak-form of market efficiency.

Bundoo (2009) focuses on the arbitrage pricing theory (APT) framework to analyze several macroeconomic factors likely to influence the market return (SEMDEX return) on the stock exchange of Mauritius (SEM). Seven variables were considered including exchange rate. The sample data are monthly observations from January 2002 to December 2006. Four variables are statistically significant at the 10% level or better in explaining variation in the equity premium on the SEM. The most important variable is the exchange rate.

Maysami, Howe and Hamzah (2014) examine the long-term equilibrium relationships between selected macroeconomic variables and the Singapore stock market index, as well as with various Singapore Exchange indices – the finance index, the property index, and the hotel index. It was find that the Singapore's stock market and the property index form co-integrating relationship with changes in the short and long-term interest rates, industrial production, price levels, exchange rate and money supply.

Menike (2006) investigates the effects of macroeconomic variables on stock prices in emerging Sri Lankan stock market using monthly data for the period from September, 1991 to December, 2002. The null hypothesis states that money supply, exchange rate, inflation rate, and interest rate variables collectively do not accord any impact on equity prices is rejected at 0.05 level of significance in all stocks. The results indicate that most of the

companies report a higher R^2 which justifies higher explanatory power of macroeconomic variables in explaining stock prices. Exchange rate reacts mainly negatively to stock prices.

2.4.3 Market capitalization

The contemporary view of economic development holds that a major requirement for economic advancement is a developed code of business laws, institutions, and regulations that allow citizens to legally own, capitalize, and trade capital assets. As a corollary, we expect that development of equity markets will serve as catalysts for enrichment of the population, that is, that with large relative capitalization of equities will tend to be richer. Bodie, et al. (2009) opined that developed markets for corporate equity contribute to the enrichment of the population, and that an increase in the ratio of market capitalization to GDP is associated with an increase in per capita GDP. The principal theory is that the price movement of a stock indicates what investors feel a company is worth. We don't equate a company's value with the stock price. The value of a company is its market capitalization, which is the stock price multiplied by the number of shares outstanding (i. e. is calculated as current market price per share times the number of shares outstanding). It is common to refer to public firms as small capitalization, medium capitalization or large capitalization (while the definition changes overtime with growth in stock prices). Most investors are interested in the company's market capitalization. It represents the value of shares owned by stockholders.
Mohammad (2011) uses Multivariate Regression Model computed on Standard OLS formula and Granger causality test to model the impact of changes in selected microeconomic and macroeconomic variables on stock returns in Bangladesh. He examines monthly data for all the variables under study covering the period from July 2002 to December 2009. The study finds that market Prices/Earnings and growth in market capitalization have a positive influence on stock returns. However, no unidirectional Granger Causality is found between stock returns and any of the independent variables and the lack of Granger Causality reveals the evidence of an informationally inefficient market.

2.4.4 Treasury Bills

Treasury bills, popularly known as T-bills, are short-term finance bills issued by the government as a means of borrowing money from the public. They are not backed by any trade instrument, like the commercial papers. These bills are highly liquid and risk-free as they are backed by a guarantee from the government. The loans raised through treasury bills are of temporary or short term in nature. The bills are the major source of short-term funds for the government to bridge the gap between revenue and expenditure.
Adoo (2016) examines the impact of interest rates and Treasury bill rates on stock market return on Ghana Stock Exchange over the periods between January 1995 and December 2011. He used Johansen's Multivariate Co-integration Model and Vector Error Correction Model to establish that there is co-integration between Treasury bill rate and stock market returns indicating long-run relation. The study employs multiple regression analysis approach (OLS) carried out by Eview 7 program, the result show that T- bill rate have negative relationship with stock market returns but is not significant. The results tend support to the idea that T-bill rate has negative relationship but weak predictive power on the stock return. He concluded that T-bill rate impact on stock market return on the long run.
Khalid, Muhammad (2012) investigates long-run effect of macroeconomic variables on the movement of Karachi Stock Exchange (KSE) return. The monthly data of inflation, exchange rate, Treasury- bill and stock return is taken from the period of January 2000 to December 2010. The result of descriptive statistics revealed that KSE return provides highest return. Co-integration is used for the purpose to explore the long-run co-movement between different series. The result showed that there is no co-movement between variables and KSE return.

The data was not stationary at ADF & PP level, but at first difference data become stationary. The result of the correlation shows that there is no significant positive correlation among these variables. There is insignificant positive correlation between T-Bill and inflation and T-Bill and Exchange rate. In order to investigate the direction of flow of information Granger causality test is used. The result shows that exchange rate granger causes the RM. Similarly, inflation granger causes the T-Bill. The result of impulse function response showed that changes in stock prices of KSE are due to by itself. T-Bill exerts pressure on inflation.

Mahedi (2012) examines the long-run relationship and the short-run dynamics among macroeconomic variables and the stock returns of Germany and the United Kingdom. He uses the Johansen Co-integration test to indicate the co-integrating relationship between the stock prices and macroeconomic determinants. And then, he used error-correction models to investigate both the short and long-term casual relationships and each case is examined individually. For Germany case, the results show that the short-run causality runs from stock returns to inflation, from money supply to stock returns and from industrial production to stock returns. The long-run causality runs from inflation to stock returns and from exchange rate to stock returns. There is only one short and long-run relationship, that is, from the stock returns to industrial production. For the United Kingdom case, he finds that the short- run causality run from stock returns to T-bill, from stock returns to money supply, from stock returns to exchange rate, exchange rate to stock returns and stock returns to industrial production. The long run causality runs from inflation to stock returns. The short and long-run causal relationship runs from stock returns to inflation, from money supply to stock returns and from industrial production to stock returns. These results indicate the existence of short-run interactions and long term causal relationship between both Germany and the UK stock markets and the macroeconomic fundamentals.

Quadir (2012) investigates the effects of macroeconomic variables of treasury-bill, interest rate and industrial production on stock returns on Dhaka stock exchange for the period between January 2000 and February, 2007 on the basis of monthly time series data applying Autoregressive Integrated Moving Average (ARIMA) model. The overall market stock return was taken as an independent variable. The stock returns of different companies are not considered separately. The results show that although ARIMA model finds a positive relationship between treasury-bill, interest rate and industrial production with market stock returns but the coefficients have turned out to be statistically insignificant.

