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# Is CAPM an Absurd Model?

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**Abstract:** As it were, there is no clear cut understanding of the belief on the predictive power of CAPM as enunciated by Sharpe supported by Lintner and Mossin with particular reference to Nigerian Stock Exchange (NSE) stocks. In the light of this assertion, the objective of this study is to apply CAPM on the NSE sector stocks from 2000-2012. Being an empirical study, secondary dataset collected from the financial statements of the subject-firms, NSE/CBN was used. The study concludes that the CAPM is not a good predictor of stock return in the selected sectors of the NSE.

**Key words:** CAPM, risk-free rate of return, equity beta, equity market risk premium, required rate of return to equity, market return

## INTRODUCTION

On Wednesday, October 15, 2014 by 5.54 am, I got an email from my friend Professor Pablo Fernandez of IESE Business School, Madrid, Spain, addressing me thus: Dear Chuke, I have written the study "CAPM: an absurd model. It may be downloaded in http://ssrn.com/abstract=2505597. I will appreciate very much your opinion and criticism. Thanks and best regards, Pablo Fernandez, Professor of Finance, IESE Business School. Madrid. Spain. The message itself sounds absurd and I went to bed again thinking about it. The major reason why I considered his message absurd was that I have made many investment decisions based on CAPM and it had never occurred to me that CAPM had been failing me. I clutched to it so much that I regard the proponents of the model as my role models in Finance. I decided to investigate his claim but not in a hurry. This is because in the culture and environment I exist, we are meant to understand that one need to lick a hot soup from the periphery. My renowned Professor gave me a hot soup to digest, but Justice, I said I must do to it. I went to work a month later because of cluster of official engagements hanging around me. Before then, I asked myself so many questions among which are why has it taken so long for one to discover this shortcoming of CAPM. Where are other experts in the field of finance? What are their opinions? With this in mind I settled down to work and to come up with my own view from the emerging market Nigeria in West Africa, where I reside and work for more than four decades now, hence the need for this study.

According to Fernandez (2014) of which I quite agree, in research, we strive to find out the true state of something and to differentiate between a fact and an opinion. Theory is an idea or set of ideas that is intended to explain facts or events. Model is a set of ideas and numbers that describe the past, present or future state of something. Fact is something that truly exists or happen, something that has actual existence, a true piece of information. Opinion is what someone thinks about a particular thing. Does CAPM explain facts or events or does it describe the past, present or future state of expected return?

Under CAPM the proponents assume that all investors have homogeneous expectations that is same expected return, volatility and correlations for every security can lend and borrow unlimited amounts at the risk-free rate of interest can short any asset and hold any fraction of an asset, plan to invest over the same time horizon. Only care about the expected return and the volatility of their investments. Other assumptions are: no transaction costs (no taxes, no commissions); all information is available at the same time to all investors; each investor is rational and risk-averse and wants to maximize his expected utility. Based on these it was inferred that the market has a "true beta" for each security and an expected MRP (common to all investors). Other inferences from CAPM assumptions provide that all investors will always combine a risk free asset with the market portfolio will have the same portfolio of risky assets (the market portfolio) as very risk-averse investors will put most of their wealth in risk-free asset while risk-tolerant investors will put most of their wealth in the market portfolio, agree on the expected return and on the expected variance of the market portfolio and of every asset, agree on the expected MRP and on the beta of every asset, agree on the market portfolio being on the

minimum variance frontier and being mean-variance efficient, expect returns from their investments according to the betas (homogeneous expectations), trading volume of financial markets will be very small.

In finance, there is widespread agreement that the Capital Asset Pricing Model (CAPM) is a good predictor of securities returns in stock markets. While the above assertion had been empirically validated and also disproved in several stock markets in developed economies, there have been few such studies in the stock markets of developing economies like Nigeria. Such study has now become imperative given the recent discourse on the model. Companies quoted on the NSE are segregated into many sectors. To this effect, the major objective of this study is to examine the relevance of CAPM in the Nigerian context with particular reference placed on the selected sectors of the NSE. In addressing this objective, the study seeks to answer the question: from the perspective of CAPM are the subject-firms stocks correctly valued, undervalued or overvalued by the CAPM? The study covers the period of 13 years (2000-2012), comprising 156 month. This period was selected to cover both the pre and post share decertification era in the Nigerian Stock market. The study covers only stocks in the secondary arm of the Nigerian stock market. Daily official price lists of the exchange and the annual reports of the firms were collected over the period, January 2000 to December 2012. Only firms listed on the exchange between years 2000-2012 were selected for this study. This period was also selected for our study because it was a relatively stable period in Nigeria as it was fairly free from major political factors that could upturn the capital market so adversely. The relevance of the study can be capture in the research by Damodaran (2006) who concludes that valuation is at the heart of what we do in finance to those who need to identify and buy stocks that trade at less than their true value so that they can make profit when the prices converge on true value. It is also necessary when there is need to investigate whether market prices deviate from true value. One major limitation of this study is the unavailability of complete data for 2013. The inclusion of the 2013 data would have made the work the most recent study.

## Literature review

**Theoretical review:** The CAPM of Sharpe (1964), Lintner (1965) and Mossin (1966) asserts that the expected return for any security is a function of three variables: expected beta, expected market return and the risk-free rate. Sharpe and Lintner demonstrate that a financial asset's return must be positively linearly related to its beta (β). Lintner (1969) argued that the existence of heterogeneous expectations does not critically alter the CAPM in some simplified scenarios and said that "in the undoubtedly more realistic case with different assessments of covariance matrices, the market's assessment of the expected ending price for any security depends on every investor's assessment of the expected ending price for every security and every element in the investor's assessment of his N×N covariance matrix (N is the number of securities) as well as the risk tolerance of every investor." Every rational investor wishes to form an optimal portfolio which is one that has the lowest risk for a given expected return. The investor forms a portfolio with N securities. The quest to find out the type of equity and bond portfolio a risk-averse investor should form led to the delivery of CAPM by Sharpe (1964). In 1990, William Sharpe was awarded the Nobel Prize for his work on the CAPM, published in 1964. Lintner (1965), Mossin (1966) (Nobel Prize winner) developed the CAPM simultaneously and independently in 1965, 1966 and 1973, respectively. They state that the return on any asset or portfolio is related to the riskless rate of return and the expected return on the market in a linear fashion. It shows the relationship between expected return of a security and its unavoidable systematic risk thus:

$$R = R_f+\beta(R_m-R_f)$$

Where:

