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Equity Premium Puzzle in the Nigerian Capital Market

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Abstract

This study empirically investigates whether the equity premium puzzle (EPP) exists in the Nigerian Capital Market, using evidence from eight major sectors, consisting of agriculture, conglomerates, construction and real estate, consumer goods, financial services, health care, industrial goods, oil and gas, examined over the period 2000 to 2019 due to available data. Equity stock was used as risky asset, while treasury bills were used as risk-free assets (riskless asset). Consumption growth was included being a core intervening variable in inter- temporal and utility based asset price modelling. Employing descriptive statistics, correlation analysis, and, joint system-GMM estimation approach, the empirical results show no evidence of EPP in Nigeria, as the treasury bill rate (return on risk-free asset) outperformed the return on equity stock (risky asset) throughout the period and cross-section; and the risk aversion found to be statistically insignificant, even though it was high, implying a highly risk averse investment environment, but with no evidence of EPP in the Nigerian Capital Market. Further evidence shows an insignificant relationship between risk and return; a further validation of no evidence of EPP in the Nigerian Capital Market. Consumption growth is positively and significantly related to asset return and positively correlated with risks. Against the backdrop of the foregoing findings, continuous empirical investigation is important in the subject matter, given the unfolding dynamics, and volatile nature of the Nigerian economy and capital market. Also, a strong regulatory framework and institutional mechanisms aimed at achieving enhanced optimal investment decisions and operations, efficiency, penetration, deepening and development of the Nigerian Capital Market are also important recommendations.

Keywords: *Equity Premium Puzzle, Treasury Bills, Stock Returns, NGX, System GMM*

Introduction

A central issue in the behavioural finance literature relates to asset pricing in terms of risk-return relationship. The celebrated works of Sharpe (1964) and Lintner (1964) fuelled the debate on capital asset pricing. These pioneers of asset pricing model, using the inter-temporal capital asset pricing model (ICAPM), explained that the return of an asset is correlated with its risk. The implication of this contention

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is that an asset with a higher degree of risk should earn higher return or premium to compensate for the high risk. This was the basic insight that underlies the CAPM; that investments with risk should price higher or earn higher average returns (Gomes, Costa & Pupo, 2013). The consumption capital asset pricing model (CCAPM) introduced a significant refinement in the asset-pricing literature positing that the provision for future consumption constitutes the crucial reason for holding wealth. The model extended the traditional capital asset pricing model explaining asset-pricing relationship in terms of consumption variations. Following this contention, the consumption-stock return nexus explains the equity premium puzzle (Bostock, 2004).

Empirical researchers have probed into the issue of whether a given risk premium provides sufficient compensation for the investment's risk. This is important to investment analysis since the analysis of risk occupies a critical place in the finance literature and the fact that the determination of the risk premium investors can expect from risky assets in properly functioning and efficient capital markets, is critical for the overall investment dynamics of any country (Jorda, Scularik & Taylor, 2019). One of the most fundamental and most comprehensively investigated issues in the asset pricing literature is the Equity Premium Puzzle (EPP). The puzzle is associated with Mehra and Prescott (1985) that discovered that is impossible to concurrently explain the large historical average equity returns and the small average risk-free rate using conventional models of general equilibrium. They detected an annualized return on U.S. equities over the period 1889-1978, represented by the S&P 500 of 7%, and an annualized risk-free rate, denoted by treasury bills, of approximately 1% that resulted to a historical equity premium (EP) of approximately 6% per annum. Given a simple pure exchange, an excessively large annual premium that exceeds 0.4 % could not have been possible, except a high degree of risk aversion is inconceivably tolerated. Mehra and Prescott (1985), against the backdrop of the low degree of fluctuations in the U.S real consumption per capita suggested that the proportion of equity premium the CCAPM could explain was just 35% each year. They labelled this ''equity premium puzzle''. From a general perspective, the inability of CCAPM to explain the unreasonably high average risk premium implies that a significant coefficient of risk aversion is theoretically required to equate the empirical moment after the Arrow-Debreu asset pricing model in terms of a general equilibrium asset pricing characterized by a non-expected utility preferences with an unchanging inter-temporal elasticity of substitution and a persistent, nonetheless comparative dissimilar risk aversion (Gomes et al, 2013).

Despite the fact that many studies across developed countries have tested the EPP, the risk measurement applicability and economic implications is still contentious, particularly for emerging and frontier markets like Nigeria. The studies by Sampaio (2002), including Issler and Piqueira (2000); Araújo (2005, 2006); Catalão and Yoshino (2006), as well as Samanez and Santos (2007) did not find evidence of the EPP. Evidence of EPP is however found by Soriano (2002), with the caveat that the magnitude is however lower than the observed. Cysne (2006) finds similar evidence in support of the existence of the puzzle, with the conclusion that the consumption capital asset pricing model (CCAPM) is unable to give details of the observed risk premium.

For developing countries such as Nigeria, only few studies Nwude (2013), Ajao (2014) and Obayagbona and Omorokunwa (2019) have examined if there exist a puzzle in the capital market. There however seems to be a growing number of empirical studies investigating the existence of equity premium puzzle in markets across U.S., Europe and Asia. This includes Fernamdez, Aguirremalloa, Leichtenstein (2009); Jorda, Schularic and Taylor (2019), among others. Similarly, there is a multiplicity of models and methodology developed and empirically employed in the investigation of equity premium puzzle over the years. These include the mean-variance frontier approach by Catalo and Yoshino (2006); the inverted risk-free approach by Sampaio (2005); stochastic frontier and GMM estimation approach by Soriano (2002), Araujo (2005); and, Hansen and Jagannathan (1991); volatility frontier test and lognormal distribution and calibration by Cysne (2006); and Bayesian approach by Rogers (2015). Such methodological differences create mixed and inconclusive evidence. For developing countries like Nigeria.

Literature Review

Concept of Equity Premium Puzzle (EPP)

In corporate financial analysis, equity premium puzzle (EPP) is a phenomenon of the enigma of the observed anomalously higher historical real returns of stocks that exceeded government bonds, that standard asset-pricing model could not explain. EPP signifies the incapability of essential class of standard models of economics to provide valid explanations to the average premium associated with a well-diversified U.S. equity portfolio that exceeded the U.S. Treasury Bills detected over a period of more than 100 years. It connotes the empirical reality of the outperformance of stocks over bonds over a period exceeding 100 years by a surprisingly large margin. The puzzle represents the inability of standard inter-

temporal models of economics to give explanations to the extremely large magnitude connected with the perceived return that a risky security received above that of Treasury bills (Mehra & Prescott, 1985; 2003). The term was coined by Mehra and Prescott in a celebrated study 'The Equity Premium: A puzzle', that was published in 1985. EPP is a descriptive phenomenon of the uncharacteristic extremely large historical stocks real returns in excess of government bonds than would otherwise be expected. It refers to the exceptionally large average equity returns over bonds returns. Specifically, it connotes the very high or astonishing average stocks real return rates over bills (treasury bills) above the theoretically expected or assumed, culminating in a puzzle that needs to be unravelled (Kocherlakota, 1996). The differential that subsists between the stocks rate of return and the return rate on bills-the equity premium astonishingly averaged 6.18% each year (i.e 6.98% - 0.98%). According to Abel (1997), if the difference between the stocks return rate- the riskier assets and the less risky assets (safer assets)- and treasury bills per year, on the average, is astronomically higher than would have been the case, observed or expected, it is an equity premium puzzle. Such astonishing differential rate of return between equity (stocks) and bonds is a violation of the optimal allocation of resources-based competitive general equilibrium theory by Pareto and Arrow-Debreu (Gomes, et al., 2013).