2.4.5 Deposit Rate

Deposit rate is the interest rate paid by financial institutions to deposit account holders. It include certificate of deposits, savings accounts and self-directed deposit retirement accounts. These rates help individuals and companies in making right decisions about either to deposit their resources in banks or to invest in securities. Increase of deposit interest rates lead to deposit more surpluses in banks. On the other hand, the decrease leads to invest more in financial markets.

Asankha (2012) examine the dynamic relationships between stock market performance and interest rate in Sri Lanka during June 2004 to April 2011. He used all share price index in the Colombo stock exchange as a measure of stock market performance indicator and Sri Lanka Interbank offer rate as a measure of interest rate. He employed some conventional time series econometric techniques namely unit root test, co-integration test, Vector Autocorrelation model (VECM), Granger causality test and Impulse response function (IRF) to trace out the relationship between stock market index and interest rate. The findings reveal that stock

market performance is negatively associated with interest rate in the long –run while no causal relationship is found in the short run.

2.4.6 Lending Rate

The stock market reflects the overall health of the economy. One measure of the health is rising or falling interest rates. Interest rate is the cost of borrowing or using someone else's money. The Central Bank of Nigeria (CBN) raises or lowers interest rates to fight inflation or make it easier for companies to borrow money. Most commercial lending institutions follow the CBN's lead. All of this up-and-down adjustment affects the stock market. Investors have to learn to calculate the impact of rate changes on stock prices.

Stock prices depend on companies' profitability. When companies have to pay more to borrow money, the additional interest expenses eats into companies' profits. If investors perceive that companies can't make up for the lost profits, stock prices may drop. Higher interest rates signal investors to monitor company profits to see if the stock price is too high because it is based on old assumptions about interest rate. On the other hand, declining interest rates signal cheaper borrowing for companies. This can influence a rise in stock prices if investors perceive that companies will spend less on their profits on interest.

When interest rates are low it is possible to borrow large sums of money for cheap and invest them in an attempt to earn higher returns. For example, imagine borrowing money at 5 percent and investing it in the stock market for 10 percent.

Cohen, Diether and Malloy (2007) use data on loan fees and loan accounts to identify cases where a shift to shorting supply clearly occurs. For example, when prices (loan fees) and quantity (loan amounts) both increase, an upward shift in demand must have occurred, and when prices and quantities both decrease, an upward shift in supply must have occurred. However, while a shift in demand (or supply) may be identified by the empirical strategy, it does not rule out that a shift in supply (or demand) did not also occur simultaneously, but to an extent. Hence, the magnitude of the shift in demand or supply is unknown, making interpretation of the size of the impact on price difficult. The authors find significant price responses associated with demand shifts, but no price responses associated with supply shifts.

The interest rate represents an opportunity cost for investing in stocks, and a component of the equity capitalization rate. Therefore, it is considered as one of the most important factors affecting the behavior of investors in the market. To the extent that stocks tend to suffer as interest rate goes up, equities are a risky investment, and those stocks that are particularly vulnerable to increases in the general level of interest rates are especially risky (Malkiel, 2003).

Using historical data from 1890-1979, Grossman and Shiller (1981) showed evidence that stock price movement can be attributed to real interest rate movement. They study examined how historical movements can be justified by new information.

It should be noted that rising interest rates do not automatically result in dropping stock prices, and falling interest rates do not necessarily mean more cash and profits for companies, and therefore higher stock prices. If investors perceive that the CBN raises interest rates to keep inflation down, that can be good for businesses. Stock might rise in that circumstance. Similarly, if investors think the CBN is lowering rates because of declining economy, stocks may seem less attractive and market prices could go down.

2.4.7 Interest Rate Differential

Conventional wisdom has historically suggested that there exists an inverse relationship between interest rates and stock valuations. The logic goes something like this. When interest

rates fall, fixed income investments become less competitive because of their lower yields, and therefore, stocks become more attractive as a result. Conversely, when interest rates rise, fixed income investments become more competitive because of their higher yields, and therefore, stocks become less attractive as a result.

A sudden flow of money out of bond market into stock market could spell large capital losses for fixed income investors. Low returns in other asset classes could provide incentives for investors to engage in potentially unsafe "reach for yield" either through excessive use of leverage or through other forms of risk-taking. The Interest Rate Differentials (IRD) is a differential measuring the gap in interest rates between two similar interest bearing assets. When interest rates fall, there will be a surge in the value of stock investment as individuals and groups like hedge funds borrow to invest. The longer interest rates stays low the more leverage might end up being deployed. Investments involving lending money might see lower returns. For example, bonds would command lower interest rates (this is the differential in interest rate). With high interest rates, the stock market would be fueled by less borrowing. This might not mean declining values in the stock market, but it might move slower. However, investments like bonds and Certificate of Deposits (CDs) would become more valuable since they would command higher interest rates. As interest rate rises, bonds become more attractive investment, given their risk-return characteristics; this motivates investors to adjust their investment portfolios by buying bonds and selling stocks, thus depressing stock prices. 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 prices.

Traders in the foreign exchange market also use interest rate differentials when pricing forward exchange rates. Based on the interest rate parity, a trader can create an expectation of the future exchange rate between two currencies and set the premium (or discount) on the current exchange rate future contract.
Kitamura and Akiba (2006) examine the effects of interest rate differential as inflowing information into the Forex market on the yen/dollar exchange rate and unexpected volume by a structure VAR model. The impulse response shows that the short-term interest rate differential affects the exchange rate through: (a) UIP with little change in unexpected trading volume; and (b) different expectation revisions at different points in time with a high transaction volume. The effects of long-term interest rate differential on the exchange rate appear instantaneous with high trading volume, reflecting instantaneous reshuffling in international portfolio holdings of long-term assets.
The above review of related literature is an indication that there are varying results from different countries, sectors and firms within the same industry.