$R$ = Expected rate of return on a security or a portfolio
$R_f$ = Risk-free rate of return
$R_m$ = $R_f+\beta(R_m-R_f)$
I = Securities 1, 2, ..., N

When the "homogeneous expectations" assumption is not met, the market M will no longer be the efficient portfolio for all investors. Investors with different expectations will have different portfolios (each one having the portfolio he considers most efficient), instead of the market portfolio M. A share's historical beta can be calculated by means of any of the following equations:

$$\beta = \text{Covariance}(R_i, R_M)/\text{Variance}(R_M)$$
$$= \text{Cov}(R_i, R_M)/M^2$$

Where:

$R_i$ = Security return
$R_M$ = Market return

$$\beta i = \text{Correlation}(R_i, R_M)\times \text{Volatility}(R_i)/\text{Volatility}(R_M) = \text{Corr}(R_i, R_M)\sigma i/\sigma M$$
$$R = \text{Corr}(R_i, R_M) = \text{Cov}(R_i, R_M)/(\sigma_M \sigma_i) = \beta_i\sigma_M/\sigma_i$$

$$R^2 = 1 - \sigma_\varepsilon^2 / \sigma_i^2; \sigma_\varepsilon^2 = \sigma_i^2 - \beta_i^2 \sigma M^2$$
$$= \sigma_i^2 - R^2\sigma_i^2 = \sigma_i^2(1 - R^2)$$

To calculate a share's beta, a regression is normally performed between the share's return ($R_i$) and the market return ($R_M$). The share's beta ($\beta_i$) is the slope of the regression: $R_i = a+\beta_i R_M+\varepsilon$, $\varepsilon$ is the error of the regression. The model submits that only risk which cannot be diversified away, i.e., systemic risk is worthy of being rewarded with a risk premium for financial valuation purposes. The remaining risk, i.e., unsystemic or diversifiable risk may be reduced to zero by portfolio diversification and so it is not worthy of a risk premium. The line that reflects the combination of systemic risk and return available on alternative investments at a given time is called the Security Market Line (SML). Any security that lies on the SML is being correctly priced. If there is temporary disequilibrium in the market and the return on some assets becomes higher than that given by the SML, then the security is underpriced. Under this market condition, if the market mechanism is working ideally as investors demand more of such securities as super-good investment, the prices will continue to rise until that higher level of return reaches the SML value. Conversely if as a result of the market disequilibrium the level of return is lower than that given by the SML, then the security is overpriced. Under this market condition, if the market mechanism is working ideally as investors sell-off more of such securities as super-bad investment, the prices will continue to fall until the level of return rises to that given by the SML value. Therefore, investors should select investments that are consistent with their risk preferences. While some investors consider only low risk investments, others welcome high risk investments. However, investors should sell overpriced securities, buy underpriced securities and hold onto correctly priced securities. The key to this decision is that when actual return-CAPM required return = +ve alpha, the security is underpriced when actual return-CAPM required return = zero alpha, the security is correctly priced when actual return-CAPM required return = -ve alpha, the security is overpriced. The CAPM provides a framework for valuation of securities.

In CAPM, market risk of a risky asset or stock is measured by beta ($\beta$) which when multiplied by the Equity Market Risk Premium yields the total risk premium for a risky asset. That is total equity risk premium for a risky asset (Rp) is equals to its beta multiplied by the equity risk premium (ERP) for the entire equity stock market portfolio (i.e., Rp = $\beta$(Rm-Rf). Hence, from our definition of expected return that for a risky asset at any point in time is represented by Re = Rf+$\beta$(Rm-Rf). That is ERP for the entire equity market is Rm-Rf while that of a specific equity stock is $\beta$i(Rm-Rf). Therefore, expected return on any risky investment = Risk-free Rate +Risk premium of the risky asset multiplied by equity risk premium.

Brennan (2004) admits that different classes of investors may have different expectations about the prospective returns on equities which imply different assessments of the risk premium. Bostock (2004) says that understanding the equity premium is largely a matter of using clear terms. These statements, I believe, propelled Fernandez (2007) to designated equity premium (also called market risk premium, equity risk premium, market premium and risk premium) in four different concepts: Historical Equity Premium (HEP); Expected Equity Premium (EEP); Required Equity Premium (REP); Implied Equity Premium (IEP). Fernandez (2007) posits that provided that analysts use the same time frame, the same market index, the same risk-free instrument and the same averaging method (arithmetic or geometric), HEP is equal for all investors. The REP, the EEP and the IEP differ for different investors.

Akintola-Bello (2004) used 96 months of security returns from Jan 1992 to December 1999 to estimate the betas for 173 firms quoted on the Nigerian stock exchange. He used growth rates in the NSE All-share index as the proxy for the market rate of return. It is generally accepted that due to some statistical factors, the estimated betas using the regression analysis are not unbiased estimates of the underlying beta of a firm's securities. The underlying beta of a security is likely to be closer to 1 than the sample estimate. To correct for this bias, Merrill Lynch developed an adjustment technique. After using the ordinary least squares to gain a preliminary estimate of beta, using 60 monthly returns, the beta is adjusted as follows: Adjusted Beta = 2/3(Computed Sample Beta)+1/3(1) = 0.67 (Raw beta)+0.33(1). The formula pushes high betas down toward 1.0 and low betas up toward 1.0. The raw betas computed are adjusted to remove individual securities bias.

Therefore, the conventional approach for estimating betas used by most investment firms, analysts and services is to use historical market data for firms that have been quoted for a long period. One can estimate returns that an investor would have made on their investments in intervals (such as a week, a month) over that period. These returns can then be related to a proxy for the market portfolio to get a beta in the CAPM.

