CBN Journal of Applied Statistics (JAS)

Volume 8 | Number 2 Article 6

12-2017

The Consumption-Oriented Capital Asset Pricing Model in the Nigerian Stock Exchange

Abidemi C. Adegboye
Adeyemi College of Education, Ondo State

The Consumption-Oriented Capital Asset Pricing Model in the Nigerian Stock Exchange

Abidemi C. Adegboye[1]

In this study, the Consumption-oriented Capital Asset Pricing Model (CCAPM) is tested for Nigeria by considering returns on investments in the Nigerian Stock Exchange market and other financial assets for the period 1993: Q1 to 2016:Q4. Three tests are conducted. The first test examines forecast performance of excess returns for the selected portfolios in predicting future consumption; the second test estimates the consumption betas for the set of assets using two alternative formulations of the CCAPM; and the third test included consumption growth variable in a multifactor risk analysis to compare with the basic CAPM formulations. The empirical results indicates that while stock returns do not predict future consumption decisions well, both Treasury Bill rates and dividend yield performed well in predicting consumption behaviour. For the consumption beta estimates, CCAPM is found to only be relevant for few portfolios in the stock market, with negative betas for the entire market. Betas for Treasury bill rates and dividend yields however suggest that the assets form strong basis for both current and future consumption decisions. The results also show that the consumption growth factor does not have any significant risk premium for the categories of assets.

Keywords: CCAPM, Consumption Growth, Dividend Yield, Excess Returns, NSE, Treasury Bill Rate

JEL Classification: E44 G12 G11

1.0 Introduction

A major variable linking the stock market and output in most economies is consumption expenditure - both in actual or implied terms. The linkage is based on the wealth effect as the traditional channel for transferring risks and assets. It is on this basis that the Consumption Oriented Capital Asset Pricing Model (CCAPM) was developed. The CCAPM is one of the extensions of the original market-oriented CAPM developed by Sharpe (1964) and Lintner (1965). In the CAPM, an asset's payoff basically depends on the level of its riskiness in the market. The main argument of the CCAPM is that the expected excess return on any risky asset should be proportional to its marginal utility in

[1] Department of Economics, Adeyemi College of Education, Ondo state, Nigeria. Email: cornabi@gmail.com; Tel: 07033227416

consumption. The theory focuses on sensitivities of returns to changes in real consumption spending in terms of the structure of the systematic risks and resultant excess returns. Thus, "securities with higher sensitivities of returns to movements in real consumption spending have more systematic risk and should have proportionately higher excess returns" (Breeden, Litzenberger and Jia, 2015). Apparently, if an asset has a real rate of return, an individual may be able to increase his utility by deferring consumption from the current period and investing in the asset in order to consume in a later period. The relative attractiveness between current and future consumption affects the asset's price as reflected in its return. An important implication is that changes in consumption should mirror changes in asset prices.

Consumption as a component of aggregate income has had the largest share over time in Nigeria with proportions reaching 74.0 percent in the 1990s, 73.2 percent in the 2000s and 74.1 percent in 2016 (CBN, 2016). Empirically, there does not appear to be many studies explaining consumption behaviour in Nigeria, especially, on the basis of the textbook theoretical foundations. The main explanation for the dearth of such studies could be linked to the paucity of time series data, especially in disaggregated form. For such a large component of aggregate income, there is need to investigate its dynamic properties within business cycles. Such studies would provide the necessary information about consumption trends with respect to its relationship with other macroeconomic aggregates. One of such relationships involve streams of income and risks emanating from the stock market. If a consumption-asset risk relationship is empirically established, then coordinated measures towards aggregate consumption growth and performance could be arranged.

In investigating the consumption and asset pricing relationship for Nigeria, the study by Idolor (2011) was the closest in estimating the CCAPM effects. However, the study focused on estimating a basic consumption function with stock returns as an explanatory variable, without taking into account the intertemporal utility implications. This study improves on the previous studies by using appropriate utility-based framework in the CCAPM estimation which gives room for effective prediction of consumption behaviour. Moreover, being an aggregate factor, consumption may not respond to only stock prices as an asset
This study also extends the previous studies by including other asset categories in the CCAPM model.

The main aim of this paper is therefore to use the models and methodologies available on the CCAPM to test the consumption-asset relationship (in terms of utility and risks) for the Nigerian stock market. The focus thus is to provide the theoretical background, adapt existing formulations, and extend the scope of literature for stocks in the Nigerian market. Moreover, the basis for wealth diversification is that different classes of assets respond differently to diverse economic conditions, which causes investors to move assets from one class to another to reduce risk and to profit from changing conditions. Hence, other asset categories are considered in the CCAPM for comparison. This study therefore provides an empirical background for examining how investors' utilities transmit to asset pricing decisions in the Nigerian stock market.

The paper is structured into five sections, including this introduction. In section two, theoretical and empirical literature that are pertinent to the issues within the study is reviewed, while the data and analytical procedure for the study are provided in section three. The empirical analysis of the study is conducted in section four and policy implications of findings as well as conclusions are provided in section five.

2.0 Literature Review

2.1. Theoretical Framework

The theoretical foundation provided for the CCAPM indicates three main implications for empirical analysis. First is the endogeneity that exists between consumption expenditure and wealth-asset regimes of investors. Second, it shows that consumption-based asset pricing models emphasizes utility and "use marginal rates of substitution" to determine the relative prices of composite consumption good (Mehra, 2012). Third, the theory indicates that an intertemporal approach is essential for empirical estimation of the CCAPM relationship. The consumption CAPM therefore uses marginal utility of consumption to measure the effect of risk on the returns of assets rather than relying on an indirect measure of risk, like the covariance of stock returns with the market index return (Bishop, 2001). More practically, the CCAPM estimation shows how the relative attractiveness between current and future consumption affects an asset's price as reflected in its return.

The original treatise on the consumption-oriented Capital Asset Pricing Model (CCAPM) as demonstrated by Rubinstein (1976), Breeden and Litzenberger (1978), and Breeden (1979) posits that in an intertemporal economy, equilibrium expected excess returns is proportional to its "consumption beta." In this section we present a general and simplified derivation of the CCAPM within an intertemporal choice structure based on the formulation provided in Bailey (2005). In this study, we focus on the *intertemporal* CAPM which provides more robust analytical basis. The CAPM with intertemporal patterns is typically constructed under the assumption that portfolio and consumption decisions are made in continuous time. However, to avoid the complex mathematics of continuous time stochastic processes, the CCAPM presented here is introduced in terms of the simpler model of investor behaviour in discrete time (akin to Bailey, 2005; and Levy and Samuelson, 1992).