2.5 Macroeconomic Variables and Equity Risk Premium
A central theme in finance and economics is the pursuit of a unified theory of the rate of return across different classes of financial assets (Constantinides, 2002). In particular, we are interested in the mean, covariability, and predictability of the return of financial assets. At the macro level, we study the short-term risk-free rate, the term premium of long-term bonds over the risk-free rate and the aggregate equity premium of long-term bonds over the risk-free rate and the aggregate equity premium of the stock market over the risk-free rate. The neoclassical rational economic model is a unified model that views these premia as the reward to risk-averse investors that process information rationally and have unambiguously defined preference over consumption.

Macroeconomic trends have exceptionally strong influence on stock markets (Nestorovski and Naumoski (2013). Periods of economic distortions, followed by recession, as well as periods of economic boom are causing significant movements on the stock market and increase volatility. Economic crisis through the history has definitely affected the increase in volatility of investment in shares. Moreover, in times of economic crisis it comes to an increase in risk aversion among market participants because of uncertainty about what will happen in the future. Therefore, it is logical that investors will demand higher compensation in the form of traditional return for investing in stocks during economic downturns than during expansionary phases of the business cycle. That extra return that should stimulate investment is the risk premium.

The Equity Risk Premium (ERP) is the expected future rate of return on equity securities in excess of the risk-free rate (Damodaran, 2014); and equity indexes are fairly volatile (Chandra, 2012). The expected return has far-reaching economic and financial implications for corporations, governments and individuals, because ERP estimates are used for allocating capital (it is a key measure of aggregate risk-aversion and an important determinant of the cost of capital for corporations), pricing assets (a fundamental quantity in all of asset pricing-both for theoretical and practical reasons), and determining quantities reserved for future obligations (savings decisions of individual and budgeting plans for government).
The ERP represents a key assumption in almost every method of deriving discount rates for asset pricing, including the capital asset pricing model (CAPM), the arbitrage pricing model, the multifactor model, and others.

The issue of whether stock returns are predictable is still an active area of research. As an indicator of future activity, a high ERP at short horizons tends to be followed by higher GDP growth, higher inflation and lower unemployment (see for example, Piazzesi and Schneider, (2007), Stock and Watson (2003), and Damadara (2014), Bloon (2009), and Duarte, Kogan and Livdan (2013) study connections between the ERP and real aggregate investment. As a potential explanation of the jobless recovery, Hall (2014) and Kuehn, Petrosky-Nadenu and Zhang (2012) propose that increased risk-aversion has prevented firms from hiring as much as would be expected in the post-crisis macroeconomic environment. Among many others, Adrian, Covitz and Liang (2013) analyze the role of equity and other asset prices in monitoring financial stability.

The risk in equities as a class comes from more general concerns about the health and profitability of the overall economy. That is, the equity risk premium should be lower in economy with predictable macroeconomic variables. Many authors have shown the relation between the state of the economy and the market risk premium. In that light, Rietz (1998) takes the probability of major catastrophic events to explain the high risk premiums, and Barro (2006) makes extension of this argument. Gabaix (2009) expanded the Barro-Rietz model with the inclusion of time-varying losses during the disaster. Barro, Nakamura, Steinsson and Ursua (2009) used panel data for 24 countries for more than 100 years in their study of the empirical effects of economic shocks. They found that the average duration of economic shocks in six years and half of the short term impact of economic shocks is reversed in the long-run.

Arouri and Jawadi (2011) explore the market risk premium in the United States during the economic crisis. In fact they followed the evolution of the expected risk premium in periods of economic crisis. They found a large growth of the global risk premium precisely in periods of significant economic disturbance: the oil crisis (1973-1974), the monetary experiment

(1979-1982), Gulf War (1991-2003) and crises in emerging countries (1992, 1993, 2001) and the terrorist attack (2011). Most importantly, the recent global economic and financial crisis (2007-2009) led to a significant increase in the world price of risk which indicates a reasonable lack of confidence about the future of financial markets. Furthermore, they found that the systematic risk in the U.S. was significantly higher in the periods of economic distortion, especially in the period of financial crisis (2007-2009). Accordingly, the premium raised in those periods.

Imran and Zakaria (2014) used monthly data in their study from July 2001 to December 2013 in the co-integration analysis of macroeconomic variables as determinants of Equity Risk Premium. ERP has been used as endogenous variable while interest rate, inflation, exchange rate and foreign private investment have been used as exogenous variables. Augmented Dicky Fuller and Phillop Perron test has been used to verify that test is stationary at same level. Schwartz information criterion has been used to find the suitable lag length for performing co-integration test. Co- integration test has confirmed that there is long term relationship between endogenous and exogenous variables. In order to confirm the causality of relation they perform Granger causality test and found that interest rate does granger cause to equity risk premium followed by exchange rate that causes equity risk premium at 10% significant level. Variance decomposition and impulse response showed the interest rate has significant effect followed by exchange rate and inflation over equity risk premium. Foreign private investment has no or very little effect on equity risk premium.

Radulescu and Pele (2014) estimate the relation between the equity risk premium and the fundamental macroeconomic and financial variables in the United States during the period 1964-2012 by applying the standard OLS regression and the Hodrick-Prescot filter. Consequently, based on these results and applying the ARIMA models, they forecast the evolution of the equity risk premium in the United States for the period 2013-2016. According to their results, the equity risk premium in the United States is gradual increase in the following years, an evolution determined by FED monetary policy perspectives, but also by the narrowing of the private consumption gap.

Using annual and quarterly data since 1952, Boucher (2012) estimates a fundamentals-based empirical model for the earning-price ratio of US stocks. The key fundamental-variable is a time-varying discount rate, decomposed into time-varying measure for the real interest rate and the equity risk premium. Applying the Johansen procedure, he explicitly estimated the equity risk premium with co-integration test in an error correction model. This equity risk premium is determined by GDP volatility and price inflation. In a lesser extent, the share of U.S. equities held by institutional investors can explain the risk premium. Demographic variables explain the earning-price ratio but only as a short-run phenomenon. His results suggest that change in the macroeconomic equity risk premium has driven much of the recent run-up in stock prices.

Pastor and Veronesi (2012) analyze how changes in government policy affect stock prices. Their general equilibrium model features uncertainty about government policy and a government whose decisions have both economic and noneconomic motives. The model makes numerous empirical predictions. Stock prices should fall at the announcement of a policy change, on average. The price decline should be large if uncertainty about government policy is large, and also if the policy change is preceded by a short or shallow economic downturn. Policy changes should increase volatilities and correlations among stocks. The jump risk premium with policy decisions should be positive, on average.