**Empirical review:** In the view of Fernandez (2014), the CAPM is an absurd model because its assumptions and its predictions/conclusions have no basis in the

real world. He went further to state that users of the CAPM make many illogical errors valuing companies, accepting/rejecting investment projects, evaluating fund performance, pricing goods and services in regulated markets, calculating value creation among others. He affirms that a theory is an idea or set of ideas that is intended to explain facts or events and a model is a set of ideas and numbers that describe the past, present or future state of something. He wrote that with the vast amount of information and research that we have, it is quite clear that the CAPM is neither a theory nor a model because it does not explain facts or events, nor does it describe the past, present or future state of something. He described CAPM as an uninformed opinion and not as a sensible opinion. To justify his claim, he quoted Ricardo Yepes, professor of philosophy of his university, who wrote that: "learning means being able to keep perceiving reality as it truly is complex and not trying to fit every new experience into a closed and pre-conceived notion or overall scheme". Overall, he says that beta and the expected Market Risk Premium for the market as a whole do not exist as different investors have different cash flow expectations and use different expected (and required) returns to equity, different expected market risk premium and different expected beta. He suggests that one could only talk of the beta and the market risk premium if all investors had the same expectations. But investors do not have homogeneous expectations. He ended up suggesting in sections 11 and 12 of his work how to calculate required returns in a sensible way and how to use betas being a reasonable person.

To support his claim, Fernandez (2014) documented the outcome of previous studies on CAPM as follows. The CAPM of Sharpe (1964), Lintner (1965) and Mossin (1966) asserts that the expected return for any security is a function of three variables: expected beta, expected market return and the risk-free rate. Sharpe (1964) and Lintner (1965) demonstrate that with some assumptions, a financial asset's return must be positively linearly related to its beta ($\beta$) for all assets i:

$$E(R_i) = a_1 + a_2 E(\beta_i)$$

Where:

$E(R_i)$ = The expected return on asset I
$E(\beta_i)$ = Asset i's expected market beta
$a_1$ = The expected return on a "zero-beta" portfolio
$a_2$ = The market risk premium $E(R_M)-R_F$

Miller and Scholes (1972) report that the sample average of the standard error of the beta estimates of all NYSE firms is around 0.32 as compared to the average estimated beta coefficient of 1.00. Thus, a random draw from this distribution of betas is going to produce any number between 0.36 and 1.6495% of the time. It is this imprecision in individual beta estimates (or the better known "errors in variables" problem) that motivated portfolio formation techniques by Fama and MacBeth (1973).

Scholes and Williams (1977) found that with nonsyncronous trading of securities, OLS estimators of beta coefficients using daily data are both biased and inconsistent. Subsequent works by Basu (1977), Banz (1981), Reinganum (1981), Litzenberger and Ramaswamy (1979), Keim (1983, 1985) and Fama and French (1992) suggest that either: expected returns are determined not only by the beta and the expected market risk premium but also by other firm characteristics such as price-to-book value ratio (P/B), firm size, price-earnings ratio and dividend yield which means that the CAPM requires the addition of factors other than beta to explain security returns) or the historical beta has little (or nothing) to do with the expected beta and the historical market risk premium has little (or nothing) to do with the expected market risk premium or the heterogeneity of expectations in cross-section returns, volatilities and covariances and market returns is the reason why it makes no sense to talk about an aggregate market CAPM (although at the individual level expected CAPM could work). Each investor uses an expected beta, an expected market risk premium and an expected cash flow stream to value each security and investors do not agree on these three magnitudes for each security. Consequently, it makes no sense to refer to a "market" expected beta for a security or to a "market" expected market risk premium (or to a "market" expected cash flow stream) for the simple reason that they do not exist.

Basu (1977) found that low price/earnings portfolios have higher returns than could be explained by the CAPM. Banz (1981) and Reinganum (1981) found that smaller firms tend to have high abnormal rates of return. Litzenberger and Ramaswamy (1979) found that the market requires higher rates of return on equities with high dividend yield. Keim (1983, 1985) reports the January effect that is seasonality in stock returns. Tinic and West (1984) reject the validity of the CAPM based on intertemporal inconsistencies due to the January effect. Lintner (1969) argued that the existence of heterogeneous expectations does not critically alter the CAPM in some simplified scenarios and said that "in the (undoubtedly more realistic) case with different assessments of covariance matrices, the market's assessment of the expected ending price for any security depends on every investor's assessment of the expected ending price for

every security and every element in the investor's assessment of his N×N covariance matrix (N is the number of securities) as well as the risk tolerance of every investor." Roll (1977) concluded that the only legitimate test of the CAPM is whether or not the market portfolio (all assets) is mean-variance efficient. Roll (1981) suggests that infrequent trading of shares of small firms may explain much of the measurement error in estimating their betas. Constantinides (1982) points out that with consumer heterogeneity "in the intertemporal extension of the Sharpe-Lintner CAPM, an asset's risk premium is determined not only by its covariance with the market return but also by its covariance with the m-1 state variables" (m is the number of heterogeneous consumers). He also points out that the assumption of complete markets is needed for demand aggregation. Lakonishok and Shapiro (1984, 1986) find an insignificant relationship between beta and returns and a significant relationship between market capitalization and returns. Shanken (1992) presents an integrated econometric view of maximum-likelihood methods and two-pass approaches to estimating historical betas.

The hardest blow to the CAPM was published by Fama and French (1992). They showed that in the period 1963-1990, the correlation between stocks' returns and their betas was very small while the correlation with the companies' size and their (P/B) was greater. They concluded thus"our tests do not support the most basic prediction of the Sharpe-Lintner-Black CAPM that average stock returns are positively related to market betas". The authors divided the shares into portfolios and found that the cross-sectional variation in expected returns may be captured within a three-factor model, the factors being: the return on the market portfolio in excess of the risk-free rate; a zero net investment portfolio that is long in low P/B stocks and short in high P/B stocks and a zero net investment portfolio that is long in small firm stocks and short in large firm stocks. The following Table 1 shows the study's main findings.