Theoretical Framework

The theoretical basis for this study follows the inter-temporal CAPM, which provides a robust analytical, coherent and intuitive background for the equity premium puzzle. The CAPM with inter-temporal configuration is presumably based on the view that the decisions concerning portfolio as well as consumption choices are made in continuous time. Avoiding rigorous mechanistic mathematical derivations, the CAPM is often presented in discrete time simplistic model of investor behavior. This follows the approach of Bailey (2005). The theoretical basis for this study follows the inter-temporal CAPM, which provides a robust As a starting point, the future value ratio (FVR) for asset returns [1+rj] H =1, is written in the form:

$U_j - U_0 = 0_H B_j$H 1,2,3,…,n (1)

$U_j - U_0 = \theta$, where the conventional CAPM prediction is such that $\mu i{-}r0 = (ui - r0)\beta j$

μ_j= the expected return on asset *j*, *E(rj);*

$\beta jH \equiv (rj,)/varH$ represents the beta-coefficients with respect to j and *H*;

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$\mu 0$ = the expected rate of return for an asset with zero beta-coefficient, such that $B_j\mathrm{H} = 0$; θ_H = a; where H represents the state variable that is to be optimized (i.e utility).

In line with equation (1), the 'excess return' on an asset is proportional to its beta-coefficient; with the beta-coefficient indicating the rate of return on the asset and the stochastic discount factor (H). Following this, the expected excess return of an asset, $\mu_\mathrm{j}-\mu_0$, is described as the expected return rate on a zero-beta asset or portfolio. Here, the 'zero-beta' reflects the market portfolio return rate. In line with Bailey (2005), the existence of a risk-free asset undoubtedly signifies a beta-coefficient (risk) that is zero (in the context of the market rate of return). The $\mu_\mathrm{j}-\mu_0$, in CAPM represents the excess expected market portfolio return. Following this, the regression model for r_j and H is in the form:

$$r_j = \alpha jH + \beta \mathrm{j_H H}, + \varepsilon j \qquad (2)$$

where rj is the excess return ($\mu j-\mu 0$); $\alpha_\mathrm{jH} = \mu_\mathrm{j} - \beta_\mathrm{j}E(H) = 0$; and, ε_j is the unobserved error term that has standard stochastic properties. Comparable with Bailey (2005), the growth rate of aggregate (economy wide) consumption is substituted for H. This insight is hinged on the fact that H is influenced by consumption, in addition to replacing H by $H \approx 1-\gamma c$; with c representing the consumption growth rate, as well γ being the (constant) relative risk aversion coefficient. With the replacement of H by rM, i.e. rate of market return, the CAPM equation is rewritten in the form:

$$\mu_\mathrm{j}-\mu_0 = 0_\mathrm{H}\mathrm{B_jH}$$

$$\text{as: } \mu_\mathrm{j}-\mu_0 = \theta \mathrm{rM}\beta j\mathrm{rM} \qquad j = 1,2,3,\ldots,n \qquad (3)$$

such that, $\beta j\mathrm{rM} = cov(rj,rM)/var(rM)$; θrM is the same across all assets. Using the same intuition as in the case of H, a model that links specific asset returns (rj) and return on market portfolio is captured in the form:

$$r_\mathrm{j} = \alpha \mathrm{j}_r M + \beta_{jRM} M + \epsilon_j \quad j = 1,2,3,\ldots,n \qquad (4)$$

where $\alpha j_\mathrm{rM} = \mu_\mathrm{j} - \beta_\mathrm{jrM}\, E(\mathrm{rM}) = 0$ and εj is likely to have the similar properties as equation 2 (Adegboye, 2017). Equations (3) and (4) represent the fundamental CAPM. Both equations show that the expected rate

of return of market portfolio, *r*M, can be interpreted in terms of the risk associated, risk-free premium and growth rate of consumption. Alternatively, equation (4) may be considered as a factor model, where growth rate of consumption is one of the factors. In this case, the inter-temporal CAPM includes a wider range of factors, such as growth in consumption, risk, as well as the risk-free assets asset rate of return, like treasury bills or government bonds.

The Empirical Review

A review of some pertinent studies on the equity premium puzzle (EPP) both from the perspective of developed and developing economies is presented in this section. Mehra and Prescott (1985) utilizing data that covers the period 1889-1798 for the U.S economy for a representative agent that seeks to maximize a given asset pricing-model, estimate the parameters of a preference function that has the capacity to equate the theoretical risk premium with the historical average. By means of realistic values for risk aversion, the authors were unable to find any evidence concerning the historical average interest rate nor the EPP that existed within the 0.8% - 6.98% range. They were of the opinion that the puzzle is largely explained by the infinitesimal risk-free interest rate average, rather than the huge average mean return of equities. Hansen and Jagannathan (1991) validate these results in the context of the consumption-oriented asset-pricing model using an elegant and economically intuitive prescriptive model.

Hibbard (2000), following the methodology used by Mehra and Prescott model, test the EPP in New Zealand. Quarterly data on financial asset returns, as well as data on consumption over the period of 1965-1997 were utilized. Durable goods consumption is excluded in favour of non-durable goods, including services consumption. Government bond as risk-free rate was used since the data on Treasury bill were not available in New Zealand prior to 1978. Nonetheless, that of Mehra and Prescott (1985) utilized 90-day Treasury bill yields. The findings using a calibration of consumption-based asset pricing model find evidence for the EPP in New Zealand. Swan (2002) empirically sought to establish the ability of the EPP to explain the excess 6% equity return each year above that of the Treasury bills for a period of 100 years using data from the NYSE. He used a methodology that incorporates the endogenous stock market trading into an investor's preference mode. The assumption is based on the view that investors enjoy trading and that the investor's excess trading return with respect to liquid treasury bills compared to equity illiquidity is precisely rewarded by the equity premium that is anticipated. The results show that the perceived transaction costs, including differentials in liquidity that exists between equity, as well as bills are in line

with the premium. Using further evidence from the Australian and the US NYSE for the period 1955-98 by means of the stochastic discount factor volatility, with daily dividend yields and turnover, the evidence confirm the puzzle.