As equity prices decline significantly and inflation rates increased in the late 1970s, Modigliani and Cohn (1979) argued that low equity value of that period were the consequence of investors being inconsistent about their dealings with inflation. They argued that investors were guilty of using historical growth rates in earnings, which reflected past inflation, to forecast future earnings, but current interest rate, which reflected expectations of future inflation, to estimate discount rates. When inflation increases, this will lead to a mismatch, with high discount rate and low cash flows resulting in asset valuations that are too low (and risk premiums that are too high).

In the Modigliani-Cohn model, equity risk premiums will rise in periods when inflation is higher than expected and drop in periods when inflation is lower than expected.
Campbell and Voulteenaho (2004) update the Modigliani-Cohn results by relating changes in the dividend to price ratio to changes in the inflation rate over time and find strong support for the hypothesis.

2.5 Knowledge Gap

These years witnessed a lot of changes in the Nigerian economy and in the capital market, especially in the secondary market. With changes taking place at terrific pace in the field of investments, it has become a specialized activity demanding scientific plans and procedure for success. Policy measures and steps initiated in the economy on a phased manner definitely be affected the future cash flows of the companies and in turn affect the return expectations and risk tolerance of investors. This leads to investment decision- making more complex.

Equity risk premiums are a central component of every risk and return model in finance. It is a key component into the expected return that we demand for a risky investment. It is the price for taking risk. This expected return is a determinant of both the cost of equity and the cost of capital, essential inputs into corporate financial analysis and valuation.
Equity risk premium is a market-wide number in the sense that it is not company-specific but affects expected returns on all risky investments, and by extension, reduces their value. Consequently, the choice of an equity risk premium may have much larger consequences for value than firm-specific inputs.

A survey of related literature show that studies on the statistical factors model (factor likelihood) are centered on advanced and Asian countries neglecting most of the African countries, particularly Nigeria. The few Nigerians, for example, Asaolu and Ogunmuyiwa (2011) and Izedonmi and Abdullabi (2011), to shrink this gap failed to subject their studies to two-pass regression technique; and also others based their studies only on macroeconomic variables. This paper, therefore, studies the two models (statistical factors and enlarged pre-specified macroeconomic variables models), made comparison of the two models, subjecting them to two-pass regression, thereby finding the effects of both the latent and observable factors on investors in the pricing of financial assets in the Nigerian Capital Market
Doing so:

(1) It may give us a way of estimating an "intrinsic" equity risk premium, based upon macroeconomic variables that are less susceptible to market moods and perceptions;

(2) We may get better understanding of what causes equity risk premium to change over time; and

(3) We may be able to come up with better estimate of future premiums.

3. Methodology

3.1 Research Design

The relationship between inflation rate, exchange rate, premium motor spirit price, treasury-bill, market capitalization, lending rate, deposit rate and interest rate differential and share prices in Nigeria equity market is examined in the study. The study employed the survey research design in conjunction with econometric procedure. The econometric model in the data analysis is consistent with the studies done by Naik and Padhi (2012), Odion (2013), Saeed and Akhten (2012), Izedonmi and Abdullahi (2011), and Ozcan (2012). The study used investigative econometric research design which undertakes the examination of a data-set, and determines potential relations between variables using monthly data.

3.2 Population

The population of this study comprises all of the stocks quoted in the Nigerian equity market.

3.3 Sample size

Theoretically, APM is testable for any subset of the market. For the present study, closing share prices of fifty (50) companies listed in the Nigerian Stock Exchange are collected on a monthly basis. The companies are selected on the basis of certain criteria: (1) the companies continuously constituted the NSE share index; and (2) traded at least for a period of three years. Convenient sampling in conjunction with random sampling technique was used to select the 50 stocks.

3.4 Data collection Method

The study is based on secondary data. Time series of share prices data pertaining to these selected companies and eight selected macroeconomic variables are considered on the basis of the criteria comprising of the characteristics of the economy, economic significance and its relation with systematic risk. All these variables selected have some impact on the future cash flows or discount rate of an organization.

Data related to Nigerian economy for this study are collected from the official publication and websites of Government of Nigeria, Central Bank of Nigeria (CBN) Statistical Bulletin, and Nigerian Stock Exchange Fact book (various issues).

3.5 Operational measures: Description of Variables

3.5.1 Dependent variable:

Nigerian stock exchange All-Share Index is used as a proxy for stock market returns (SMR). The All-Share Index (ASI) is a broad market indicator of the stock market, which measures the overall performance of the stock market and is specified as the dependent variable.

3.5.2 Independent variables:

Inflation Rate (Inf. R)

Inflation is a rise in consumer prices, increasing cost of living. Inflation is captured by consumer price index (CPI).

Exchange Rate (ER)

The price at which one currency is traded for another in the foreign exchange market is the exchange rate between the two countries. Exchange rate is the bilateral nominal rate of exchange of the Naira against one unit of a foreign currency, Dollar ($). Exchange rate is the price of a unit of a given currency in relation to other currencies.

Market Capitalization
Market capitalization (market cap) captures the market value at a point in time of the shares outstanding of a publicly traded company, being equal to the share price at that point in time times the number of shares outstanding. Market capitalization is used by the investment community in ranking the size of companies.

Treasury Bills
Treasury bills, popularly known as T-bills, are short-term finance bills issued by the government. They are short term securities sold by the government as a means of borrowing from the public.
At the bills maturity, the holder receives from the government a payment equal to the face value of the bill.

Interest rate differentials (IDR)
Interest rate differential is a differential measuring the gap in interest rates between two similar interest bearing assets.

Lending rate (LR)
Lending rate is the bank rate that usually meets the short and medium-term financing needs of the private sector.

Deposit rate (DR)
Deposit rate refers to the amount of money paid out as interest by a bank or financial institutions on cash deposit on savings and other investment accounts (certificate of deposits, self-directed deposit retirement accounts, etc.).