Following some algebraic manipulations, the future value ratio (FVR) for returns, $E\left[1 + r_j\right]H = 1$, can be written in the form:

$$\mu_j - \mu_0 = \theta_H \beta_{jH} \qquad j = 1,2,3, \dots, n \tag{1}$$

The expression above is quite similar to the familiar CAPM, prediction,

$$\mu_i - r_0 = (\mu_i - r_0)\beta_j$$

In (1) the symbols are interpreted as follows:
μ_j= the expected rate of return on asset *j*, *E(rj);*
$\beta_{jH} \equiv cov(r_j, H)/varH$: the *beta-coefficient* between *j* and *H*;
μ_0 = the expected return on an asset with zero beta-coefficient with *H* – i.e. β_{jH} = *0*; θ_H = a number, the same for all assets; and *H* = state variable to be optimised (i.e. utility).

Equation (1) states that the 'excess return' on each asset is proportional to its beta-coefficient (where the beta-coefficient is now defined for the asset's rate of return and the stochastic discount factor, H). In the equation, the excess expected return, $\mu_j - \mu_0$ is defined in terms of the expected rate of return on a zero-beta asset, or portfolio. In the CCAPM, however, the 'zero-beta' corresponds to H, rather than the rate of return on the market portfolio. As Bailey (2005) noted, if a risk-free asset exists, it would certainly have a zero beta-coefficient (with respect to H).

In the CCAPM, θ_H replaces $\mu_j - \mu_0$, the excess expected return on the market portfolio. But θ_H is not the same as in the CAPM, because *H* is

actually the state variable to be optimised. In this sense, the CCAPM is a generalization of the CAPM.

Given the definition of β_{jH}, it is possible to construct a regression model for each r_j and H:

$$r_j = \alpha_{jH} + \beta_{jH}H + \varepsilon_j \qquad (2)$$

where r_j is the excess return $(\mu_j - \mu_0)$, $\alpha_{jH} = \mu_j - \beta_{jH}E(H) = 0$, and ε_j is an unobserved random variable with standard stochastic properties. According to Koijen, Nijman and Werker (2010), the main limitation of the CCAPM as expressed in an equation like (2) is that H, the stochastic discount factor (i.e. marginal utility of asset use), is a purely subjective reflection of preferences and can differ from one investor to another. Without additional restrictions on H, the model is simply too general. The commonest refinement of the CCAPM (as shown in Bailey, 2005) is to replace H with the (proportional) rate of growth of aggregate (economy-wide) consumption. This specialization comes about by recognizing that H depends on consumption and by choosing H with $H \approx 1 - \gamma c$, where c is the rate of growth of consumption and γ is the (constant) coefficient of relative risk aversion.

If H is replaced with c, it is possible to rewrite the CCAPM equation $\mu_j - \mu_0 = \theta_H \beta_{jH}$ as

$$\mu_j - \mu_0 = \theta_c \beta_{jc} \qquad j = 1,2,3,\ldots,n \qquad (3)$$

where, $\beta_{jc} = cov(rj,c)/var(c)$ and θ_c as before, is a number that is the same for all assets. With identical reasoning as for H, a regression model linking returns (r_j) and consumption (c) can be constructed:

$$r_j = \alpha_{jc} + \beta_{jc}c + \varepsilon_i \qquad j = 1,2,3,\ldots,n \qquad (4)$$

where $\alpha_{jc} = \mu_j - \beta_{jc}E(c) = 0$ and ε_j is expected to have the same properties as (2) above.

Equations (3) and (4) form the heart of the CCAPM. They show that the CCAPM can be interpreted much like the static CAPM but with the rate of growth of consumption, c, replacing the rate of return on the market portfolio, r_M. Alternatively, (4) can be viewed as a factor model with c as one of the factors. Furthermore, as already hinted, the CCAPM can be

placed within the context of the intertemporal CAPM; the latter includes a wider range of factors along with *c* in (4).

2.2 Empirical Literature

Consumption-based asset pricing models are unique multi-period general equilibrium asset pricing models in financial economics research which have been on the forefront of explaining the asset market (Breeden et al, 2015). The Consumption Capital Asset Pricing Model (CCAPM) was first derived in the late 1970s in successively more general models by Rubinstein (1976), Breeden and Litzenberger (1978), and Breeden (1979). Also, Lucas (1978) work on Euler equations has provided very useful guide to obtaining the empirical framework in the analysis of consumption-based asset pricing tests. The CCAPM is built on the classic single-period, market-based CAPM of Sharpe (1964) and Lintner (1965), as well as on the subsequent major work on the intertemporal CAPM by Merton (1973). The Consumption CAPM links asset pricing with macroeconomic risks.

The CCAPM is based on a relationship between market returns and consumption decisions. This relationship has been studied with varying outcomes. Ludvigson and Steindel (1999) found that the "dynamic response of consumption growth to an unexpected change in wealth is extremely short-lived" and that a wealth shock had a positive, but uncertain impact on consumption growth. Also, Singh (2012) examined how shocks emanating from changes in the stock wealth affected the consumption demand in India using a Bayesian VAR framework and noted that the effect of the stock market wealth shock on consumption demand in India is relatively small in magnitude. Other studies such as Rangvid, Santa-Clara and Schmeling (2016) have found that higher capital market integration forecasts more consumption risk sharing in the future, establishing a link between stock market and consumption. For China, Hau (2011) demonstrated the stock market and consumption relationship using the Vector Autoregression technique and found that the market returns do not serve as good leading indicator of future economic activities for Chinese consumers. He related the poor performance to the emerging status of the market with low efficiency. Caporale and Sousa (2016), used the consumer's budget constraint to demonstrate that a cointegration relationship exists between consumption and aggregate wealth, and such trend could predict stock returns among 31 emerging markets.

In Nigeria many studies have found reasonable linkages between stock market prices or returns and real sector variables (Ikoku, 2010; Ohiomu, 2011; Idolor, 2011; Ogunrinola & Motilewa, 2015). Ohiomu (2011) examined the effects of stock market fluctuations on consumer behaviour in Nigeria by estimating the marginal propensity to consume out of financial wealth, while, allowing for differences in stock market capitalization, and comparing it with ones obtained more directly from consumption functions that include stock market prices. The results showed that capital market performance and stock returns shocks had significant impacts on the marginal propensity to consume in Nigeria.

The initial empirical tests carried out on the CCAPM did not yield much consensus on its validity. Tests of the special case of the CCAPM under constant relative risk aversion such as Hansen and Singleton (1983) and Mehra and Prescott (1985) rejected the model, while Chen, Roll and Ross (1986) found no significant consumption factor priced in the presence of other factors, including industrial production, junk bond returns, and inflation hedges. Later studies showed stronger theoretical support for CCAPM and tests were conducted in that direction. Campbell and Cochrane (2000) produced an empirically tractable model with the habit formation approach, using an "external habit." They were able to fit many aspects of empirical data on stock and bond returns as related to real consumption growth, especially the risk premium on the stock market, and obtained strong relationships. Mankiw and Zeldes (1991) improved CCAPM analysis by assuming that many households did not own stock at all or in significant amounts, a situation called "limited participation." They found that for households who actually owned stocks, the implied estimates of relative risk aversion were much more reasonable than for households who did not own stocks.