Roll and Ross (1994) attribute the observed lack of a systematic relation between risk and return to the possible mean-variance inefficiency of the market portfolio proxies. Lakonishok *et al.* (1994) argue that the size and P/B effects are due to investor overreaction rather than compensation for risk bearing. According to them, investors systematically overreact to corporate news, unrealistically extrapolating high or low growth into the future. This leads to underpricing of "value" (small capitalization, high P/B stocks) and overpricing of "growth" (large capitalization, low P/B stocks). Kothari *et al.* (1995) point out that using historical betas estimated from annual rather than monthly returns produces a stronger relation between return and beta. They also claim that the relation between P/B and return observed by Fama and French (1992) and others is exaggerated by survivor bias in the sample used and conclude: "our examination of the cross-section of expected returns reveals economically and statistically significant compensation (about 6-9% per annum) for beta risk." Pettengill *et al.* (1995) find "consistent and highly significant relationship between beta and cross-sectional portfolio returns". They insist: "the positive relationship between returns and beta predicted by CAPM is based on expected rather than realized returns". They remark that their results are similar to those of Lakonishok and Shapiro (1984). Fama and French (1996) argue that survivor bias does not explain the relation between P/B and average return. They conclude that historical beta alone cannot explain expected return. Kothary and Shanken (1999) insist on the fact that Fama and French (1992) tend to ignore the positive evidence on historical beta and to overemphasize the importance of P/B. They claim that while statistically significant, the incremental benefit of size given beta is surprisingly small. They also claim that P/B is a weak determinant of the cross-sectional variation in average returns among large firms and it fails to account for return differences related to momentum and trading volume. Berglund and Knif (1999) propose

Table 1: Main findings of Fama and French (1992)'s study

| Size of the companies | Average beta | Annual average return (%) | Beta of the companies | Average beta | Annual average return (%) | P/B Price/ book value | Average beta | Annual average Return (%) |
|---|---|---|---|---|---|---|---|---|
| 1 (biggest) | 0.93 | 10.7 | 1 (high) | 1.68 | 15.1 | 1 (high) | 1.35 | 05.9 |
| 2 | 1.02 | 11.4 | 2 | 1.52 | 16.0 | 2 | 1.32 | 10.4 |
| 3 | 1.08 | 13.2 | 3 | 1.41 | 14.8 | 3 | 1.30 | 11.6 |
| 4 | 1.16 | 12.8 | 4 | 1.32 | 14.8 | 4 | 1.28 | 12.5 |
| 5 | 1.22 | 14.0 | 5 | 1.26 | 15.6 | 5 | 1.27 | 14.0 |
| 6 | 1.24 | 15.5 | 6 | 1.19 | 15.6 | 6 | 1.27 | 15.6 |
| 7 | 1.33 | 15.0 | 7 | 1.13 | 15.7 | 7 | 1.27 | 17.3 |
| 8 | 1.34 | 14.9 | 8 | 1.04 | 15.1 | 8 | 1.27 | 18.0 |
| 9 | 1.39 | 15.5 | 9 | 0.92 | 15.8 | 9 | 1.29 | 19.1 |
| 10 (smallest) | 1.44 | 18.2 | 10 (low) | 0.80 | 14.4 | 10 (low) | 1.34 | 22.6 |

Adopted from Fernandez (2014)

an adjustment of the cross-sectional regressions of excess returns against betas to give larger weights to more reliable beta forecasts. They find a significant positive relationship between returns and the beta forecast when the proposed approach is applied to data from the Helsinki Stock Exchange while the traditional Fama and MacBeth (1973) approach as such finds no relationship at all. Elsas *et al.* (1999) "find a positive and statistically significant relation between beta and return in our sample period 1960-1995 as well as in all subperiods we analyze" for the German market. They claim, "our empirical results provide a justification for the use of betas estimated from historical return data by portfolio managers."

Cremers (2001) claims that the data do not give clear evidence against the CAPM because it is difficult to reject the joint hypothesis that the CAPM holds and that the CRSP value-weighted index is efficient or a perfect proxy for the market portfolio. He also claims that the poor performance of the CAPM seems often due to measurement problems of the market portfolio and its beta. He concludes that "according to the data, the CAPM may still be alive." Bartholdy and Peare (2000) argue that 5 years of monthly data and an equal-weighted index provide the most efficient estimate of the historical beta. However, they find that the ability of historical betas to explain differences in returns in subsequent periods ranges from a low of 0.01% to a high of 11.73% across years and at best 3% on average. Based on these results, they say "it may well be appropriate to declare beta dead". Chung *et al.* (2006) use size-sorted portfolio returns at daily, weekly, quarterly and semi-annual intervals and find in every case that the distribution of returns differs significantly from normality. They also show that adding systematic co-moments (not standard) of order 3 through 10 reduces the explanatory power of the Fama-French factors to insignificance in almost every case. Gomes *et al.* (2001) claim that size and P/B play separate roles in describing the cross-section of returns. These firm characteristics appear to predict stock returns because they are correlated with the true conditional market beta of returns. Avramov and Chordia (2001) test whether the Gomes *et al.* (2001) scaling procedure improves the performance of the CAPM and consumption CAPM. They show that equity characteristics often enter beta significantly. However, "characteristic scaled factor models" do not outperform their unscaled counterparts.

Shalit and Yitzhaki (2002) argue that the OLS regression estimator is inappropriate for estimating betas. They suggest alternative estimators for beta. They eliminate the highest four and the lowest four market returns and show that the betas of the 75% of the firms change by more than one standard error. Avramov (2002) shows that small-cap value stocks appear more predictable than large-cap growth stocks and that model uncertainty is more important than estimation risk: investors who discard model uncertainty face large utility losses.

Griffin (2002) concludes that country-specific three-factor models are more useful in explaining stock returns than are world and international versions. Koutmos and Knif (2002) propose a dynamic vector GARCH model for the estimation of time-varying betas. They find that in 50% of the cases betas are higher during market declines (the opposite is true for the remaining 50%). They claim that the static market model overstates unsystematic risk by >10% and that dynamic betas follow stationary, mean reverting processes. McNulty *et al.* (2002), say that "although Apple's stock was almost twice as volatile as IBM's during the 5 years (1993-1998) we looked at (52% volatility for Apple; 28% for IBM), its correlation with the market's movement was only one-fourth as great (0.105 for Apple; 0.425 for IBM) resulting in a beta of 0.47 for Apple compared with 1.09 for IBM". They also point out that for a "UK-based multinational, a 2 days shift in the sampling day (using Friday's stock prices rather than Wednesday's) to calculate beta, generated quite different betas of 0.70 and 1.41."