3.6 Model specification
The study follows the approach of Chen, Roll and Ross (1986).
Pre-specified Arbitrage Pricing Model can be defined thus:

$$
\begin{aligned}
r_{it} &= \alpha_{0\,1} + b_1\, t\, b\, r_{\,t} + e_{it\,1} \\
r_{it} &= \alpha_{02} + b_2 i\, n\, f_{\,t} + e_{it\,2} \\
r_{it} &= \alpha_{0\,3} + b_3 e\, x\, c\, h_{\,t} + e_{it\,3} \\
r_{it} &= \alpha_{0\,4} + b_4 c\, p\, z_{\,t} + e_{it\,4} \\
r_{it} &= \alpha_{0\,5} + b_5 l\, r_{\,t} + e_{it\,5} \\
r_{it} &= \alpha_{0\,6} + b_6 d\, r_{\,t} + e_{it\,6} \\
r_{it} &= \alpha_{0\,7} + b_7\, id\, r_{\,t} + e_{it\,7}
\end{aligned}
\qquad (3.1)
$$

Where r_{it} represents the return of security i at time t, tbr, pms, inf, excg, cpz, lr, dr and idr are treasury bill, Premium motor spirit, inflation, exchanges rate, capitalization, lending rate, deposit rate and interest rate differential respectively. Equations represented by (3.4) are time series or one pass regressions and their corresponding two pass or cross-sectional regression is given as:

$$E(R_i) = R_f + \beta_{i,F1}\left[E(R_{F1}) - R_f\right] + \beta_{i,F2}\left[E(R_{F2}) - R_f\right] + \ldots + \beta_{i,F7}\left[E(R_{F7}) - R_f\right] \quad (3.2)$$

$$\bar{r} = \alpha_1 b_1 + \alpha_2 b_2 + \alpha_3 b_3 + \alpha_4 b_4 + \alpha_5 b_5 + \alpha_6 b_6 + \alpha_7 b_7 + w_i \quad (3.3)$$

Where $b_1, \ldots, b_7$ are Treasury bill risk premium, inflation risk premium, exchange rate risk premium, capitalization risk premium, lending rate risk premium, deposit rate risk premium, and interest rate differential risk premium respectively. It is assumed that $E(z/w) = 0$.
This models assets that investors want to be compensated for all the risk factors that systematically affect the return of an asset. The compensation is the sum of the products of each risk factor's systematic risk ($\beta_{i,F1}$), and the risk premium assigned to it by the financial market$[E(R_{F2}) - R_f]$.
Thus, the contracting test equation based on the residual technique can be stated as:

$$w_i = c_0 + \beta_{i1} + c_2\beta_{i2} + \cdots + c_0\beta_{in} + \varepsilon_{i1} \quad (3.4)$$

$$z_i = \alpha_0 + \alpha_1\beta_1 + \alpha_2\beta_2 + \alpha_3\beta_3 + \alpha_4\beta_4 + \alpha_5\beta_5 + \alpha_6\beta_6 + \alpha_7\beta_7 + \varepsilon_i \quad (3.5)$$

Equation (3.6) shows that the residuals of the pre-specified APT are expressed as direct function of the factors in the statistical APM; while equation (3.7) indicates that the residuals of the statistical APM are expressed as direct function of the factors in the pre-specified APM. This is referred to as contrasting test.
The following assumption about linearity of the relationship between risk premium and the macroeconomic variables are made. Hence our model is described as:
$E(R_i)=R_f+\beta_i, F_1\,[E(R_{F1}) - R_f] + \beta_{i,F2}[E(R_{F2})-R_f] + \ldots + \beta_{iFN}[E(R_{FN}) - R_f]$ (3.6)

$$y_i = \alpha_0 + \alpha_1\beta_1 + \alpha_2\beta_2 + \alpha_3\beta_3 + \alpha_4\beta_4 + \alpha_5\beta_5 + \alpha_6\beta_6\alpha_7\beta_7 \quad (3.7)$$

Based on the model the following hypotheses are developed.
Hull hypothesis (H_0): states that none of the values influence risk premium:

$$H_0 : \alpha_0 = 0;\ \beta_1 = 0; \beta_2 = 0; \beta_3 = 0; \beta_4 = 0; \beta_5 = 0; \beta_6 = 0; \beta_7 = 0$$

The alternative hypothesis (H_1) is formulated as follows:

$$H_1: \alpha_0 \neq 0;\ \beta_1 \neq 0; \beta_2 \neq 0; \beta_3 \neq 0; \beta_4 \neq 0; \beta_5 \neq 0; \beta_6 \neq 0;\ \beta_7 \neq 0$$

If the alternative is accepted, this means that the selected macroeconomic variables have influence on the risk premium.

3.7 Estimation Technique
The study adopts the Ordinary Least Squares (OLS) estimation technique which is expressed as follows:
Let the dependent variables be represented by y and the explanatory variables x. We can restate any of the cross-sectional regression equation as:
$Y_t = c_0 + \beta x'_t + u_t$ (3.8)
Taking the expectation of equation (3.10) we have
$Ey_i = Ec_0 + \beta Ex'_t + Eu_t$ (3.9)
The expected value of a constant is zero, multiplying (3.11) by x_t, we have:

$$Ey_t x_t = \beta E x_t u'_t + E x_t u_t$$

$$E x_t u_t = E x_t y_t - \beta E x_t x'_t \quad (3.10)$$

If the moment condition $E x_t u_t = 0$ is not violated, equation (3.12) becomes:

$$E x_t y_t - \beta E x_t x'_t = 0$$

$$E x_t x'_t = E x_t y_t \quad (3.11)$$

If $E(x_t x'_t)$ is not a vector it means that the population estimator can be given as

$$\beta = E\,(x_t x'_t)^{-1} E(x_t y_t) \quad (3.12)$$

3.8 Analytical Procedure

The method of data estimation utilized multiple regression analysis. The analytical procedures involved in the study include the following: First, the descriptive statistics for the data. The unit root test is conducted for each of the variables to establish the level of stationarity of variable series before applying them to first pass regression so as to generate the non-latent or observed macroeconomic factors and to load them. The pre-estimation test of the macroeconomic variables is conducted using the Augmented Dickey-Fuller (ADF) test.