Incomplete or partial markets analysis of market risks and volatility with consumption-based market participation have also been performed with results indicating that the CCAPM may not fully explain reasons for individual asset pricing and accumulation (Heaton & Lucas, 1996; Brav, Constantinides & Geczy, 2002; Vissing-Jorgensen, 2002; Bansal & Yaron, 2004). Bansal, Dittmar & Kiku (2009) observed a cointegrating relationship between aggregate consumption and aggregate dividends and showed that "the deviation of the level of dividends from consumption is important for predicting dividend growth rates and returns at all horizons" used in their model. Jagannathan and Wang

(2007) also provided evidence that when consumption betas of stocks are computed using year-over-year consumption growth, the consumption-based CAPM explains the cross-section of stock returns as well as the Fama and French (1992) three factor model.

In the case of Nigeria, not much has been done on the test of the CCAPM. The only empirical study to our knowledge is that of Idolor (2011) who tested whether the Consumption Capital Asset Pricing Model (CCAPM) is superior to the Capital Asset Pricing Model (CAPM) in explaining portfolio returns in the Nigerian capital market. He collected data from the third quarter (Q3) of year 2000 to the fourth quarter (Q4) of year 2009 for the study and estimated the models with the Ordinary Least Squares technique. The results showed that CCAPM is not superior to CAPM in explaining variations in portfolio returns of quoted companies in the Nigerian capital market.

The literature considered in this section have established a general relationship between consumption and the stock market, and also presented empirical evidence of the CCAPM. For the initial analysis, there appears to be varied outcomes, especially for different data use. The major deficiency is in the methodology, where a direct relationship is sought between the two variables. The studies assumed a linear pattern of interrelations between the real sector variables and stock returns. The estimates thus set out to observe direct relationships and covariances. However, the consumption CAPM estimation does not assume covariance relationship between stock returns and consumption, rather it is based on utility smoothening approach (Poterba, 2000). Moreover, the consumption CAPM tends to handle the asymmetry that exists in the effects of wealth changes on consumer spending.

The major difference between direct and utility-based estimation of the consumption-returns relationship is that, while direct estimation assumes a linear coefficient relationship, utility-based estimations assumes a relationship that is non-linear in coefficients. This is the main reason for the application of the Generalised Method of Moments (GMM) for estimating the relationship. Moreover, the prediction of stock performance using consumption-based utility optimization provides a unique way of guiding real sector activities in the stock market. This study improves on previous study in this direction, especially when such intertemporal analyses are scanty in Nigeria.

3.0 Data and Methodology

The methodology adopted in testing the CCAPM in Nigeria takes the implications of the theoretical framework into cognizance and employs three related but empirically separate analysis. First, we test the performance of risk premium in predicting consumption behaviour over time and use it to identify whether the trend in consumption expenditure decisions could be observed based on excess returns in the stock market. This strand of analysis follows the original empirical tests by Harvey (1989) who tested whether or not the slope of the term structure of interest rates actually forecasted expected real growth of the whole economy. The method also follows Estrella and Hardouvelis (1991) which examined the ability of the term structure of returns to forecast the components of real GDP.

The model estimated for the prediction analysis is:

$$(400/k)(logx_{t+k} - logx_t) = \alpha + \beta ert_t + \epsilon_t \quad (5)$$

where x_{t+k} is the quarter $t+k$ value of real consumption per capita and k is the forecast horizon. ert_t is the difference between the stock market returns and the risk-free rate (proxied by the Treasury Bill rate) for quarter t. Thus, *ert* is the excess return in the market as determined by the CAPM. According to Panopoulus (2007), the model structure specified above provides effective means of estimating prediction models where n-period ahead forecasts are to be reported. For the model, the estimation period is updated recursively by adding one observation at a time and holding the initial sample fixed. From this recursive estimation, we obtain 4 sets (i.e. corresponding to k = 1, 2, 3 and 4) of out-of-sample forecasts for the model.

The second empirical analysis conducted is the actual estimation of the CCAPM based on the general proposition and foundation provided by Rubinstein (1976), Breeden and Litzenberger (1978), Lucas (1978), and Breeden (1979). In this direction, the variants of CCAPM which have become highly relevant because of the problems with data and estimation are taken into consideration. Hence, two alternative models of the CCAPM are estimated and tested for the Nigerian case in this study. The first model specifies a consumption factor within the traditional static CAPM by replacing, market premium with future consumption growth as shown below.

$$Y = a + bR_{t+1} \quad (6)$$

where *Y* is the asset return, and R is the consumption return (proxied by growth rate of consumption). The subscript in the equation indicates, future rates. Campbell and Cochrane (2000) used a similar form of the model to good effects in testing the CCAPM for the US data.

The second variant is the canonical consumption-based model with time-separable power utility based on the classic form studied by Hansen and Singleton (1982). In the model, the risk-return relationship is specified as:

$$Y_{t+1} = \beta \left(\frac{C_{t+1}}{Ct}\right)^{-\eta} \quad (7)$$

where y represents the excess returns, C is consumption, β is the market premium, and η is the consumption utility or premium. By taking logarithms, the canonical consumption-based model with power utility can be further expressed as:

$$y_{t+1} = \ln(\beta) - \eta \ln(c_{t+1} - c_t) \quad (8)$$

where *c* is now consumption in per capita terms. The advantage of this model is that it captures the dynamic intertemporal structure of the original CCAPM model in a quite simplified manner, while providing a broad template for analyzing CCAPM for different market forms.

In the third empirical analysis, we present the CCAPM alongside the CAPM (with market betas) and the multifactor arbitrage pricing theory (APT) and observe the contemporaneous or relative performance of the CCAPM. Within this structure, further support for a consumption-based analysis of the market may be obtained by considering the consumption risk within the APT. We follow Chen, Roll and Ross (1986) to investigate exposures of stock returns to "economic state variables," such as (1) fluctuations in monthly industrial production (*iidp*), (2) the naira exchange rate (*ex.rate*), (3) changes in money supply (*ms*), (4) the interest rate spread (*int.spread*), and (5) government spending (*gov.exp*).

The main focus of the study is to test the CCAPM for the Nigerian Stock Exchange and compare it with other assets in the Nigerian financial market. On this basis, returns on stocks for the entire market (using the All Share Index) and for eight (8) major sectors in the market are used.

For the sectoral returns within the market, asset portfolios were created from these sectors for the study. The major sectors used include agriculture (*agric*), conglomerates (*conglo*), construction/real estate (*constr*), consumer goods (consumer), financial services (*financial*), Healthcare (*health*), industrial goods (*industrial*), and oil and gas (*OandG*). In creating asset portfolio returns for the sectors, the following formula was used:

$$PR = \sum_{i=1}^{n} \frac{average\ stock\ price\ \ in\ sector\ i}{sum\ of\ \ stock\ prices\ in\ the\ market} \times rss_i \qquad (9)$$

where *PR* is portfolio return and rss_i is return on sector stock *i*. It could be noted that given the nature of financial markets in Nigeria, stock returns may not be the only financial asset type that covaries with consumption changes. There is need to improve the outcome of the study by considering other asset types in comparison with the stock market assets. In order to present a more robust analysis therefore, three sets of asset categories were created to study the CCPAM effect. The stock market stocks (both entire market and sector stocks) formed the first category of assets. The second asset category is the 90 days Treasury Bills, and the third category is dividend from corporate shares.