Fama and French (2004) affirm that "the failure of the CAPM in empirical tests implies that most applications of the model are invalid". Merrill Lynch and Bloomberg adjust betas in a very simple way: expected beta = 0.67 historical beta +0.33. Of course, this "expected beta" works better than the "historical beta" because "Beta = 1 does a better job than calculated betas" = Fernandez and Bermejo (2015), claim that "$\Sigma = 1$ Does a Better Job than Calculated $\Sigma$", They computed the correlations of the annual stock returns (1989-2008) of the Dow Jones companies with $\Sigma$Rm and with Rm and find that the 2nd correlation (assuming $\Sigma = 1$ for all companies) is higher than the first one for all companies except Caterpillar and GM. Rm is the return of the S and P 500. Carvalho and Barajas (2013) study the betas in the Portuguese market and conclude that the results could reinforce the position of those who affirm that calculated betas do not work better than beta = 1. In fact, in most of the cases (62.5%) in the sample the beta =1 provides a better correlation than calculated betas". Thompson *et al.* (2006) in their study "Nobels for Nonsense", show evidences against Markowitz and the CAPM: the correlation between the return and the volatility of the Ibbotson Index in 1926-2000 was negative (-0.32); 65% of the portfolios

chosen randomly had a higher return than the CAPM could predict; an "equal weight index" had in 1970-2002 an annualized return 4.8% higher than the S and P 500. They conclude that "the use of flawed models by true believers can cause mischief not only for individual investors but also for the economy generally."

Bossaerts suggest a new approach to asset pricing and portfolio choices based on unobserved heterogeneity and offer a novel econometric procedure to test their novel model (they name it CAPM+ε). Then, they apply the econometric tests to data generated by large-scale laboratory asset markets and they claim that CAPM+ε is not rejected. But this was done in a laboratory and not in the real financial markets. Aktas and McDaniel (2009) show cases where CAPM-generated costs of equity are less than zero; less than the risk-free rate and less than the company's marginal cost of debt. They calculated betas using 60 and 120 monthly returns. They also refer to a COMPUSTAT file with 8361 companies with listed betas: 925 of these are negative. Magni (2009, 2010) explains the incorrectness of the CAPM and its development. He also points out that Dybvig and Ingersoll (1982) were the first that noticed that CAPM is at odds with arbitrage pricing. Shalit and Yitzhaki argue (with theoretical studys) that the only problem of CAPM is relying on the Normal distribution. Levy and Roll (2010), with a provocative title (The Market Portfolio May Be Mean/Variance Efficient after All) affirm that "many conventional market proxies could be perfectly consistent with the CAPM and useful for estimating expected returns, if one allows for only slight estimation errors in the return moments". They call this data-massage "a reverse-engineering approach": "we find the minimal variations in sample parameters required to ensure that the proxy is mean/variance efficient." Fernandez (2014) refers this study as an example of "using the hammer to fit the data into a model"; He shows its graphic representation in the 2 charts about which the authors surprisingly say that "sample betas are quite close to betas that have been adjusted". Fernandez (2014) states that Levy and Roll (2010) is an experiment because they use monthly returns of only the 100 biggest US companies in the period Dec. 1996- Dec. 2006 (in that period the average returns of all companies were positive). They work with historical returns but claim to prove or disprove something for the CAPM that deals with expected returns.

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report that "beta, varies across return frequencies". They show that "Berkshire has a market beta below 0.60 when estimated with daily return data but a beta of about 0.95 when estimated with quarterly data". They conclude that "beta differences across frequencies occur even in large and liquid stocks and cannot be explained by microstructure and trading frictions." They calculate the betas using returns over the previous 60 months. Carelli calculate betas of 1,385 US companies on March 31, 2014: "147 betas for each company using monthly, weekly and daily returns and using different intervals: from 1-5 years. The median of the difference (maximum beta-minimum beta) was 1.03. Ranking the companies according to their betas, we find that the average of the (maximum ranking-minimum ranking) for the 1,385 companies is 786."

## MATERIALS AND METHODS

**Suggested estimation methods:** Fernandez (2007) computed Historical betas of AT and T, Boeing and Coca-Cola during the two-month period of December 2001 and January 2002 with respect to the S and P 500. Each day, betas are calculated using 5 years of monthly data that is on December 18, 2001, the beta is calculated by running a regression of the 60 monthly returns of the company on the 60 monthly returns of the S and P 500. The returns of each month are calculated on the 18th of the month. The monthly return of December 18, 2001 = (total return December 18, 2001/total return November 18, 2001)-1.

Pablo and Vicente (2009) using the return of the S and P 500 as market return, computed the correlations of the annual stock returns (1989-2008) of the Dow Jones companies and discovered on average that the composite stock market with a beta that is equal to one does better than calculated betas. They also discovered that the Adjusted betas (i.e., 0.67(calculated beta)+0.33) have higher correlation than calculated betas but adjusted betas have lower correlation than beta that is equal to one. They carried the exercise with four calculated betas every year end versus S and P 500 using, monthly data of last 5 years; monthly data of last 2 years; weekly data of last 5 years; daily data of last 5 years and found similar results with the four betas. Despite this results, Fernandez (2015) reports that 97.3% of the professors that justify the betas use regressions, webs, databases, textbooks or studys while only 0.9% of the professors justified the beta using exclusively personal judgement (named qualitative betas, common sense betas, intuitive betas, logical magnitude betas and own judgement betas by different professors).