4 Data presentation, analyses and results

4.1 Descriptive Statistics of Macroeconomic Variables

In this section, we compute the descriptive statistics of the pre-specified macroeconomic variables. The values of the statistics are presented as follows:

Table 4.1: Descriptive Statistical Values of 7 Macroeconomic Variables

	CCPZ	CDR	CEXCH	CIDR	CINF	CLR	TBR
Mean	0.008	0.00571	0.005164	0.0026	0.001	0.0019	0.09
Median	0.012	0	3.13E-05	-4E-04	0.007	0.0004	0.091
Maximum	0.413	0.50224	0.155751	0.1704	0.074	0.1317	0.155
Minimum	-1	-0.4509	-0.086485	-0.154	-1	-0.101	0.01
Std. Dev.	0.121	0.11214	0.03132	0.0394	0.085	0.0284	0.037
Skewness	-3.63	0.85997	1.611444	0.2508	-11.5	0.7897	-0.19
Kurtosis	35.68	9.9494	9.518994	8.055	136.6	9.4885	2.271
Jarque-Bera	6727	307.514	317.3057	154.83	1E+05	267.57	4.045
Probability	0	0	0	0	0	0	0.132

Source: E-views 9

Note that ccpz, cdr, cexch, cdr, cinf, clr and tbr stand for changes in capitalization, deposit rate, exchange rate, interest rate differentials, inflation, lending rate, and Treasury bill rate. The seven macroeconomic variables are called pre-specified APT factors and their mean, minimum, maximum, standard deviation, skewness, kurtosis and Bera-Jarque statistics are given in table 4.1. The mean values of these variables are all positive implying that their first

difference displays increasing tendency like stock returns. Deposit rate has the highest maximum changes (0.50) over time and appears to be the most volatile among these macroeconomic variables because it has the highest standard deviation (0.112). Three of the macroeconomic variables- capitalization, inflation, and Treasury bill- are negatively skewed; while the others are positively skewed. Only Treasury bill is platykurtic in nature; the remaining six variables are leptokurtic. Also, the JB statistics are asymptotically large and correspond to zero p-value except the case of Treasury bill where the JB statistic is approximately 4.05 and the p-value is 0.13. In view of this, it means that only Treasury bill follows normal distribution process. This distribution process is reinforced in the histograms below:

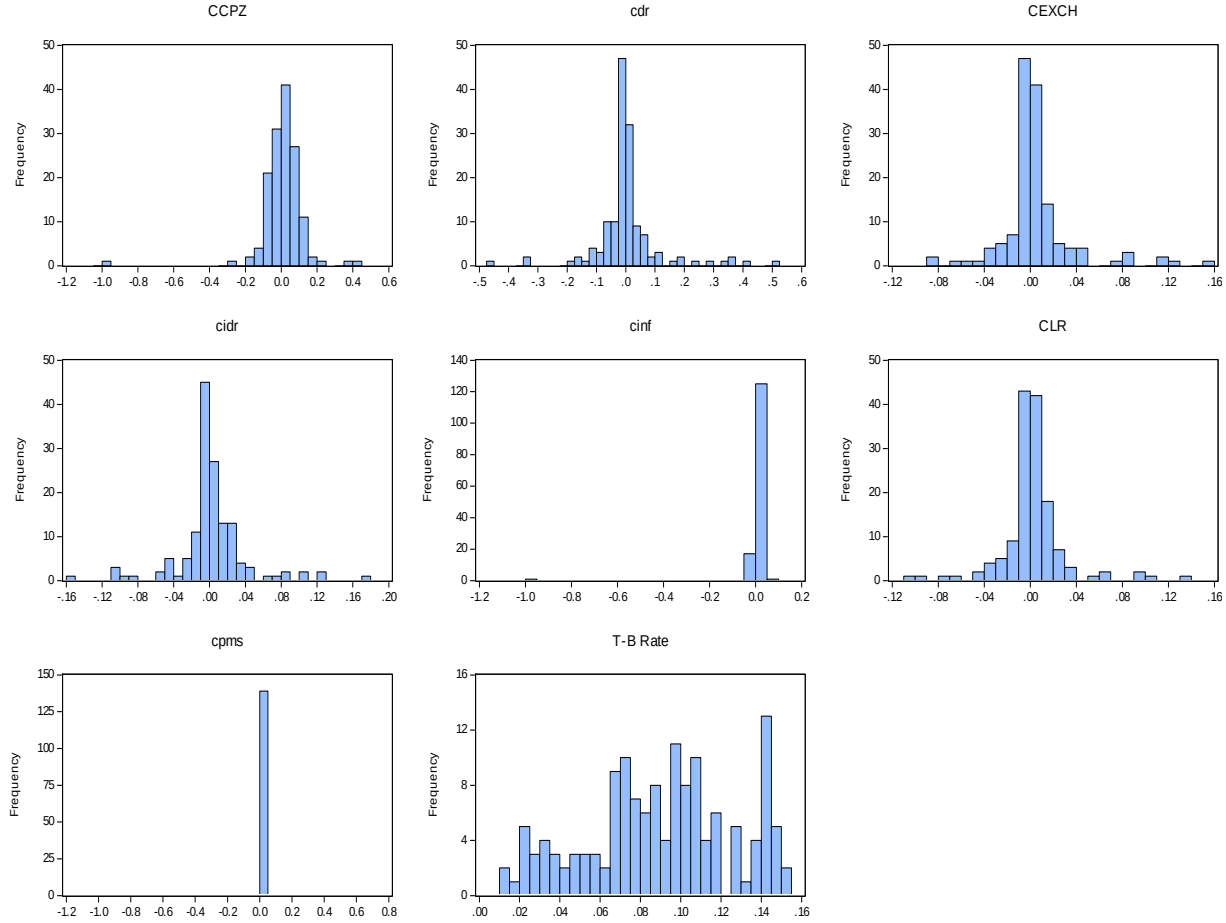

Figure 4.1: Histogram showing the Distribution Process of the Macroeconomic Variables

We can see from the histograms that capitalization, inflation and Treasury bill skewed to the left while exchange rate, deposit rate, lending rate and interest rate differentials skewed to the right confirming our earlier position.