For each of these asset categories, returns were computed. The data for stock market prices were sourced from the Nigerian Stock Exchange historical data on annual stock price movements (1993 – 2016). Stock returns are computed as

$$r_t = \left(\frac{p_t - p_{t-1}}{p_{t-1}}\right) X\ 100$$

where r_t is returns, p_t is the stock price. The risk-free rate (90-days Treasury Bills rate), consumption expenditure, industrial production, the naira exchange rate, money supply, government expenditure, and the interest rate spread were also sourced from the CBN Statistical Bulletin (2015) and Quarterly Statistical Bulletin (2017:Q1). Returns on dividend is considered as the dividend yield and the data is obtained from the Securities and Exchange Commission (SEC) annual Statistical Bulletin (2010) and several annual reports of the Nigerian Stock Exchange (2011 – 2016). Consumption growth is the quarterly changes in per capita expenditure on consumption. Data used covers the period 1993:Q1 to 2016:Q4.

The methodology adopted in this study acknowledges the empirical implications of the CCPAM, namely, endogeneity between consumption asset wealth, and intertemporal optimization of utility. Moreover, asset pricing models are generally non-linear in coefficients. This makes the use of Ordinary Least Squares (OLS) as estimation tool ineffective since the error term will be correlated with the explanatory variable and the estimated betas for the CCAPM would yield biased and inconsistent results (Romer, 2011). Although Ludvigson and Steindel (1999) successfully used the dynamic OLS technique estimating consumption-returns relationship, a caveat was imposed since this method only adapts fully when cointegration is established among the variables over a long period. The modeling arrangement used in this study follows a simplification of the intertemporal CCAPM. To avoid the simultaneity problem, an instrumental variable (IV) specification for the estimation is more appropriate. The intertemporal optimization condition implies that the choice of instruments is critical in providing reliable estimates. For this reason, the Generalised Method of Moments, which selects instruments based on the moment conditions of the probability distribution, is preferred over other IV estimators like the Two Stage Least Squares technique (2SLS). For instance, the 2SLS instruments for consumption in the model from the estimated returns equation and therefore foregoes any optimization decision implied in the model.

The GMM is an estimation procedure that allows for non-linear estimation of the regression equations when heteroskedasticity and cross-correlation of returns is a concern. Briefly, the GMM estimator is computed by minimizing the quadratic form

$$q = m' W^{-1} m \tag{10}$$

where

$$m = T^{-1} \sum Z_t' \otimes u_{t+1} \tag{11}$$

and W is the asymptotic variance/covariance matrix for the orthogonality conditions m or the weight factor. Hansen (1982) shows that an *asymptotically efficient*, or *optimal* GMM estimator of the parameter may be obtained by choosing W so that it converges to the inverse of the long-run covariance matrix. Z_t is any subset of the variables in the current information set and is used to capture the instruments in the model, q is the moment condition to be minimized and T is the entire

time period that is used to obtain the average moments. The instruments in the GMM are taken as the lags of consumption growth and return series.

4.0 Empirical Analysis

4.1 Preliminary Data Analysis

In this section, the results of the estimated models and tests presented in the previous section are reported and analyzed. We begin by considering the general and summary statistics of the variables used in the analysis. In Table 1 the descriptive statistics of the portfolio returns are reported. The data is presented along sub-periods consisting of the pre-financial crisis in the Nigerian financial sector (between 2008 and 2009) from 1993 – 2007 and the post crisis period of 2009 – 2016. The summary statistics of Treasury Bill rates and average dividend yields are also reported. In all, Treasury bill rates were higher in each of the sub-periods, followed by dividend yield. This means that negative excess returns on each of the portfolios would be expected as shown in the lower part of Table1. Thus, as a class of asset desired to be held, returns on Treasury bills are higher with less risk (considering the low standard deviation values). Dividend yields are also high, with low risks, suggesting that trading in the stock market portends less returns when compared with dividend policy holders in Nigeria.

Table 1: Descriptive Statistics for Quarterly Returns

ASSETS	1993 – 2016		1993 – 2007		2009 – 2016	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Market return	3.34	13.85	3.21	14.98	2.74	28.08
Agriculture	3.24	20.74	6.67	11.62	-0.49	14.54
Conglomerates	0.46	34.25	1.98	31.53	-5.26	28.54
Construction/real estate	2.22	21.88	3.78	13.50	-1.40	29.12
Consumer goods	3.73	15.53	4.14	12.44	5.41	19.47
Financial services	0.59	16.60	2.72	13.24	-1.86	19.33
Healthcare	1.26	28.95	2.46	25.65	1.43	34.27
Industrial goods	2.90	30.33	0.50	11.43	2.48	41.58
Oil and gas	3.31	23.08	4.94	16.82	-0.81	30.05
Treasury bill rate	11.96	5.03	13.84	4.82	8.97	3.91
Dividend yield	7.06	2.48	8.50	1.63	4.74	1.80
			Excess returns			
Market return	-8.62	13.91	-7.16	12.95	-9.46	14.35
Agriculture	-8.72	21.28	-10.63	16.62	-6.23	27.26
Conglomerates	-11.49	34.25	-11.85	31.65	-14.23	28.48
Construction/real estate	-9.74	23.29	-10.06	16.03	-10.37	30.25
Consumer goods	-8.23	16.51	-9.70	13.72	-3.55	20.18
Financial services	-11.36	16.95	-11.12	14.95	-10.83	18.60
Healthcare	-10.70	29.60	-11.37	26.42	-7.53	34.97
Industrial goods	-9.06	31.14	-13.34	13.07	-6.49	41.70
Oil and gas	-8.65	23.46	-8.89	17.83	-9.78	30.10

In terms of the individual sectors, the consumer goods portfolio clearly dominated all the other portfolios on average in terms of returns. Only the consumer goods portfolio had consistently higher returns than that of the entire market in each of the sub-periods. The sector also performed very impressively during the 2009-2016 period. Surprisingly, the consumer goods portfolio actually had lower standard deviation values than most of the other portfolios in the sample. This implies that the asset with less variations (or risk) performed better in returns over the sample period. Average returns on all asset categories were higher in 1993-2007 period than post 2009 period, suggesting that financial market rates on assets have been lower since the financial crisis. Indeed, average returns were negative for five of the sectors after the 2009 period. The overall market return was however positive, and relatively high at 2.74, for the 2009 – 2016 period. Quarterly variations in returns were also highest for most of the assets during the 2009 – 2016 period, suggesting higher market risks, but lower returns in the market.