Griffin (2002) concludes that country-specific three-factor models are more useful in explaining stock returns than are world and international versions. Gomes *et al.* (2001) claim that size and P/B play separate roles in describing the cross-section of returns. These firm characteristics appear to predict stock returns because they are correlated with the true conditional market beta of returns. Avramov and Chordia (2001) test whether the Gomes *et al.* (2001) scaling procedure improves the performance of the CAPM. They show that equity characteristics often enter beta significantly. However, "characteristic scaled factor models" do not outperform their unscaled counterparts. Shalit and Yitzhaki (2002) argue that the OLS regression estimator is inappropriate for estimating betas. They suggest alternative estimators for beta. They eliminate the highest four and the lowest four market returns and show that the betas of the 75% of the firms change by more than one standard error. Avramov (2002) shows that small-cap value stocks appear more predictable than large-cap growth stocks and that model uncertainty is more important than estimation risk: investors who discard model uncertainty face large utility losses. Koutmos and Knif (2002) propose a dynamic vector GARCH model for the estimation of time-varying betas. They find that in 50% of the cases betas are higher during market declines (the opposite is true for the remaining 50%). They claim that the static market model overstates unsystematic risk by >10% and that dynamic betas follow stationary, mean reverting processes. McNulty *et al.* (2002), say that "although Apple's stock was almost twice as volatile as IBM's during the 5 years (1993-1998) we looked at (52% volatility for Apple; 28% for IBM), its correlation with the market's movement was only one-fourth as great (0.105 for Apple; 0.425 for IBM) resulting in a beta of 0.47 for Apple compared with 1.09 for IBM". They also point out that for a "UK-based multinational, a 2 days shift in the sampling day (using Friday's stock prices rather than Wednesday's) to calculate beta, generated quite different betas of 0.70 and 1.41. Fama and French (2004) affirm that "the failure of the CAPM in empirical tests implies that most applications of the model are invalid".

Merrill Lynch and Bloomberg adjust betas thus to obtain Expected beta = 0.67 historical beta +0.33 which they claim it works better than the historical beta. Fernandez and Bermejo in their study titled "$\beta$ = 1 Does a Better Job than Calculated $\beta$", http://ssrn.com/abstract=1406923 computed the correlations of the annual stock returns (1989-2008) of the Dow Jones companies with $\beta$Rp and with Rm and find that the 2nd correlation (assuming $\beta$ = 1 for all companies) is higher than the first one for all companies except

Caterpillar and GM. Rm is the return of the S and P 500. Carvalho and Barajas (2013) study the betas in the Portuguese market and conclude that "the results could reinforce the position of those who affirm that calculated betas do not work better than beta = 1. In fact, in most of the cases (62.5%) in the sample the beta =1 provides a better correlation than calculated betas".

Thompson *et al*. (2006), in their study "Nobels for Nonsense", show evidences against Markowitz and the CAPM: the correlation between the return and the volatility of the Ibbotson Index in 1926-2000 was negative (-0.32); 65% of the portfolios chosen randomly had a higher return than the CAPM could predict; an "equal weight index" had in 1970-2002 an annualized return 4.8% higher than the S and P 500. They conclude that "the use of flawed models by true believers can cause mischief not only for individual investors but also for the economy generally." Bossaerts, Plott and Zame suggest a new approach to asset pricing and portfolio choices based on unobserved heterogeneity and offer a novel econometric procedure to test their novel model (they name it CAPM+ε). Then, they apply the econometric tests to data generated by large-scale laboratory asset markets and they claim that CAPM+ε is not rejected. OK in a laboratory but in the real financial markets Σ Aktas and McDaniel (2009) show cases "where CAPM-generated costs of equity are less than zero; less than the risk-free rate and less than the company's marginal cost of debt". They calculate betas using 60 and 120 monthly returns. They also refer to a "COMPUSTAT file with 8361 companies with listed betas: 925 of these are negative". Magni (2009, 2010) explains the incorrectness of the CAPM and its development. He also points out that Dybvig and Ingersoll (1982) were the first that noticed that CAPM is at odds with arbitrage pricing. Shalit and Yitzhaki (2010) argue (with theoretical studys) that the only problem of CAPM is relying on the Normal distribution.

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**Nature and sources of data:** Data for this study are of secondary nature. To compute the monthly average prices for 156 months (2000-2012) the daily market prices of each of the subject firms' ordinary shares from 2000-2012 are required. To compute the rates of returns of the subject-firms, the equity price appreciation or depreciation of the subject firms from 2000-2012 are required. To compute the rates of returns of the market, we need the NSE All-Share Index (ASI) from 2000-2012. We also need the Nigerian Treasury Bill rates for each year from 2000-2012 to compute the risk-free rate of return. Therefore, in essence, we need for each subject firm the relevant daily market prices. Since, these daily official lists are audited and published as approved by the regulatory authorities such as the CBN, SEC and NSE from 2000-2012. They constitute authoritative and official documents to be relied upon in assessing the performance of the affected institutions. The stocks market prices and the NSE ASI were picked from the NSE daily official list for 2000-2012 while the Treasury Bills rates were picked from the CBN Statistical Bulletin 2000-2012.

**Population and sample:** The population of this study is all quoted companies in Nigerian Stock market. The sample of study is all the quoted firms in the subject-sector on the Nigerian Stock Exchange.

**Computation methodology:** Under the CAPM, the expected return as implied by the Capital Asset Pricing Model (CAPM) will be derived and compared with the actual return from each of the stocks to ascertain whether the stock is appropriately valued, undervalued or overvalued. To accomplish this, it is necessary to derive value for each of the variables in the equation of the CAPM.

**Estimating the expected rate of return:** To adjust for risk the discount rate for each of the stocks will be determined using the Capital Asset Pricing Model (CAPM) as in Arnold (2008). The message of CAPM is that if we know the risk free rate and the return on the whole market portfolio, the required rate of return on a risky asset will depend upon its beta coefficient, it tells us that the required rate of return on as asset is equal to the risk free rate plus a fraction (or multiple) or the market risk premium where the fraction (or multiple) is represented by the asset's beta coefficient. Thus:

$$Ki = R_f + \beta i(R_m - R_f)$$

Where:

$Ki$ = Cost of equity i which is also the expected required rate of return
$R_f$ = Risk free rate
$\beta i$ = Each equity risk relative to the market
$R_m$ = Market rate of return

**Estimation of risk free rate ($R_f$):** The risk free rate is that which could be earned on some zero-risk asset. Assets that have strictly zero risk are in practice hard to find but usually a 3 months Federal Government of Nigeria (FGN) Treasury bill for short term and long term FGN bonds are used to represent risk free rate of interest. This is because the interest payable on any of the two is fixed, government is unlikely to default and if the bill or bond is held to redemption, its maturity value is also certain. In this study the average rate of all the FGN Treasury bills issued for each year serves as a good proxy for risk free rate for each year under consideration.