Soriano (2002) utilize data series for the period 1980-1998, comparable to Sampaio (2002). However, a different methodology is utilized in estimating a model of asset-pricing characterized by constant relative coefficient of risk aversion functional utility by means of the GMM. The stochastic discount frontier was used to test the results. The GMM estimates generated a risk aversion coefficient of 2- 4. The tests using the stochastic discount frontier, however produced a coefficient that is higher than 6. These values characterizes a confirmation and validity of the puzzle, nonetheless it is a lesser magnitude compared to Mehra and Prescott's (1985) in the case of the economy of the United States.

Mehra (2003) extended his empirical investigation of the EPP to a number of industrialized economies to include the U.S, United Kingdom, Japan, Germany, and France for the period 1889-1978. The investigation is based on one of the fundamental assumptions of CCAPM that the growth rate of consumption, as well as market return are mutually log-normally distributed. Xiao and Wang (2004), using monthly data that spans July, 1993 to December, 2003, and the Generalized Method of Moments (GMM) technique, find no equity premium puzzle in China. Specifically, the magnitude of the coefficient of risk aversion is found to be considerably lesser, compared to the limits established by Mehra and Prescott (1985).

Nwude (2013) estimates the equity risk premiums (ERP) for an emerging stock market in the context of Nigeria. He employs quarterly data spanning the period 2000-2011 for the Federal Government of Nigeria (FGN) Treasury bills and daily NGX, All-Share index (ASI), from which the actual returns for stock market and risk-free rates are computed. Utilizing the Arithmetic Mean (AM) and Geometric Mean (GM), he finds a high ERP when compared to developed economies. This exceptional case, he attributes to the fact that the Nigerian capital market is an evolving one fraught with several challenges that warrant a greater ERP. Ajao (2014) tests the reality of the EPP using evidence from the Nigerian financial market. He uses annual times series data that spans the period 1985 to 2011. The findings show no evidence of the equity premium puzzle during the studied period.

Obayagbona and Omorokunwa (2019) empirically investigates the equity risk premium puzzle (ERP) in the Nigerian Capital Market using quarterly data that covered the period 2000Q1- 2017Q4. They used the equity All Share Index (ASI) and the Nigerian Treasury Bill Rate (TBR) over the specified period to investigate the existence or otherwise of equity risk premium puzzle. The return on the ASI was proxied by the log of current price index to the ratio of lagged price index. Utilizing descriptive statistics and cointegration technique, the empirical findings show evidence of no equity risk premium puzzle in the Nigerian Capital Market in the focus period, as the Treasury Bill rate (TBR) consistently performed better than equity stock return across most of the quarters. Jorda, Scularik and Taylor (2019) investigate the risk premium puzzle based on evidence from the U.S, in addition to 15 other advanced economies. The results show that in the long-run, returns on housing remain comparable to equities.

Research Hypotheses

As a frame of reference the following hypotheses stated in the null form are

Ho_1: There is no significant evidence of equity premium puzzle in the Nigerian Exchange Limited.

Ho_2: Equity premium puzzle cannot be significantly explained in terms of asset-risk return relationship.

Ho_3: The equity premium puzzle has no significant effect on portfolio investment choices in the Nigerian Exchange.

These hypotheses, serve as the link between theory, speculation and facts; the confirmation or otherwise of these propositions is the subject of the following section.

Methodology

This research study seeks to investigate the validity of the EPP in the Nigerian capital market. To this end, stock market returns of eight (8) major sectors disaggregated into 24 firms in the market (i.e .3 firms from each sector) for the period 2000-2019 were used. The period marked important unfolding dynamics in the Nigerian Exchange Limited-the official stock exchange in Nigeria. However, the sample size was restricted to exclude companies with any missing observations for the considered period. The sectorial returns using asset portfolios was computed. The agricultural conglomerates, construction/real estate, consumer goods, financial services, healthcare, industrial goods, and oil and gas, sectors was utilized to have a representative sample. The selection of these sectors is informed by their relative influence and critical mass in the Nigerian Capital Market overtime.

Quarterly data series were generated from secondary sources, including annual reports, such as the Central Bank of Nigeria (CBN) Statistical Bulletin, the Nigerian Exchange Limited official fact book, as well as the Securities and Exchange Commission (SEC). The period is sufficiently long enough to identify whether the equity premium puzzle exists in the Nigerian Capital Market or not. Indeed, the structure of the research involves the combination of cross sectional and time series data to form a panel data. The major variables are returns on risky, as well as riskless assets, in addition to the growth rate of consumption (i.e. consumption growth rate). As widely used, return on equity is proxied by the Nigerian All Share index (ASI), whereas the return on risk-free (riskless) asset is proxied by the 90 days Treasury bills. The consumption growth rate (indicated by per capita consumption growth) a proxy for household consumption was also utilized.

Model Specification

The model for this study is based on Mehra (2003) and Gomes et al (2013), with slight modification to situate the study in the Nigerian context. Given a perfectly competitive market with no credit constraints as well as transaction costs, the time-separable utility function of a representative agent is maximized as:

$$\text{Et} = [\sum_{j=0}^{\infty} \beta j U\ (ct + j)\ ], (O < \beta < 1) \qquad (5)$$

where E_t is the conditional expectation pertaining to all publicly available information in time t, β represents the inter-temporal discount factor, same as $(1+k)^{-1}$, such that k stands for the inter-temporal discount factor; c_t denotes per capita consumption and $U(c_{t+j})$ indicates the utility function of the agent. Furthermore, the model adopts a utility function that is characterized by constant relative risk aversion (CRRA) in the form:

$$U(c) = \frac{ct(1-\alpha)}{1-\alpha} \quad , 0< \alpha < \infty \qquad (6)$$

where $\alpha\ stands$ for the risk aversion coefficient.

The income percentage apportioned to consumption, as well as savings to maximize the inter-temporal utility is determined by the representative agent. Where the agent purchases a risky asset, he has to give up p_t current consumption units. This signifies a loss of utility that is equal to $p_t U'(c_t)$. If this equity is sold in the subsequent period, his consumption is $p_{t+1} + y_{t+1,}$ where $y_{t+1,}$ represents the paid dividends at t+1. The consumption in question signifies an expected utility gain of $\beta Et(p_{t+1} + y_{t+1}) U'(c_{t+1})$. At optimum, the lost utility by sacrificing consumption in the current period, in addition to purchasing a risky asset must necessarily be equal to the discounted expected consumption utility purchased in the following period, by selling the financial security. The aforesaid connection is represented in the form:

$p_t U'(C_t) = \beta Et[p_{t+1} + y_{t+1}) U'(c_{t+1})]$ (7)

Rewriting (7) produces;

$1 = [\frac{U\prime(Ct+1))}{U'(ct)} Re, t+1]$ (8)

where $Re, t+1$ denotes the stock market return (risky asset), represented by $(p_{t+1} + y_{t+1})/p_t$.