In Table 2, the time series properties of monthly consumption growth for the sample period are presented. This analysis is necessary since problems have been encountered with the application of consumption data in CCAPM, especially on measurement and aggregation (see Breeden et al, 1989; Mehra, 2012). In the properties reported in Table 2, average quarterly consumption growth for the entire period was positive at 1.34 percent although the standard deviation is quite high. This implies that there were large variations in consumption growth over the period. The average consumption growth for the two sub-periods are less than that of the entire period. Since the sub-period averages are both less than that of the entire period, there is strong evidence that average consumption growth for the sub-period left out (2008) was quite high and positive. The standard deviations for the period after the crisis is higher than those of the other periods, even though the period had the least growth in consumption on average. Apparently, periods of weak consumption expenditure also witnessed the biggest swings in Nigeria.

The first-order autocorrelation is 0.51 for the entire period, 0.53 for the pre-crisis period and 0.45 for the post crisis period. These are really high positive autocorrelation values that show clearly that disturbances in consumption growth are highly correlated and estimations based on the data need adequate consideration. Indeed, the autocorrelations are high for the periods for up to the third-order. The test statistic for the joint null hypothesis that all autocorrelations are zero for lags 1 through 4 is

given by Q_4 in the Table. The value is sufficiently high for each period and the p-value indicates significance at the 1 percent level. Thus, autocorrelation is a strong issue in consumption growth in for the Nigerian data.

Table 2: Time Series Properties of Percentage Changes in Real Per Capita Consumption

PERIOD	T	$\bar{c}$	$\widehat{SD}(c)$	$\hat{\rho}_1$	$\hat{\rho}_2$	$\hat{\rho}_3$	$\hat{\rho}_4$	Q_4	p-value
1993Q1 – 2016Q4	96.00	1.34	14.73	0.60	0.23	-0.33	-0.27	101.20	0.00
1993Q1 – 2007Q4	59.00	1.31	7.56	0.71	0.31	-0.49	-0.34	91.60	0.00
2009Q1 – 2016Q4	32.00	0.72	20.61	0.49	0.17	-0.42	-0.23	43.10	0.00

Note: T denotes the number of observations while $\bar{c}$ and $\widehat{SD}(c)$ are the sample mean and standard deviation respectively; the $\hat{\rho}_{is}$ are the autocorrelation coefficients.

4.2 Analysis of Regression Results

The first empirical analysis of the CCAPM that is performed is to consider the performance of the excess returns of the assets in predicting future changes in consumption growth in Nigeria. As suggested in the previous section, other asset categories (Treasury bills rates and dividend yields) are included in the prediction estimation. The results are presented in Table 3. Generally, the results of the prediction model did not perform too well, considering the low adjusted R-squared values and the high standard errors of estimates (SEE). This essentially shows that financial asset returns do not perform very well in predicting changes in consumption behaviour in Nigeria. Further outcome on the prediction performance can be observed by considering the estimated slope (β) coefficients. In this regard, the results for the stocks returns are poor compared with those of Treasury Bills rates and dividend yield. In the first quarter horizon, only the conglomerate portfolio had a significant β of -0.47. In the second quarter, construction and consumer goods portfolio had significant slope coefficients, while only those of conglomerates and oil and gas were significant in the third quarter. Only, that of oil and gas portfolio also passed the test in the fourth quarter. The significant slope coefficients for conglomerates and construction portfolio are negative indicating that excess returns tend to generate negative consumption attitude in the future.

For the other asset categories, none of the slope coefficients was significant in the first quarter horizon. For the second to the fourth quarter however, the slope coefficients were significant, positive and high for both Treasury bill rates and dividend yield, suggesting that these

assets tend to stimulate consumption behaviour after a period of time. Apparently, the slope coefficients of the prediction equations reveal that stock market assets performed poorly, while other financial assets performed well in predicting consumption changes in Nigeria. For the poor stock market outcomes, Breeden et *al*. (2015) and Funke (2002) found poor prediction outcomes based on CCAPM for less developed markets, although the results for developed markets were better. Apparently, the level of development of the stock market tends to improve the predictive capacity of market returns as also demonstrated in Rangvid *et al*. (2016). The results also imply that when other channels of adjustment to wealth shocks are available, especially in the long run, stock market assets may not be effective in the CCAPM. For such outcomes, Mehra (2012) also finds that prevalence of borrowing and lending among agents could limit the success of homogeneous household constructs used to predict stock returns.

Table 3: Predicting Future Cumulative Changes in Real per Capita Consumption Using Various Asset Returns

k Months Ahead	Coeff.	*ASI*	*Agric.*	*Conglo*	*Constr*	*Consumer*	*Financial*	*Health*	*Industrial*	*O&G*	*T-B rate*	*Div. yield*
1	α	13.19*	10.09*	2.21	7.21*	13.61*	7.33	9.11	9.17**	12.03*	6.37	7.18*
		(-2.15)	(-2.04)	(-1.74)	(-2.22)	(-2.82)	(-1.85)	(-1.11)	(-5.09)	(-2.31)	(-1.80)	(-2.07)
	β	0.55	0.25	-0.47*	-0.41	0.69	-0.09	-0.08	-0.04	0.01	4.56	3.31
		(-1.33)	(-1.620	(-2.39)	(-1.29)	(-1.33)	(-0.40)	(-0.61)	(-0.44)	(-0.23)	(-1.25)	(-1.63)
	$\bar{R}^2$	0.36	0.35	0.38	0.36	0.37	0.35	0.35	0.12	0.35	0.36	0.35
	SEE	71.12	71.36	69.68	71.1	70.62	71.53	71.57	27.97	71.62	71.1	71.19
2	α	10.07*	10.72*	4.88*	11.09*	13.53*	9.37*	10.17*	8.42*	19.17*	13.0*	12.79*
		(-2.41)	(-2.36)	(-2.11)	(-2.31)	(-3.09)	(-2.98)	(-3.42)	(-3.66)	(-2-00)		
	β	0.11	0.22	-0.34	-0.35*	0.58*	0.02	0.09	-0.09	-0.15	5.0*	3.72*
		(-1.11)	(-0.92)	(-1.47)	(-2.09)	(-2.37)	(-0.20)	(-0.36)	(-0.30)	(-1.03)	(-12.50)	(-10.00)
	$\bar{R}^2$	0.11	0.03	0.08	0.03	0.06	0.01	0.18	0.18	0.01	0.21	0.24
	SEE	44.65	44.42	43.15	44.29	43.6	44.67	44.58	44.59	44.21	44.34	44.46
3	α	10.55*	9.74*	8.27	10.16*	11.57**	9.70*	9.91**	9.17**	8.33*	9.42*	7.63*
		(-2.19)	(-2.22)	(-0.99)	(-2.71)	(-7.03)	(-2.17)	(-8.22)	(-6.66)	(-2.69)	(-2.03)	(-2.49)
	β	0.12	0.03	-0.18*	-0.23	0.28	0.02	0.04	-0.04	0.07*	5.15**	4.15**
		(-0.97)	(-0.730	(-2.31)	(-1.35)	(-0.92)	(-0.610	(-0.43)	(-0.69)	(-2.06)	(-11.10)	(-9.32)
	$\bar{R}^2$	0.12	0.12	0.09	0.12	0.14	0.12	0.12	0.12	0.16	0.13	0.14
	SEE	27.95	27.99	28.6	27.91	27.61	28	27.98	27.97	28.85	27.73	27.7
4	α	9.09**	8.42*	8.32*	8.51**	8.15**	8.01**	8.13**	8.60**	8.95*	11.11**	9.36**
		(-5.02)	(-2.18)	(-2.16)	(-7.11)	(-7.03)	(-7.270	(-7.31)	(-7.930	(-3.160	(-7.320	(-6.99)
	β	0.07	0.01	0.09	0.01	-0.04	-0.04	-0.03	0.02	0.08**	4.45**	3.73**
		(-0.91)	(-0.21)	(-0.74)	(-0.17)	(-0.35)	(-0.41)	(-0.27)	(-0.20)	(-9.210	(-10.50)	(-9.61)
	$\bar{R}^2$	0.38	0.36	0.12	0.36	0.36	0.36	0.36	0.36	0.3	0.37	0.38
	SEE	17.94	17.97	21.21	17.97	17.96	17.96	17.95	17.96	18.78	17.84	17.63