**Estimation of beta coefficient ($\beta$):** Beta coefficient measures the sensitivity of each of the stock's returns to movements in the market's return. It enables us to state what premium should be paid on each of the firms' shares by comparing each of them with that of the whole market portfolio. The conventional approach for estimating betas as used by Value Line Investment Services, Merrill Lynch (a US investment firm) and the London Business School Risk Management Service is to relate historical returns on an investment to a proxy for the market portfolio returns,

Table 2: Actual rates of return of the market and risk-free rates

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Market (Rm) | 37.91 | 38.28 | 7.07 | 51.82 | 17.13 | 4.06 | 31.43 | 53.05 | -58.54 | -36.64 | 17.18 | -20.03 | 30.57 |
| Rf | 12.00 | 12.95 | 18.88 | 15.02 | 14.21 | 7.00 | 8.88 | 6.82 | 8.20 | 3.79 | 3.85 | 9.70 | 13.64 |
| Rm-Rf | 25.91 | 25.33 | -11.81 | 36.80 | 2.92 | -2.94 | 22.55 | 46.23 | -66.74 | -40.43 | 13.33 | -29.73 | 16.93 |
| Market risk | 3.82 | 5.36 | 4.02 | 5.64 | 7.68 | 4.48 | 5.33 | 4.87 | 8.19 | 11.22 | 5.34 | 4.60 | 3.73 |

Compiled from NSE DOL and CBN Statistical Bullettin

using the ordinary least square techniques to get a beta. This is usually represented by the equation of a straight line:

$$Y = a+bx$$

Where:

a = The intercept of a straight line or 'alpha' coefficient

b = The slope or 'beta' coefficient

Also, according to Fischer and Jordan (1995), the beta coefficient is computed for each equity using:

$$\beta i = n\sum xy-\sum x \sum y/n\, x2-\sum x^2-(\sum x)^2 = n\sum RmRi-\sum Rm\sum Ri/n\sum Rm^2-(\sum Rm)^2 \text{ and } a = \acute{y}-\beta\chi$$

In this study, we used 156 months of each security's returns based on capital gain or loss from January 2000 to December 2012 to estimate betas for the firms quoted on the Nigerian Stock Exchange. The proxy for the market portfolio is therefore the NSE All-Share-Index (ASI), which encompass the total market value of quoted stocks. It is generally accepted that due to some statistical factors such as error in capturing the data and early approximations, the estimated betas using the regression analysis are not unbiased estimates of the underlying beta of a security. To correct for this bias, Akintola-Bello (2004) adopted this following technique. After using the ordinary least squares to gain a preliminary estimate of beta, using monthly returns, they adjusted the beta using Adjusted beta = Raw beta (0.67)+0.33. However, since the data used in this study are historical data, the actual figures were picked from the relevant sources. This makes use of adjusted beta in computing rate of return required irrelevant.

**Estimation market return (Rm):** The NSE All-Share-Index is used as a proxy for market rate of return. The NSE ASI was established on January 02, 1984 as a base date and set at 100 as a base value to which all subsequent values of the index can be related. It is a real time index because it is recalculated at the end of every trading day and captures the population of all listed shares.

**Estimation of Actual Rates of Return of the stocks (Ri):** The rates of return on each share were obtained by computing the relative values of prices between holding periods (monthly). In this study capital gain yields were computed and used alongside the market return which includes no dividend. The reason for this is to work with like terms for easy comparison on the same platform. The 12 monthly returns for each year for each share were chain linked to obtain the annual return for each stock. Chain link simply means finding the geometric mean of the 12 monthly returns. According to Watsham and Parramore (2007) the geometric mean is the most appropriate measure of means when an average rate of change over a number of time periods is being calculated. It is a single measure of periodic growth rate which if repeated n times will transform the opening value into the terminal value. To measure the annual growth rate over n years, the appropriate model for geometric mean is as:

$$GM = (1+g_1)(1+g_2)(1+g_3)...(1+gn)^{1/n}-1$$

where, g is the periodic growth rates expressed as decimal. The decision rules in gauging how CAPM best suits the sector stocks are as follows. If CAPM computed return is equal to the actual return, the stock is normally valued by CAPM; if CAPM computed return is less than the actual return, the stock is undervalued by CAPM; If CAPM computed return is greater than the actual return, the stock is overvalued by CAPM (Table 2).

## RESULTS AND DISCUSSION

In the Agricultural/Agro-Allied sector of the NSE, the CAPM made twenty-two under-valuations, sixty-six overvaluations and no single correct prediction of the stock returns from all the firms quoted in this sector (Table 3). Therefore, CAPM as enunciated by Sharpe (1964) is not a good predictor of stock return in the Agricultural/Agro-Allied sector of the Nigerian Stock Exchange (Table 4).

From the findings on four sectors of the NSE namely Airlines Services, Automobile and Tyre, Road transport and Maritime Services, there is no single correct prediction on all the stocks return by the CAPM. Therefore, CAPM as enunciated by Sharpe (1964) has no predictive power on the rates of return on all the stocks listed under the four sectors of the NSE.