On the contrary, the risk free one period Treasury bills is represented by:

$1 = [\frac{U\prime(Ct+1))}{U'(ct)} Rf, t+1]$ (9)

where $Rf, t+1 = 1/q_t$; q_t being the asset price. The GMM estimation approach is to be used for the equations, and, similar to Issler and Piqueira (2000), Soriano (2002) and Gomes et al (2013), the return on the risky asset, in line with Mehra and Prescott (1985) and Gomes et al (2013), is written as:

$Et(R_{e, t+1}) = Rf, t+1 + covt\{\frac{-U'(Ct+1),Re,t+1}{Et[U\prime(ct+1)]}\}$ (10)

Thus, the equity premium can be expressed as :

$Et(R_{e, t+1}) - Rf, t+1 = +covt\{\frac{-U'(Ct+1),Re,t+1}{Et[U\prime(ct+1)]}\}$ (11)

The expression (11) shows that the risk premium is a function of the variance between the marginal utility of consumption, as well as the return on assets, an implication that greater stock market return volatility tend to call forth higher risk premium as demanded by investors. In line with Mehra (2003), and further adopted by Gomes et al (2013), the following additional assumptions are made:

(i) the growth rate of consumption, $x_{t+1} \equiv \frac{(ct+1)}{Ct}$ is independent and identically distributed (i.i.d).

(ii) the dividends growth rate, $z_{t+1} \equiv \frac{(yt+1)}{yt}$ is likewise i.i.d; and

(iii) (x_t, z_t) are jointly log-normally distributed.

Based on this, the total equity return, $R_{e, t+1}$ is similarly i.i.d, in addition to $(x_t, R_{e,t})$ being jointly log-normally distributed. Consequently, since $U'(c_t) = c_t^{-\alpha}$, the overall risk-free asset return is presented in the form:

$\frac{1}{\beta e^{-\alpha\mu x + (\frac{1}{2})\alpha^2 \sigma x2 ())}}$ (12)

where $\mu_x = E[\ln x]$ and $\sigma_x^2 = Var[\ln x]$ denote the expectation and the variance of the growth rate of consumption, respectively. The risk premium is presented as:

$\ln E(R_e) - \ln R_f = \alpha\sigma_x^2$ (13)

In equation (13), the risk premium is seen to be dependent on the consumption growth rate variance, as well as coefficient of risk aversion, $\sigma_x^{2.}$. For a low σ_x^2, only a large risk premium can explain a high degree of

risk aversion. Based on the empirical model, it can be discerned that the gap between the expected equity return, as well as the returns on risk free asset is dependent on the magnitude of the coefficient of risk aversion, α, as well as the variance of the growth rate of consumption, $\sigma_x^{2.}$. Consequently, to evaluate model fit quality, the valuation of the last unknown parameter is done with the recognition that the expected return rate of the risky asset cannot be observed directly. To resolve this issue, two distinct methodologies proposed by Mehra (2003) are applied. In the first approach, the historical mean value is substituted for E[R.e,t], and $\sigma_x^{2.}$ is calculated by means of $\sigma_x^{2.} = [\sum_{t-1}^{T}(Xt - X)^2]/(T-1)$, where $x= \sum_{t-1}^{T}(Xt/T)$. In the second procedure, GMM estimation is carried out, where the GMM is used to estimate α, as well as other parameters, hinged on the assumption of a log-normality. In general, this method, is applied when one moment condition exist, such that the expected value is zero, with the moment condition being dependent on non-unitary root variables (Gomes et al., 2013).

Estimation Method

The standard methodology adopted in this study for testing the EPP in the Capital Market in Nigeria is the Generalized Method of Moment (GMM). First, the performance associated with risk premium in terms of its capacity to predict the return of an asset over time is conducted. This is also used to detect if the growth in consumption series are linked to stock market returns. The method is in line with Harvey (1989), and Estrella and Hardouvelis (1991), such that

$$Y=a+b_1R_t+ 1 \qquad (14)$$

Where *Y is* the return on asset and R is the risk premium return. In the second empirical analysis, the sensitivities of excess return of stocks to the growth rate in consumption were implemented. Following this, the entire stock market returns (based on the Nigerian All Share Index) of eight (8) key sectors decomposed into 24 firms was computed. Finally, a joint GMM is used to estimate the risk aversion coefficient (α), based on the assumption of log-normality. Using this approach, the moment condition is used to generate the risk aversion coefficient, as well as the variance of the growth rate in consumption by means of the moment condition. Being a consistent estimator, the magnitude of the coefficient of risk aversion is identified in the third moment (Hansen, Heaton & Yaron, 1996). The GMM estimator, therefore, apart from generating the coefficient of risk aversion also enables the testing of whether the estimated coefficient is statistically significant or not (i.e. statistically different from zero). A high and significant risk aversion

coefficient, implies evidence of high and statistically significant equity premium puzzle (EPP). This, added to a low discount factor implies evidence of an EPP. Considering the multiplicity of the types of asset in relation to stock market, in addition to the need to have a robust representative sample, three sets of asset are utilized to test the puzzle. Overall stock index performance and sectorial stocks represents the first. The 90 day-tenor Treasury bills represents the second, while dividend yields constitute the third. The individual asset return for each category is calculated using;

$rt = (pt - pt-1)/(pt-1)\ X\ 100$ or $rt = (pt - pt-1/\ p)$ (15)

where *rt* is returns, *pt* is the stock price.

Operationalization and Measurement of Variable

The definitions of the variables in the model, measurement as well as the sources of data are provided in the Table 1.

Table 1. Definition of Variables and Measurement

Variable	Description/Measurement	Source
Return on Stocks (LR)	Current price of stocks minus previous price divided the previous price of stocks multiplied by 100.	Nigerian Stock Exchange Facts Book
Treasury Bills Rate (LTBR)	90-days Treasury Bills rate (interest earning on 90 days-Treasury Bills	Securities and Exchange Commission (SEC), CBN.
Consumption growth (LCG)	Consumption growth is the changes in per capita expenditure on consumption.	Central Bank of Nigeria (CBN) Statistical Bulletin (various issues).

Source: Author's Compilation (2022)

Analysis of Results and Discussion of Findings

This study investigates whether the equity premium puzzle (EPP) exist in the Nigerian Stock market. This section therefore, focuses on the presentation, analysis and interpretation of the data employed in the study. Based on the nature of the study, several sequential analytical approaches are adopted to make the study robust. In order to present a detailed and robust analysis, two general methods are used in the empirical analysis, namely statistical and econometric methodologies. The statistical method entails the use of descriptive statistics, as well as correlation analysis to examine the initial characterization, as well as the nature and degree of relationship among the variables of the study. The joint system-GMM is thereafter employed as the standard econometric tool to investigate the existence of EPP in the Nigerian Exchange Limited.

Table 2 presents the descriptive statistics of the sectorial portfolio returns. The descriptive statistics of the entire market return and Treasury bill rates (risk free asset) are also reported. From the summary statistics, the mean value of the cross-sectional market return over the period is 4.02 percent; with a median value of 3.07 percent; an indication that market rate of return over the period has been heterogeneous and dissimilar across the sectors, perceptibly due to endogenous and exogenous market forces and the performance of the individual sectors concerned. The standard deviation of 13.6 is higher than the mean and median value; a clear indication of market volatility over the period due to global uncertainties, commodity price shocks and the resulting asset price variability. Apparently, stock returns have been generally unstable over the focus period. The pronounced gap between the maximum and minimum values of 7.11 and -0.28, further gives credence to the fact that the rate of market return has moved rather diametrically over the period of the study. The standard deviation of 20.72, which is a measure of the variability in the sector, clearly shows a pronounced volatility in the sector over the focus period.