* and ** indicate significance at 5 and 1 percent respectively

Note that the standard errors of coefficients in the results are derived from the Newey and West (1987) corrections that take into account the moving averages that could arise from the overlapping of forecasting horizons as well as conditional heteroscedasticity. Results were obtained based on equation (5).

The results presented in Table 4 show the outcome of the estimation of the alternative CCAPM equations, as specified in the previous section. We may observe the more representative estimates among the three asset categories or between the two alternative models that where estimated. In the first place, the results show that, on a general level, the traditional CAPM model that relates returns on asset to future consumption perform better in creating betas or risks for the assets in the market than the canonical model. Apparently, consumption growth considered within a longer horizon does not effectively explain excess returns on assets in the market. The canonical equation only significantly estimated the beta for few of the returns, especially for the 2009-2016 period. These results suggest that consumption growth (or utility changes) was a stronger factor in asset pricing decisions after the financial crisis. In other words, the market became more mature and stabilized after the crisis. Indeed, both models performed better in estimating the betas for the 2009-2016 period.

Table 4: Consumption betas based on the alternative models

Assets	1993 – 2016		1993 – 2007		2009 – 2016	
	Traditional	Canonical	Traditional	Canonical	Traditional	Canonical
ASI	0.57	-0.42	0.71	-6.89	0.38	-9.24**
	(-0.91)	(-0.85)	(-1.21)	(-1.33)	(-0.88)	(-16.10)
Agric	1.01	-1.46	0.96	-0.67**	0.49	-0.22
	(-1.21)	(-1.38)	(-1.57)	(-9.13)	(-0.71)	(-0.69)
Conglomerates	2.76*	0.98*	2.59**	0.38	2.48	0.13
	(-2.71)	(-2.99)	(-8.1)	(-0.50)	(-1.53)	(-1.00)
Construction	-1.05	0.65*	1.06	0.08	-0.77	0.18*
	(-0.96)	(-3.10)	(-0.82)	(-0.22)	(-1.04)	(-3.05)
Consumer	1.90*	-2.14	0.89	0.31	1.97**	-0.04
	(-2.05)	(-1.03)	(-1.11)	(-0.41)	(-7.73)	(-0.25)
Financial	0.25	-0.34	1.77**	1.13	0.06	-0.15**
	(-1.11)	(-0.63)	(-7.97)	(-1.06)	(-0.30)	(-9.12)
Health	1.06	0.80**	0.24	0.14	2.71**	0.10
	(-1.07)	(-2.17)	(-0.40)	(-0.16)	(-8.11)	(-0.37)
Industrial	0.97	3.34	0.57	-0.22	2.67**	0.03
	(-1.63)	(-1.68)	(-1.01)	(-0.21)	(-9.02)	(-0.52)
Oil and gas	0.63	-5.81	9.35	-2.14**	4.46**	-0.52
	(-0.77)	(-1.33)	(-1.69)	(-10.4)	(-6.17)	(-1.02)
Treasury bill rate	0.39**	2.96*	0.59**	9.10**	0.27	0.52**
	(-6.83)	(-2.42)	(-11.60)	(-12.90)	(-1.85)	(-13.20)
Dividend yield	0.29**	4.54*	0.51**	3.09**	0.19**	0.48
	(-8.99)	(-3.14)	(-9.92)	(-9.47)	(-9.38)	(-1.89)

* and ** indicate significance at 5 and 1 percent respectively

Note: The traditional CAPM ($Y = a + bR_{t+1}$) estimate and the canonical [$y_{t+1} = ln(\beta) - l\eta(c_{t+1} - c_t)$] estimates

Generally, the canonical model estimated more negative *betas*, apart from the construction portfolio, suggesting that expectations about future consumption changes creates negative risk premiums in the market. Many studies using similar approach to CCAPM have also found negative coefficients (Jagannathan and Wang, 2007; Koijen *et al.*, 2010; Ghosh, Julliard and Taylor, 2017). A plausible explanation for this outcome is that decisions about future consumption desire tends to cause assets to be priced higher, thereby giving lower average returns. For the significant *betas*, the results indicate high coefficients for each of the returns. Surprisingly, the only significant stock market returns beta was negative and high at -9.24 (the highest beta for all asset groups), suggesting possible overpricing of assets on the basis of expected future consumption changes. The betas for conglomerates, construction, consumer goods, health, industrial goods, and oil and gas portfolios all had significant positive betas within the sub-periods in the analysis. Only financial services and agricultural portfolios demonstrated negative *betas*.

In terms of asset type, there is a clear distinction in the *betas* between the stock market and the others. Each of the betas for treasury bill rates and dividend yield is significant and positive, indicating that both asset categories tend to form a strong basis for consumption decisions (whether current or expected). This result again demonstrates the superiority of treasury bills and dividends over stocks in the CCPAM for Nigeria. Although such comparative outcomes have not been observed in previous studies for Nigeria, other studies like Artis and Hoffmann (2008) and Bai and Zhang (2012), while considering the role of liquidity and risk positions of consumers, confirm that more stable assets improve intertemporal consumption decisions.