4.2 Pre-estimation Tests for both Firm Level Data and Macroeconomic Data

We conducted theunit root test to establish the level of stationarity of variable series before applying them to first pass regression so as to generate the non-latent or observed macroeconomic factors and to load them.

The pre-estimation test of the macroeconomic variables is conducted using the Augmented Dickey-Fuller (ADF) test. The ADF test results are reported in table 4.5:

Table 4.2: Unit Root Test Results on Specified Macroeconomic Variables

Variable	ADF-Stat	5% Critical-Value	P-value
TBR (1)	-6.257098	-2.881978	0.00
LR (1)	-10.93026	-2.881978	0.00
IRD (1)	-17.75526	-2.881830	0.00
INF (1)	-8.474433	-2.881830	0.00
EXC (1)	-6.569101	-2.882748	0.00
DR (1)	-12.32562	-2.881978	0.00
CAP (1)	-11.31100	-2.881978	0.00

Source: E-views 9

The unit root test is conducted under the assumption of intercept and no trend. It is clear in table4.5 that all ADF statistics are larger than the critical statistic at 5 percent level of significance. Therefore, the null hypothesis that these series are not stationary is rejected. However, the series are all I(1) variables and as such their first difference data can be fitted to regression so as to extract the pre-specified factors and to load the factors. The results of the pre-specified variable first pass regression are reported in appendix three.

4.3 Empirical Test of the Pre-specified Macroeconomic Variables Arbitrage Pricing Model and the applicability (fairness) of the model in the Nigerian Equity Market

The seven macroeconomic variables that are selected for this study are loaded in the first pass regression and then cross-sectionally priced to test whether the pre-specified APM is empirically applicable (fair) or not. The results are reported in table 4.3.

Table 4.3Results of the Pre-specified Macroeconomic Variables APM

Variable	Coefficient	st -error	t-value	p-value
E__CIDR__	**(-0.320924)***	**0.040490**	**-7.925963**	**0.0000**
E_CDR_	**(-0.532424)***	**0.065413**	**-8.139380**	**0.0000**
E_CINF_	**(-0.073412)***	**0.030243**	**-2.427381**	**0.0201**
E_CLR_	**(0.198789)***	**0.025997**	**7.646594**	**0.0000**
E_CPZ_	**(-0.012392)****	**0.006740**	**-1.838538**	**0.0738**
E_EXCH_	**(0.006859)***	**0.000888**	**7.720784**	**0.0000**
E_TBR_	**(0.053568)***	**0.005788**	**9.255533**	**0.0000**
C	**(0.226930)***	**0.112996**	**2.008297**	**0.0518**
MA(1)	**-0.242657**	**0.292468**	**-0.829686**	**0.4119**
SIGMASQ	**0.131225**	**0.027754**	**4.728142**	**0.0000**

Note critical value at 1%=2.00 ** and * imply significant at 5% and 1% respectively
Source: E-views 9

The results of the pre-specified APM in table 4.10 are prettily surprising because all the coefficients of the priced factors associate with p-values that are far less than the alpha value at 1 percent. Even the observed t-values are respectively larger than the critical t-values. This means the macroeconomic risk premiums-Treasury bill risk premium, inflation risk premium, exchange rate risk premium, capitalization risk premium, lending rate risk premium, deposit rate risk premium and interest rate differential risk premium play significant role in

determining average return. However, some of these risk factors (inflation risk premium, capitalization risk premium, deposit rate risk premium and interest rate differential risk) are inversely related to average return. This suggests that these risk premiums decrease with a rise in return. Conversely an increase in Treasury bill risk premium, exchange rate risk premium and lending rate risk premium affects average return positively.

Fairness is a technical term used in finance for applicability, adequacy, soundness, or significance. Theoretically, for APM to be empirically fair or applicable, at least one of the risk factors must command risk premium; in other words, must be significant. The results of the test show that the arbitrage pricing model is empirically fair or applicable and valid in the Nigeria Equity market. This is because all the risk factors tested or selected macroeconomic variables command risk premium.

4.4 Relationship between Information not Captured by Pre-specified APM and Macroeconomic Factors

We extend the investigation to the nexus between information not captured by the pre-specified APT and the macroeconomic risk factors. The results obtained from this investigation are reported in table 4.4:

Table 4.4 Relationship between Information not Capture by Pre-specified APM and Macroeconomic Factors

Variable	Coefficient	St-error	t-value	p-value
AVGRE	0.877061	0.033575	26.12279	0.0000
E-CIDR_	0.264133	0.008572	30.81200	0.0000
E_CDR_	0.446222	0.013714	32.53762	0.0000
E_CINF_	0.064881	0.003517	18.44926	0.0000
E_CLR_	-0.164089	0.005524	-29.70380	0.0000
E_CPZ_	0.009949	0.000917	10.84717	0.0000
E_EXCH_	-0.006189	0.000268	-23.12851	0.0000
E_TBR_	-0.046920	0.002739	-17.13283	0.0000
MA(1)	0.999999	8471.564	0.000118	0.9999
SIGMASQ	0.003285	0.776306	0.004231	0.9966

Source: E-views 9

Table 4.4 reveals that all the coefficients of the observed risk factors correspond with p-values that are less than the alpha value at 1 percent. This means that the macroeconomic risk factors identified in this study significantly influence random surprise or information. That is accidental news can be significantly governed by macroeconomic risk premiums.

4.5 Post Estimation Test for Pre-specified Arbitrage Pricing Model

We conduct three tests to check whether the pre-specified APM is free from multi-collinearity, serial correlation and wrong specification (functional form). The results of these tests are reported in tables 4.5, 4.6 and 4.7 respectively.