The mean value of construction/real estate sectorial return is 2.25 percent, with a median value of 1.92 percent. The maximum and minimum values are 6.23 and 0.88 percent. The consumer goods sector, with a mean return of 6.25 percent is clearly higher than all \other sectors in the market. This is due to the fast-moving nature of consumer goods that are characterized by higher sales turnover. For the risk-free asset return (i.e. treasury bills rate), the mean value is 11.9; a clear indication that gilt-edge security, with zero level of associated risk, has a higher rate of return than the risky asset (stocks) and even more safer. This is a clear indication that EPP does not exist in the Nigerian capital market since the value of the risk-free asset

(i.e. riskless asset- Treasury bills) is considerably higher than that of the risky asset (i. return on equity). This is attributable to the fact that investors have high degree of risk aversion with preference for gilt-edge instruments, compared to equity investments, and due to the evolving nature of the stock market in Nigeria, which is shallow, fragmented, segmented with respect to equity listing, and pronounced sectorial market concentration.

Table 2: Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.
Market Return	4.02	3.75	7.11	-0.28	13.62
Agriculture	3.80	3.40	5.20	1.88	20.72
Conglomerates	2.25	1.92	6.23	0.88	28.22
Construction/Real Estate	2.38	2.16	5.21	1.89	26.27
Consumer Goods	6.25	6.50	27.21	3.88	9.72
Financial Services	2.65	1.62	7.22	0.10	16.60
Health Care	2.30	1.35	5.50	0.82	28.95
Industrial Goods	2.84	3.01	5.62	1.20	29.88
Oil and Gas	4.31	4.87	10.201	1.62	23.08
Consumption Growth	1.82	1.65	17.30	-5.60	2.32
Treasury Bill Rate	10.25	10.80	11.02	4.65	5.06
Observations	480	480	480	480	480

Source: Author's computation 2022

To examine the correlation between the variables used in the analysis, the correlation analysis is conducted. An incidence of strong correlation among the independent variables may violate the estimation technique thereby, generating unrealistic estimates. Table 3 presents the pairwise correlation matrix. From the correlation matrix, a positive correlation is observed between returns on stock (equity), risk and consumption growth rate. Thus, return on stocks has a positive co-movement with risks and growth rate in consumption. This is in consonance with the consumption- based asset pricing model. The correlation

results further points to a negative association between treasury bills rate and risk on the other hand. Apparently, as the risk associated with equities, become high, rational investors tend to have increased preference for riskless asset, a further validation (confirmation) that investors are generally risk averse, leading to portfolio asset substitution.

Table 3: Correlation Matrix

	R	*RISK*	*CG*	*TB*
R	-			
RISK	0.221	-		
CG	0.182	0.282	-	
TBR	0.250	-0.097	0.385	-
BY	0.882**	-0.173	0.214	0.262

Source: Authors' computation *2022*

Note: *;**; * denotes significance at 10%, 5% and 1 % level, respectively***

Source: Author's computations

Unit root test was also carried out in the study. Unit root test is the test of stationarity of series used in regression model .The importance of stationarity lies in the fact that non-stationary time series may not extend to future periods apart from the present, thus making the estimates generated from such series, spurious and inconsistent. Panel unit roots test was therefore, used to examine the underlying properties of the process that generate the panel series of this study. This is to ensure that the data used are applicable and reliable for the GMM estimation. Four tests of stationarity are employed in this study in order to analyze unit roots, and to examine whether the variables are stationary or non-stationary in both panels namely; Levin, Lin and Chu (LLC), Im, Pesaran and Shin W-stat(IPS) , Augumented Dickey Fuller Fisher (ADF-F) test and Phillip Peron Fisher (PP-F) tests. If the variables are stationary at their levels, they would enter the model in their level form. If however, they are not, an appropriate difference stationary mechanism (transformation); is employed to enable them attain stationarity. The result of the panel unit root test is presented in Table 4. As can be observed from the results, the null hypothesis of no unit root could not be

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rejected for only one of the variables (i.e. stock returns at levels) as the three other variables were stationary at levels.

Table 4: Unit Root Test for Variables in Levels

Test	LR	LTBR	LCG
LLC	-1.212	-3.721***	-6.212***
IPSW	-0.691	4.385	-2.801**
Fisher-ADF	28.223**	66.250*	43.161***
Fisher-PP	46.250	102.251	112.056**

Note: *;**; * denotes significance at 10%, 5% and 1 % level, respectively***

Source: Author's computations 2022

In line with Levin-Lin Chu (2002), and Im, Pesaran and Shin (2003), that unit roots in heterogenous panels may be made stationary by taking their first difference, the first difference is conducted on the respective variables, and the panel unit root test is conducted on the resultant panel series. The results of the panel unit root test on the variables in first differences are reported in Table 5. An examination of the four-unit root tests show that the variables are now stationary. This implies that the series are difference-stationary, thus attaining stationarity after first differencing. The variables are thus integrated of order one (i.e I[1]).

Table 5: Unit Root Test for Variables after First Difference

Test	LR	LTBR	LCG
LLC	-6.244***	-3.962***	-3.712***
IPSW	-3.722**	-2.2217	-2.942**
Fisher-ADF	54.32**	45.250**	32.771***
Fisher-PP	114.25***	96.38***	62.282**

Note: *, **; * denotes significance at 10%, 5% and 1 % level, respectively***

Source: Author's computations 2022

Results

The results of the returns and excess return model linking risk and consumption growth are presented in Table 6. From the results, it can be observed that the coefficient of the lagged equity variable is positively related to equity return but fails the significance test, implying that past realizations of equity returns do not significantly determine current or future equity or asset returns. With the coefficient close to one (i.e. 0.83) for the lagged dependent variable, there seems to be a very long delay for market to return to its long run position after temporary shock or perturbation. Thus, shocks in the capital market are thus, persistent over time, as any volatile movement in the market index takes time to be restored.