Finally, the results for the consumption growth variable within a multifactor risk return framework is estimated and analysed. The results of the multifactor risk model (using macroeconomic variables) are reported in Table 5. The lagged returns coefficients are all high and positive in the results for each asset category. It shows that the market carries a positive risk premium for each period and asset. The coefficients for lagged returns in the treasury bill equation are lower than those of the other assets. This suggests that the speed of adjustment to

equilibrium, based on treasury bills pricing, is slow. The results also reveal that exposure of the assets to industrial production is rewarded with a significantly positive risk premium for the entire period in the stock returns model, but with a negative premium for the treasury bill rates model. The effects in the dividend yield model is insignificant for each of the sub-periods. Exposure to money supply also results in positive premium for stock returns and negative premium for treasury bills and dividend yields.

Table 5: Economic Variables and Pricing

Period	r_{t-1}	*iidp*	*ms*	*int. spread*	*ex.rate*	*gov.exp*	*constant*
			Stock returns				
1993-2016	0.93**	0.46*	-0.04	-0.09	0.08*	0.01	-1.03
	(-12.6)	(-3.12)	(-0.55)	(-0.91)	(-2.11)	(-0.12)	(-1.05)
1993-2007	0.80*	0.26	0.19*	-0.14*	-0.04	0.04	-1.85
	(-3.44)						
2009-2016	0.66*	-0.17	0.54*	0.28	-0.39*	0.03	-3.89
	(-3.18)						
			Treasury Bill Rate				
1993-2016	0.79**	0.52	-0.16**	0.03	0.05	0.12	-1.44
	(-10.1)	(-1.23)	(-9.09)				
1993-2007	0.45**	-1.43*	-0.05	0.52**	0.08	-0.13	8.78**
	(-9.36)	(-2.17)	(-0.93)	(-8.16)			
2009-2016	0.59**	2.55*	-0.55	-0.53	0.44	0.88**	-15.47
	(-7.19)						
			Average dividend yield				
1993-2016	0.90**	-0.08	-0.03	0.01	0.04	-0.01	0.92
	(-13.20)						
1993-2007	0.98**	0.33	-0.13*	0	0.11*	0	-0.15
	(-13.90)						
2009-2016	0.98**	-0.22	0.69	1.47	-0.26	-0.03	-12.54
	(-14.00)						

* and ** indicate significance at 5 and 1 percent respectively; t-ratios are in parentheses below each coefficient

Interest rate spread and exchange rate have negative premium effects on stock returns, but positive on dividend yield. Only treasury bills had significant exposure outcomes with government spending. Apparently, increases in government expenditure stimulates treasury bill rates in Nigeria. Thus, the results indicate that price-related state factors tend to create positive premiums in treasury bills and dividend assets, while non-price state variables create positive premiums for stock market assets.

What is the effect of exposure to consumption growth within the multi-factor model? This is answered by considering the result of the model with consumption betas in Table 6. In the result, the consumption betas for both stock market and treasury bills assets fail the significance test in each period. Only the consumption *betas* for dividend yield were significant and positive for the 1993-2016 and 2009-2016 periods. This results clearly show that exposure of the stock market assets to consumption growth over time does not generate any form of additional risk premiums in the market. Apparently therefore, consumption growth does not actually constitute a risk factor in the multifactor model for stock market returns. Millard and Power (2004) found similar results, when they showed that consumption within a multi-variable asset analysis could not explain stock market returns, especially during rising market activities. Mankiw and Zeldes (1991) explained this outcome by considering limited participation, since not all consumers participate in the stock market. For the significant positive beta coefficients in the dividend equation, it can be suggested that consumption agents in Nigeria tend to react more strongly with changes in dividend yields, than changes in stock returns.

Table 6: Pricing with Consumption

Period	cgr	r_{t-1}	iidp	ms	int. spread	ex.rate	gov.exp	constant
				Stock returns				
1993-2016	0.09	0.93***	0.52**	-0.05	-0.12	0.09**	0.01	-1.21
1993-2007	0.15	0.79***	0.47	0.15	-0.18**	-0.02	0.06	-2.52
2009-2016	0.15	0.59***	-0.11	0.57**	0.2	-0.39	0.03	-3.70
				Treasury bill rates				
1993-2016	-0.08	0.78***	0.53	-0.17**	0.00	0.07	0.13	-1.41
1993-2007	0.00	0.44***	-1.56**	-0.03	0.55***	0.07	-0.15	9.28***
2009-2016	-0.02	0.59***	2.54**	-0.55	-0.54	0.44	0.88**	-15.35
				Dividend yield				
1993-2016	0.15**	0.91***	-0.03	-0.04	-0.05	0.06**	0.01	0.73
1993-2007	-0.09	0.97***	0.24	-0.11**	-0.01	0.11***	0.00	0.13
2009-2016	0.41***	0.93***	-0.07	0.66	1.52**	-0.13	-0.03	-13.44**

Note: * and ** indicate significance at 5 and 1 percent respectively

5.0 Conclusion and Policy Implications

In this study, an attempt is made to investigate the consumption-oriented Capital Asset Pricing Model (CCAPM) in the Nigerian stock market by considering overall market and sectoral returns. Since other asset categories are prevalent in Nigeria, Treasury Bill rates and dividend yields were included in the analysis. Quarterly data for the period 1993

to 2016 were used for the estimation. The test of the CCAPM in Nigeria was demonstrated by modifying and applying three methodological frameworks that have been used in literature. The first test structure based on the forecast performance of excess returns for the selected portfolios for predicting future consumption indicated that the stock returns were weak in predicting future consumption decisions. On the other hand, both Treasury Bill rates and dividend yield performed well in predicting consumption behaviour.

In the second test, the consumption betas for the assets were estimated using two alternative formulations of the CCAPM. The results indicated that consumption CCAPM was only relevant for few portfolios in the stock market, and that betas for the entire market were negative. Both Treasury Bill rates and dividend yields demonstrated positive and significant *betas* in the CCAPM estimations. This showed that both asset categories were strong basis for both current and future consumption decisions. Essentially, the results demonstrated the superiority of Treasury Bills and dividends over stocks in the CCPAM for Nigeria. In the third methodology, the consumption growth variable was included in a multifactor risk analysis using macroeconomic variables. The results showed that when consumption growth is included in the model, the performance of the multifactor function seemed to decline for both stock returns and treasury bill rates and the consumption growth factor did not have any significant risk premium for these categories of assets.

The overall results from the study indicate that the CCAPM may not be quite effective in the Nigerian Stock market, although there is evidence that it performs better for other asset categories. These imply that consumption smoothening and its growth may not be strong enough reasons for participation in the stock market. In the same vein, the results reveal a high level of disconnect between consumption expenditure decision and stock-market related asset wealth behaviour in Nigeria. Since similar results have been found for less developed and emerging stock markets, the outcome of this study could be linked to the low level of development in the NSE. The depth of the market in terms of number of participants and assess to asset variety could also ensure poor utility maximisation in the market.