Table 4.5: The Results of the Multi-collinearity Test on the Pre-specified Arbitrage Pricing Model

	E__CIDR__	E_CDR_	E_CINF_	E_CLR_	E_CPZ_	E_EXCH_	E_TBR_
E__CIDR__	1	0.695258	-0.06623	0.986439	0.118324	0.22491	-0.1
E_CDR_	0.695258	1	-0.1413	0.787905	0.309943	0.10763	-0.292
E_CINF_	-0.06623	-0.1413	1	-0.07726	0.201228	0.15604	0.3217
E_CLR_	0.986439	0.787905	-0.07726	1	0.160421	0.28031	-0.078
E_CPZ_	0.118324	0.309943	0.201228	0.160421	1	0.10851	-0.108
E_EXCH_	0.224911	0.107634	0.156041	0.280308	0.10851	1	0.7289
E_TBR_	-0.10021	-0.29196	0.321674	-0.07837	-0.1081	0.72891	1

Source: E-views 9

Table 4.5 shows that the correlation coefficients are very small far less than 1 percent except in the cases of lending rate and deposit rate, lending rate and interest rate differentials, and inflation, then exchange rate and Treasury bill rate. Thus, there is weak evidence that there is no presence of multicollinearity. (The problem of multicollinearity in a regression model arises when the independent variables are so highly correlated that it becomes difficult to separate out the influence of each of the independent variables on the dependent variables).

Table 4.6: Showing the Results of the Test of Serial Correlation for Pre-specified Arbitrage Pricing Model

	Statistic	P-value
F-statistic	1.404178	0.2246
Obs*R-squared	10.74373	0.2166
Scaled explained SS	9.347542	0.3138

Source: E-views 9

The LM test is reported in three versions as shown by table 4.6. All the statistics for the three versions appear to be very small but large p-values. Since the p-values are respectively larger than the alpha value at 1 percent, the null hypothesis of no serial correlation cannot be rejected. This means the error terms of the pre-specified APM are not serial correlated. This is in tandem with the classical assumption.

Table 4.6: Showing the Results of the Test of Functional Form for Pre-specified Arbitrage Pricing Model

	Statistic	df	P-value
t-statistic	0.640584	37	0.5257
F-statistic	0.410348	(1, 37)	0.5257
Likelihood ratio	0.587954	1	0.4432

Source: E-views 9

As shown in table 4.6, the p-value of each statistic is larger than 5 percent alpha value. By implication, the null hypothesis that the model is linear cannot be rejected. This confirms that the pre-specified APM passes the functional form test.

5. Summary, Conclusion and Recommendation

5.1 Summary

Arbitrage pricing theory (APT) in finance is a general theory of asset pricing which was first developed by Ross (1976) as an alternative to the Capital Assets Pricing Model (CAPM). It is a pricing model that seeks to calculate the appropriate price/return of an asset while taking into account systematic risks common across a class of assets. The assumption behind the model is that stock's (asset's) price/return is influenced by several independent factors. Unlike the CAPM, which is a single factor model, the APM (Arbitrage Pricing Model) posits that asset returns are driven by a group of different factors. The APM specifies neither the identity nor the number of these factors (except for the restriction that the number of assets available must be larger than the number of factors). The risk factors represent sources of systematic risk that cannot be diversified away. Our worry therefore, is the identification of these factors and their number (pre-specified) which APM leaves for us as empirical matter.
The suitability of the APM in explaining stock prices have indicated conflicting results across countries. These have brought to question the fairness of the empirical application of Arbitrage Pricing models in Nigerian equity market.

The main focus of the study is on the effects of macroeconomic variables on asset prices ant to appraise the fairness or the empirical application of the APM (pre-specified APM) in the Nigerian Equity Market.Our notion here was introduced by Chen, Roll and Ross (1986). We develop a simple statistic APT pricing specification for the pre-specified macroeconomic factors under the assumption that stock returns are linearly related to observable factors.
The test of the empirical validity of pre-specified APM is conducted after purging the macroeconomic data that are employed in this study from unit root. After this, the first pass regressions were run and the macroeconomic risk factors were loaded. Seven (7) macroeconomic risk factors are loaded and cross-sectionally priced in the general APT pricing identification. The results show that all the 7 factors (capitalization risk premium, lending rate risk premium, deposit rate risk premium, interest rate differentials risk premium, exchange rate risk premium, and Treasury bill risk premium) significantly govern the variations in average stock return. No matter the level of diversification, investors cannot eliminate these risks and therefore, they must be rewarded for taking these risks.
The Arbitrage Pricing models are empirically applicable in the Nigerian Equity market because it is tested and valid as a model that can be used in pricing assets or stocks in the Nigerian Equity market. This is because the risk factors tested significantly command risk premium.

5.2 Conclusion

We draw conclusions from the major findings and they are stated as:
The arbitrage pricing model is empirically applicable in the Nigerian equity market.
And the observable factors in the pre-specified APM command risk premiums, thereby linking asset-price behaviour to macroeconomic events. Therefore, any stock market investor in Nigeria is exposed to macroeconomic factor risks which cannot be eliminated by diversification.

5.3 Recommendations

Our recommendations are drawn from the above conclusions:

1. Based on the conclusion that investors are exposed to macroeconomic risk factors which they can neither reduce nor eliminate; we recommend that investors should hedge their portfolios using any appropriate method(s), e.g. forward contract technique.

2. Also, investors taking investment decisions should consider macroeconomic factors that are very sensitive and negative determinant of average return. This could help investors to hold efficient APT portfolios.

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APPENDIX

APPENDIX 1: 50 Sample Stocks (Quoted in the Nigerian Equity Market)

1. 7-Up Bottling Company
2. Access Bank Plc
3. Academy Press
4. Berger Plc
5. Bocgas
6. Cadbury
7. CAP
8. CCNN
9. Cileasing
10. Conoil
11. Continsure
12. Cutix
13. Diamond Bank
14. Dunlop
15. Evan Smith
16. FBNH
17. FCMB
18. FLOUR Mill Guaranty Trust Bank
19. International Brewery
20. J. Berger
21. John Holt
22. Livestock
23. May & Baker
24. M. Benefit
25. Mobil
26. Nahco
27. Nascon
28. NB
29. Neim eth
30. Nestle
31. Niger Insurance
32. Oando
33. Okomu Oil
34. Presco
35. Prestige
36. Total
37. UACN
38. UAC
39. Prop
40. UBA
41. Union Bank
42. Unilever
43. Unity Bank
44. UPL
45. UTC
46. Vita Foam
47. Wapco
48. Wapic

49. Wema Bank
50. Zenth Bank

Source: Nigerian Stock Exchange