Table 6: Estimates of Returns and Excess Return Models

Returns				**Excess Returns**			
Variable	*Coefficient*	*T-ratio*	*Prob.*	*Variable*	*Coefficient*	*T-ratio*	*Prob.*
LR (-1)	0.825	1.143	0.25	LR(-1)	-0.020	-0.741	0.18
LRISK	0.130	1.083	0.27	RISK	0.284	1.117	0.25
LCG	0.302	2.030**	0.04	LCG	0.172	2.119**	0.03
	Instrument Count = 10 J-Statistic = 26.41 [0.621]					Instrument Count= 12 J-Statistic = 32.25 [0.220]	

Note: *,**; * denotes significance at 10%, 5% and 1 % level, respectively***

Source: Author's computations 2022

A quick examination of the individual coefficients of the explanatory variables reveals a positively signed but not significant coefficient of risk. Apparently, the greater the risk, the greater the expectation for higher returns in the form of risk return premium compensation. This is in line with the investment-compensation theory that investors require greater compensation in the form of higher returns for higher degree of risk assumed. The result supports the findings of Nwude (2013), and, Jorda, Scularik and Taylor (2019). The

coefficient of consumption growth-, which indicates the growth consumption expenditures is positively signed and significantly related with equity returns, thus validating a fundamental tenet of the consumption-based asset pricing model that the returns sensitivity is positively associated with consumption changes inherent in the systematic risks. Thus, growth in consumption expenditures tend to be significantly associated with changes in equity. Thus, an individual could stimulate his utility by deferring current consumption to investing in an asset that has real rate of return in a bid to enable future consumption. For the key diagnostic test, the Hansen-J over-identification test, which serves to verify the validity of instruments is 26.41, with a corresponding probability of 0.62; thus, failed to reject the null hypothesis of no endogeneity problem.

The over-identifying restrictions, are therefore, equal to zero and valid, thus, making the estimated model fit for policy perspectives for the excess return model, the lag coefficient is negatively related to current excess equity returns. Invariably, excess return convergence exists for equities in the Nigerian capital market such that information asymmetry, institutional rigidities in the market process and frictions that tend to create abnormal (excess returns) fizzles out or diminish overtime, when there is improved capital market regulatory role, strong institutional mechanisms, better market information dissemination and technological and innovative efficiency. The coefficients of risk and consumption growth are both positively related to equity return, but only that of consumption growth is significant.

As in the earlier case, securities that are characterized by higher returns sensitivities as regard the changes in spending tend to have greater systematic risk and greater excess returns in line with the consumption-based asset pricing model. This finding further supports the position that the expected excess return of an asset that is risky according to the CCAPM should equal the consumption marginal utility. Thus, the relative attractiveness between current and future consumption affects an asset's price in terms of the return. This finding supports the position of Breeden, Litzenberger and Jia, (2015) and the findings of Adegboye (2017) that securities that are characterized by higher returns sensitivities as regard the changes in the real consumption spending tend to have greater excess returns. Considering the key diagnostic test of robustness, the Hansen-J over-identification test result of 32.3, with a corresponding probability of 0.22 failed to reject the null hypothesis of no over-identifying restrictions, thus, making the estimated model fit for policy issues.

The result of the Blundell and Bond (1998) joint system GMM estimation are reported in Table 7. The goodness of fit indicated by the adjusted R^2 of 0.914 indicates that over 91 percent, the net systematic variations in the risky asset (stock returns) and risk-free asset (return on treasury bills) are simultaneously explained by the regressors. Risk, growth rate in consumption expenditure and risk aversion coefficient are therefore fundamental factors in the equity premium puzzle analysis. The DW statistic of 1.82, which can easily be approximated to 2 is clear affirmation that there is no autocorrelation in the model results. An examination of the results show a positive lagged coefficient of return, indicating a fleeting delay for stock and assets return to return to their long run position after shocks in the returns trajectory in the capital market. This is a clear evidence of improvement in distortionary forces in the capital market ranging from institutional and technological inhibitions.

Table 7: Results of the joint GMM System Estimation

Dependent Variable: Trade Flows			
Variable	**Coefficient**	**T-ratio**	**Prob.**
Constant	1.519	1.176	0.24
LR(-1)	0.213	1.080	0.28
LRISK	0.107	1.167	0.25
CG	0.067	2.233	0.03
RISK AVERS (α)	6.113	0.944	0.34
Diagnostics:			
Adjusted R-Squared	0.914		
Durbin Watson	1.821		
Post- Diagnostics:			
Residual covariance	0.004		
J- Statistic	0.513		
Variance Inflation	4.80		

Note: *,**; * denotes significance at 10%, 5% and 1 % level, respectively***

Source: Author's computations 2022

The coefficient of the risk variable is positively related to market return, as in the earlier case; an indication that investors are highly sensitive to risk in the Nigerian Capital Market, such that investors expect a higher risk premium for investments with higher risks. Following this, investors are presumed to be highly averse to losses than to gain, and as such are greatly sensitive to risk-prone assets. To this end, investors with long-

term investments implicitly carry out frequent portfolios investment evaluations. These submissions are in line with the 'myopic loss aversion theory, following the findings of Bernartzi and Thaler (2009). The coefficient of growth rate in consumption expenditures is positively signed, as in earlier results and significant at the 5 percent level. Thus, consumption growth tends to be positively and strongly linked to asset returns, since the greater the return on asset, the greater the capacity of the individual to finance future consumption. The finding corroborates the findings of Gomes et al (2013), and in line with the submissions of Breeden et al (2015).

The coefficient of the risk aversion coefficient (α), generated from the third moment condition of the joint system-GMM is high but fails the significance test. Invariably, there is a high risk averse investment environment in the Nigerian Capital Market such that investors are highly risk averse, due perhaps to the pronounced instability of the market, fraught with unpredictable features. Since the GMM estimator, apart from generating the coefficient of risk aversion enables us to test whether the estimated coefficient is statistically significant or not, such that a high and statistically significant risk aversion coefficient implies evidence of equity premium puzzle (EPP), the equity premium puzzle is not statistically different from zero in the Nigerian Capital Market. This clearly implies that there is no evidence of equity premium puzzle in the Nigerian capital market. The findings corroborates the results of Gomes et al (2013), Ajao (2014), Rogers (2015), Obayagbona and Omorokunwa (2019) and at variance with Cysne (2006) and Jorda et al (2019).

For the key post diagnostic tests for the robustness and validity of results obtained, the residual covariance of 0.04 show clear absence of autocorrelation, since the DW statistic could break down and, thus become weak in the presence of lagged dependent variable. The Hansen-J over-identification test probability of 0.53, failed to reject the null hypothesis of no endogeneity and over-identifying restrictions. The over-identifying restrictions, are therefore, equal to zero and valid, and the instruments used are uncorrelated with the error term, thus confirming the consistency of the system-GMM estimator. The mean variance inflation factor (VIF) of 4.8 is less than 10; an indication of the absence of multicollinearity in the estimated model. Thus, the estimated model is reliable and robust for policy perspectives.

Hypotheses Testing

As a further confirmation of the empirical results, the testing of the relevant hypotheses is performed in this section. This is to enable us determine whether the given null hypotheses are accepted or rejected. The hypotheses testing are conducted as follows:

Hypothesis 1

There is no equity premium puzzle in the Nigerian Capital Market. Based on the descriptive statistic, the return on risk-free asset such as treasury bills outperformed the equity stock investment return (the risky asset). More to be considered, the empirical results of the joint system-GMM, shows a coefficient of risk aversion coefficient, with a t-value of 0.944 (in absolute values), which fails the significance test at the 5 percent level. We therefore accept the null hypothesis that there is no evidence of equity premium puzzle in the Nigerian Capital Market.