Moreover, inadequate financial sector development and high informality in the financial market in Nigeria would lower the linkage between aggregate consumption and stock returns. A large proportion of

financing mechanisms still lie outside of the formal financial markets in Nigeria. In this direction, Grossman, Melino and Shiller (1987) suggest that the empirical failure of consumption-based asset pricing models for stock returns could be due to the fact that average consumption appears smoother than instantaneous consumption. Thus, taking a perspective view of aggregate consumption within a system that has low formal financial transactions would lead to weak correlations. In the same vein, availability of other channels of adjustment to wealth shocks, especially in the long run has strong effects on the effectiveness of the CCAPM in the stock market. In the study, it has been demonstrated that other asset categories like Treasury bills and dividend holding perform better in relation to consumption smoothening in Nigeria. The high yields from Treasury Bills and corporate dividends tend to attract individuals with less understanding of the stock markets.

Finally, the results from the study imply that there is still a long way to go in terms of asset wealth adjustments to consumption decisions in Nigeria. In the first place, for consumption expenditure to have more linkages with asset-based wealth in the stock market, the market needs to improve on asset variety that could spur financing decisions on durable consumption. In general, the entire financial market in Nigeria needs to grow, especially in the area of financial asset ownership and handling, as against undue focus on the banking system and assess to government financed assets. In this direction, more stock market education should go hand-in-hand with market development in the country.

References

Artis, M. J. and Hoffmann, M. (2008). Financial Globalization, International Business Cycles and Consumption Risk Sharing. *Scandinavian Journal of Economics,* 110, 447–471.

Bai, Y. and Zhang, J. (2012). Financial Integration and International Risk Sharing. *Journal of International Economics*, 86, 17–32.

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

Bansal, R. and Yaron, A. (2004). Risks for the Long Run: A Potential Resolution of Asset Pricing Puzzles. *Journal of Finance*, 59(4), 1481-1509.

Bansal, R., Dittmar, R. and Kiku, D. (2009). Cointegration and Consumption Risks in Asset Returns. *Review of Financial Studies*, 22(3), 1343-1375.

Brav, A., Constantinides, G. M. and Geczy, C. C. (2002). Asset Pricing with Heterogeneous Consumers and Limited Participation: Empirical Evidence. *Journal of Political Economy*, 110 (4), 793-824.

Breeden, D. T. (1979). An Intertemporal Asset Pricing Model with Stochastic Consumption and Investment Opportunities. *Journal of Financial Economics*, *7*(3), 265-296.

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

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

Breeden, D. T., Litzenberger, R. H and Jia, T. (2015). Consumption-Based Asset Pricing, Part 1: Classic Theory and Tests, Measurement Issues and Limited Participation. *Annual Review of Financial Economics*, 7, 35-83.

Campbell, J. and Mankiw, G. (1990). Permanent Income, Current Income and Consumption, *Journal of Business and Economic Statistics*, 8, 265-279.

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

Caporale, G. M. and Sousa, R. M. (2016). Consumption, wealth, stock and housing returns: Evidence from emerging markets. *Research in International Business and Finance*, 36, 562-578.

CBN (2016). *Statistical Bulletin*. Abuja: Central Bank of Nigeria.

Chen, N., Roll, R. and Ross, S. A. (1986). Economic Forces and the Stock Market, *Journal of Business* 59(3), 383-403

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

Funke, N. (2002). Stock Market Developments and Private Consumer Spending in Emerging Markets. IMF Working Paper No. 02/238.

Ghosh, A., Julliard, C. and Taylor A.P. (2017). What is the Consumption-CAPM Missing? An Information-Theoretic Framework for the Analysis of Asset Pricing Models. *The Review of Financial Studies*, 30(2), 442–504.

Grossman, S.J. Melino, A. and Shiller, R.J. (1987). Estimating the continuous-time consumption-based asset-pricing model. *Journal of Business and Economic Statistics*, *5*(3), 315-327.

Hansen, L.P. and 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.

Hau, L. C. (2013). Stock Market and Consumption: Evidence from China. *Berkeley Undergraduate Journal*, 24(3), 35-49.

Heaton, J. and Lucas, D. (1996). Evaluating the Effects of Incomplete Markets on Risk Sharing and Asset Pricing. *Journal of Political Economy* 104, 443-487.

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.

Ikoku, A. E. (2010). Is the Stock Market a Leading Indicator of Economic Activity in Nigeria? *CBN Journal of Applied Statistics*, 1(1), 17-38.

Jagannathan, R. and Wang, Y. (2007). Lazy Investors, Discretionary Consumption, and the Cross- Section of Stock Returns. *Journal of Finance*, 62(4), 1623-1661.

Koijen, R. S., Nijman, T. E. and Werker, B. J. (2010). When Can Life Cycle Investors Benefit from Time-Varying Bond Risk Premia? *Review of Financial Studies*, 23(2), 741–780.

Levy, H. and Samuelson, P. (1992). The Capital Asset Pricing Model with Diverse Holding Periods. *Management Science*, 38, 1529-1542.

Lintner, J. (1965). The Valuation of Risk Assets and the Selection of Risky Investments In Stock Portfolios and Capital Budgets. *Review of Economics and Statistics*, 47(1): 13-37.

Lucas Jr, R.E. (1978). Asset Prices in an Exchange Economy. *Econometrica*, *46*(6), 1429-1445.

Mankiw N. G. and Shapiro, M. D. (1986). Risk and Return: Consumption Beta Versus Market Beta, *Review of Economics and Statistics* 68(3), 452-459.

Mankiw, N. G. and Zeldes, S. P. (1991). The Consumption of Stockholders and Non-Stockholders. *Journal of Financial Economics*, *29*(1), 97-112.

Mehra, R. (2012). Consumption-Based Asset Pricing Models. *The Annual Review of Financial Economics*, 4, 385-409.

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

NSE (2013). 2013 Market Recap and Outlook for 2014. The Nigerian Stock Exchange, Lagos.

Ohiomu, S. (2011). The Stock Market Fluctuations and Consumer Behaviour in Nigeria. *Journal of Research in National Development*, 9(2), 1596 – 8308.

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

Poterba, J. M. (2000). Stock Market Wealth and Consumption. *The Journal of Economic Perspectives*, 4(2), 99-118.

Rangvid, J., Santa-Clara, P. and Schmeling, M. (2016). Capital Market Integration and Consumption Risk Sharing Over the Long Run. J*ournal of International Economics*, 103, 27–43

Romer, D. (2011). *Advanced Macroeconomics* (4th Edition). New York: McGraw-Hill.

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.

Seyyed, A. (2010). Emerging Stock Market Performance and Economic Growth. *American Journal of Applied Sciences*, 7(2), 265-269.

Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Asset Pricing Under Conditions of Risk, *The Journal of Finance*, 19(3), 425-442.

Singh, B. (2012). How Important is the Stock Market Wealth Effect on Consumption in India? *Empirical Economics*, 42(3), 915–927.

Vissing-Jørgensen, A. (2002). Limited Asset Market Participation and the Elasticity of Intertemporal Substitution, *Journal of Political Economy*, 110 (4), 825-853.