Hypothesis 2

The equity premium puzzle cannot be significantly explained in terms of risk-return relationship. From the empirical results, the coefficient of the (risk variable), with a t-value of 1.167 (in absolute value), is not significant at the 5 percent level. We therefore accept the null hypothesis that the degree of risk does not explain the return on equity investment, as risk-free financial investments are found to have a higher rate of return than risky assets.

Hypothesis 3

The equity premium puzzle has no significant effect on portfolio investment choices in the Nigerian Capital Market. Based on the empirical results (Descriptive and GMM), Equity premium is fundamental not only in investment decisions but also to corporate finance. For instance, the cost of equity and the capital employed by firms are greatly affected by the equity premium puzzle and this has important implications for investment, financing and dividend decisions. Equity premium has significant consequences for portfolio management decisions, corporate finance, mergers and acquisitions and strategic management since such issues are discussed within the equity risk premium (ERP)

Discussion of Findings and Policy Implications

The empirical findings of this study have important policy implications. First, although the results show no evidence of equity premium puzzle in the Nigerian Capital Market, the findings inevitably show a high-risk averse environment, where investor are highly risk averse and becomes more sensitive to risks and losses than profits or returns. To this end, issues that pertains to risk-return relationship and the appropriate risk premium expected of an investment are important for optimal portfolio investment decisions to the individual, firms and corporate entities. Given the uncertainty that beclouds the investment climate in an undeveloped, shallow, fragmented and segmented capital market like Nigeria, that is evolving, with very low equity listing, deep sectorial market concentration, institutional rigidities, and arbitrariness on the part of market participants, issues of risk premium have important implications for the efficient functioning of capital market, particularly, asset valuation.

For instance, efficient asset pricing in terms of the associated risk is anchored on the presumption that in a dynamic and efficient market, a rational investor only pays the true value of the asset. Equity premium is thus fundamental not only in investment but also in portfolio management issues, corporate finance, mergers and acquisitions, strategic management, since firms' equity cost and capital remained highly influenced by equity premium, with vast investment, financing and dividend decisional implications. Whether an assumed premium or return sufficiently compensates the risk involved in any finance project is thus fundamental to asset pricing. Thus, the long-run return on asset apart from being influenced by internal market factors, tend to be influenced by exogenous macroeconomic and financial dynamics.

Also, the findings of this empirical study clearly show that return on risk free assets such as treasury bills, and possibly government bonds, are higher than that of risky assets, in contravention of the presumption of the equity premium puzzle. This could be explained by the high risk averse investment environment in Nigeria, where exogenous forces (e.g. inflation volatility, exchange rate volatility and interest rate volatility and security threat) and other obstructing market forces tend to create uncertainty in the environment , thus making investors highly risk averse in favour of gilt-edge instruments that are risk free, safe and certain.

Conclusions and Recommendations

Motivated by unending search in the behavioural finance literature, the existence or nonexistence of equity premium puzzle has led to proliferation of studies. The equity premium puzzle challenged the theoretical

submissions of the conventional general equilibrium and inter-temporal asset-pricing model, like the Consumption-based Asset Pricing Model (CB-APM), when calibrated with reasonable preference parameters, which could not explain the puzzle. This was a clear-cut violation of the optimal allocation of resources based on competitive general equilibrium theory by Pareto and Arrow-Debreu. This study sought to empirically investigate whether the equity premium puzzle and its assumption holds in the Nigerian Capital Market. The findings from the study show no evidence of equity premium puzzle, thus refuting its existence. Based on the empirical findings of this study, the following two policy recommendations are suggested for policy action:

1. Financial managers should institute sound and efficient policies that will enhance equity investment decisions, particularly with respect to optimal portfolio diversification in Nigeria, as it relates to risk and equity risk premium (ERM).
2. Sound, articulate and efficient capital market regulation policies are required, particularly to intervene in market conditions that may influence excessive behaviour and irrationality on the part of participants over time.

References

Abel, A B. (1997). The Equity Premium Puzzle: Federal Reserve Bank of Philadelphia *Working Paper*, *Ws0/2242.*

Adegboye, C. (2017). The Consumption –Oriented Capital Asset Pricing Model in the Nigerian Stock Exchange. *CBN Journal of Applied Statistics*, 8(2), 117-142.

Ajao, M.G. (2014). Equity Premium Puzzle and the Nigerian Financial Market (EPP). *Banking and Finance Journal*, 18(4), 1-22.

Araujo, E. A. Jr. (2005). Avaliando Tres Especificacoes o Fator Descent Estocastio Atraves da Frontierra de Volatilidade de Hansen-Jagannathan: um Estudo Empirico para Brasil. *Pesquisa e Planejamento Economico,* 35(1), 49-73.

Araujo, E. A. Jr. (2006). Avalicao Eteste de Dois Modelos de Formacao de Presco de Ativos Baseados no Cosumo Para o Brasil: Uma Abordagem Baseada em Teoria da Informacao. *Brazilian Business Review*, 3(1), 1-14.

Bailey, R.E. (2005). *The Economics of Financial Markets*. *London*: Cambridge University Press.

Bostock, P. (2004). The Equity Premium. *Journal of Portfolio Management*, 30(2), 104-111.

Breeden, D., Gibbons, M., & Litzenberger, R. (1989). Empirical Tests of the Consumption-Oriented CAPM. *The Journal of Finance*, 44(2), 231-262.

Breeden, D. (1979). An Inter-temporal Asset-Pricing Model with Stochastic Consumption and Investment Opportunities. *Journal of Financial Economics*, 7(1), 265-296.

Breeden, D.T., & Litzenberger, R. H. (1978). Prices of State-Contingent Claims Implicit in Option Prices. *Journal of Business*, 51(4), 621-651.

Campbell, J. Y., & Cochrane, J. H. (2000). Explaining the Poor Performance of Consumption-Based Asset Pricing Models. *Journal of Finance*, 55(6), 2863-2878.

Catalao, A. B., & Yoshino, J. A. (2006). Factor de Desconto Estocasstico no Mercado Acionario Brasileiro. *Studies in Economics*, 36(3), 435-463.

Cochrane, P. (2005). Consumption-Based Asset Pricing Model. *Journal of Monetary Economics*, 58(2), 56-80.

Cox, J. C., Ingerson, J.E., & Ross, S.A. (1977). A Theory of the Term Structure of Interest Rates. *Econometrica*, *52*, 1022-1038.

Cysne, R. P. (2006). Equity- Premium Puzzle: Evidence from Brazilian data. *Economia Applicado*, 10(2), 161—180.

Damodaran, A. (2010). Equity Risk Premium: Determinants, Estimation and Implications. Retrieved 20/5/13 from SSRN: http://ssm.com/abstract=155638Damodaran.

Estrella, A., & Hardouvelis, G. (1991). The Term Structure as a Predictor of Real Economic Activity. *Journal of Finance*, 46(2), 555-576.

Fernandez, P., Aguirremalloa, J., & Leichtenstein, H. (2009). The Equity Premium Puzzle: hired required Equity Premium, Undervaluation and self-Fulfilling Prophecy *Working Paper* WP-821, IESE Business School.

Gomes, F. A. R., Costa, L. D. A., & Pupo, R. C.A. (2013). The Equity Premium Puzzle: Analysis in Brazil after the Real Plan. *Brazilian Administrative Review*, 10(2), 135-157.

Gomes, F. A.R., Costa, L. D., & Pupo, R. C.A. (2013). The Equity Premium Puzzle: Analysis in Brazil after the Real Plan. *Brazilian Administrative Review*, 10(2), 135-157.

Fernandez, P. (2008). US Market Risk Premium used in 2008 by Professors. *Working Pape.* Retrieved on 16/7/07 from http://ssm.com/papers/abstract=933070.

Hansen, L, P. & Jagannathan, R. (1991). Implications of Security Market data for Models of Dynamic Economies. *Journal of Political Economy*, 99(2), 2252-262.

Hansen, L. P. (1982). Generalized Method of Moments. *Econometrica,* 8(2),116-132.

Hansen, L.P., & Singleton, K.J. (1982). Generalized Instrumental Variables Estimation of Nonlinear Rational Expectations Models. *Econometrica*, *50*(5), 1269-1286.

Harvey, C.R. (1989). Time-Varying Conditional Covariances in Tests of Asset Pricing Models. *Journal of Financial Economics*, 24, 289-317.

Hibbard, R. (2000). The Equity Premium Puzzle: New Zealand Evidence. *Pacific Accounting Review*, 12(2), 75-89.

Idolor, E. (2011). Consumption-Oriented Capital Asset Pricing Model and Capital Asset Pricing Model in the Nigerian Capital Market. : A comparative study. *The Journal of Commerce*, *6*(3), 1-22.

Im, K. S., Peseran, M. H., & Shin, Y. (2003). Testing for Unit Roots in Heterogeneous Panels. *Journal of Econometrics*, 115, 53-74.

Issler, J. V., & Piqueira, N. S. (2000). Estimating Relative Risk Aversion, the Discount Rate and the Inter-Temporal Elasticity of Substitution in Consumption for Brazil using three types of Utility Functions. *Brazilian Review of Econometrics*, 20(3), 201-239.

Jorbet, A., Platania, A., & Rogers, L.C.G. (2006). A Bayesian Solution to the Equity Premium Puzzle. Statistical Laboratory, University of Cambridge.

Jorda, O., Scularik, M., & Taylor, A.M. (2019). The total Risk Premium Puzzle. Federal Reserve Bank of San Francisco *Working Series*, 12, 66-84.

Kocherlakota, N R. (1996). The Equity Premium: It's Still a Puzzle. *Journal of Economic Literature,* 34(1), 42-71.

Kyriacou, K., Madsen, J., & Mase, B. (2004). The Equity Premium. Brunel Business School and Institute of Economic Studies, Denmark *Working Paper 02, 76-88.*

Levin, A., Lin, C. F., & Chu, C.S.J. (2002). Unit Root Tests in Panel Data: Asymptoptic and Finite Sample Properties. *Journal of Econometrics,* 108(1), 1-24.

Lintner, J. (1965). The Valuation of Risky Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets. *Review of Economics and Statistics*, 47 ((1), 867-887.

Liu, R., & Wang, Z. (2005). The Risk - Free rate Puzzle and Equity Premium in China. *Modern Finance and Economics – Journal of Tianjin University of Finance and Economics (China),* 80 (4), 21-23.

Lucas, R.E. (1978). Asset Prices in an Exchange Economy. *Econometrica*, 46(2), 1429-1445.

Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance, 7(1), 77-91.*

Mehra, R. (2003). The Equity Premium Puzzle: Why is it a puzzle? *Financial Analysts Journal*, 59(1)-54-69.

Mehra, R., & Prescott, F. C. (1985). The Equity Premium: A Puzzle. *Journal of Monetary Economics*, 15 (2), 145-161.

Mehra, R. (2003). The equity premium puzzle: why is it a puzzle? *Financial Analysts Journal*, 59(1), 54-56.

Merton, R. (1973). An Inter-Temporal Capital Asset Pricing Model. *Econometrica, 41(1),* 867-887.

Merton, R. (1971). Optimum Consumption and Portfolio Rules in a Continuous-Time Model, *Journal of Economic Theory*, 373-413.

Michailidis, G., Tsopoglous, S., Papanastasiou, D., & Mariola, E. (2006). Testing the Capital Asset Pricing Model (CAPM): The case of the Emerging Greek Market. *International Research Journal of Finance and Economics*, 4(1), 79-90.

Nwude, E. C. (2013). Estimation of Equity Risk Premiums (ERP) in an Emerging Stock Market: The Nigerian case. *Global Journal of Management and Business Research Marketing*, 13(4), 1-12.

Obayagbona, J., & Omorokunwa, O.G. (2019). Equity Premium Puzzle and the Nigerian Capital Market. Annual International Academic Conference on Accounting and Finance Proceedings, 2019, 740.

Panopoulou, E. (2007). Predictive Financial Models of the Euro Era: A new Evaluation Test. *International Journal of Forecasting*, 23(4), 695-705.

Rogers, L. C. G. (2015). A Bayesian Approach to the Equity Premium Puzzle. University of Cambridge Papers, 44(2), 122-45.

Rubinstein, M., (1976). The Valuation of Uncertain Income Streams and the Pricing of Options. *Bell Journal of Economics and Management Science*, 7 (2), 407-425.

Sampaio, F. S. (2002). Does Equity Premium Puzzle exist in Brazil? In M. Bonomo (ED). *Brazilian Financial Journal,21(4)* 87-117.

Samanez, C.P., & Santos, R. C. (2007). Analise e Valicao do equity premium puzzle no mercado acionario brasileiro sob diferentes contextos economicos. *Revista Brasilera de Economia de Empresas, 7(2), 29-41.*

Sharpe, W. (1964). Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk. *Journal of Finance*, 33(1), 885-901.

Soriano, A. (2002). Testando o CCAPM atraves das fronteiras de volatilidade c da equacado de Euler in Bonomo (Ed). *Financas aplicadas ao* Brasil, 121-161. Rio de Janeiro.

Soriano, A. (2002). Testando o CCPM atravels das frontiers de volatilidade eda equacao de Euler In. M. Bonomo (ED). *Financas aplicadas ao Brasil, 121*-161. Rio de Janeiro: Editora FGV.

Swan, P. L. (2002). Can Illiquidity explain the Equity Premium Puzzle? The Value of Endogenous Market Trading. School of Banking and Finance, Faculty of Commerce University of New South Wales.

Welch, I. (2001). The Equity Premium Consensus Forecast Revisited, *Working Paper*. Yale School of Management.

Xiao, J., & Wang, Q. (2004). Transaction Cost, Consumption based Asset Pricing and Equity Premium Puzzle: Empirical Analysis from Chinese Stock Market. *Management World (China)*, (12), 3-11.