From Table 5 above it is obvious that CAPM did not give any appropriate forecast of the returns from the

Table 3: (CAPM-actual) rates of return of agricultural/agro-allied sector stocks

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Afprint | 69.71 | 68.10 | 54.11 | 74.56 | 3.67 | 42.18 | -53.58 | 30.13 | -195.65 | 93.09 | 3.85 | 9.70 | 13.64 |
| Ellah Lakes | 18.15 | 9.87 | 18.88 | 15.02 | 14.21 | 7.00 | 8.88 | -412.17 | -39.25 | 3.79 | 3.85 | 9.70 | 13.64 |
| FTN Cocoa | Na | na | Na | na | Na | na | na | na | 49.42 | 74.96 | 6.06 | 32.51 | 13.64 |
| Grommac | 13.55 | 16.75 | 18.41 | 15.02 | 14.39 | 6.94 | 8.88 | -122.16 | -80.56 | na | na | Na | Na |
| Livestock Feeds | 27.35 | 24.34 | 18.88 | 44.24 | 14.21 | 7.00 | 134.64 | 7.89 | -`30.67 | 73.87 | 4.81 | 45.96 | -55.42 |
| Okitipupa Oil | 29.47 | 27.34 | 18.88 | 20.79 | 7.72 | -21.05 | 0.54 | -110.71 | -173.55 | 8.46 | 7.39 | 9.70 | Na |
| Okomu Oil | 4.57 | 35.95 | 61.32 | 57.59 | -21.96 | -7.74 | -38.50 | 69.21 | 6.68 | 37.86 | 60.10 | -44.32 | -13.19 |
| Presco | Na | na | Na | -35.9 | 18.47 | -17.00 | 34.30 | -2.33 | -26.68 | 20.53 | 7.67 | -59.13 | -57.14 |

Table 4: (CAPM-actual) rates of return of airlines services, automobile, transport andmaritime services

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASL | Na | na | na | na | Na | Na | na | -295.36 | -33.62 | 180.26 | 87.45 | -81.72 | -0.88 |
| NAHCO | Na | na | na | na | Na | Na | na | 189.08 | 42.85 | -4.94 | 5.64 | 39.29 | 1.51 |
| Bewac | 12 | 12.95 | 18.88 | 5.63 | 2.09 | 7 | 8.88 | na | na | na | na | na | na |
| Dunlop | 45.34 | 41.82 | 37.57 | 51.62 | 27.60 | -26.35 | -75.55 | 163.18 | -43.51 | 97.94 | 3.85 | 9.70 | 13.64 |
| Incar | -40.87 | -35.31 | -3.31 | 47.59 | 42.22 | 31.71 | -137.84 | -11.55 | 3.05 | 39.50 | 100.88 | na | na |
| RTBriscoe | 51.33 | -109.93 | 51.92 | -78.79 | 16.26 | 17.45 | 8.57 | -17.58 | 40.97 | 92.11 | 100.67 | 59.49 | 16.64 |
| Reitzcot | 12.00 | 12.95 | 18.88 | 15.02 | 18.59 | 7 | 8.88 | 6.82 | -233.97 | na | na | na | na |
| ABC | Na | na | na | na | Na | na | na | 98.13 | -88.32 | 16.70 | 56.64 | -24.85 | 13.64 |
| Japaul | Na | na | na | na | Na | Na | 57.52 | -61.83 | -28.90 | 45.97 | 19.99 | 13.58 | 34.07 |

Table 5: (CAPM-actual) rates of return of breweries sector

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Champion | 12.00 | 12.95 | -110.73 | -76.30 | -143.41 | 101.82 | -16.63 | 36.92 | 8.2 | 9.54 | 34.03 | -29.37 | 3.31 |
| Golden G | 12.00 | 101.62 | 84.31 | -4.95 | 14.21 | 7.00 | 8.88 | 6.82 | 8.20 | 3.79 | 3.85 | 9.70 | 13.64 |
| Guinness | 33.85 | 18.93 | -32.30 | -30.73 | -9.32 | 8.69 | 46.45 | -2.55 | 15.49 | -58.00 | -24.33 | -48.41 | 4.16 |
| Int'l Brew | 33.49 | -71.23 | 23.62 | 90.10 | -24.91 | 10.33 | 14.26 | -221.3 | -222 | 73.02 | -89.54 | 7.32 | 6.70 |
| Jos Int'l | 20.55 | -15.26 | -53.59 | -86.96 | -14.61 | 7 | 12.4 | 14.82 | -88.23 | 46.80 | 17.96 | 44.85 | 18.89 |
| Nig. Brew | -7.40 | -5.72 | 20.03 | 7.90 | 55.04 | 6.75 | 58.67 | -13.67 | 2.28 | -58.50 | -21.17 | -41.13 | 10.25 |
| Premier | 97.39 | -123.63 | 22.12 | 15.02 | 31.84 | 7.00 | 8.88 | 6.82 | 8.20 | 3.79 | 3.85 | 5.51 | 14.66 |

Table 6: (CAPM-actual) rates of return of building materials sector

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ashakacem | 62.12 | -120.60 | 50.35 | 45.68 | -16.70 | -34.14 | -11.84 | 67.62 | 56.71 | -39.40 | -63.76 | 47.32 | 29.83 |
| CCNN | -19.09 | -11.34 | -17.23 | 24.67 | -27.14 | -18.42 | -19.48 | 23.44 | 53.32 | -106.23 | 24.71 | 80.52 | 13.51 |
| Dangcem | 3.38 | 10.42 | 18.88 | 17.96 | 28.11 | -40.74 | -68.25 | 53.27 | 19.23 | -116.65 | -96.21 | -5.27 | 9.47 |
| Lafarge | 13.46 | 49.56 | 46.70 | 16.05 | 60.72 | -40.22 | -40.50 | 24.63 | 66.04 | -52.33 | -11.06 | -21.44 | 2.05 |
| Nigercem | 4.10 | 10.94 | -19.64 | -139.87 | -14.81 | 7.00 | 8.88 | 6.82 | 8.20 | 3.79 | 3.85 | 9.70 | 13.64 |
| Nig. Ropes | -0.37 | 13.47 | 10.13 | 15.02 | 43.04 | 7.00 | 6.73 | -2.92 | -160.93 | 21.18 | 12.53 | 12.38 | 18.72 |
| Nig. Wire | 12.00 | 12.95 | 28.67 | 22.74 | 14.21 | 7.00 | 8.88 | 6.82 | -10.55 | 3.79 | 1.08 | 9.70 | 13.64 |

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Breweries sector stocks throughout the 13 years period of study. The CAPM made thirty under-valuations and sixty-one overvaluations to make a total of ninety-one misappropriations in the 13 years period of study. That is 100% failure to deliver accurate forecast of the stock returns. Therefore, CAPM is not a good predictor of stock return in the Breweries sector of the Nigerian Stock Exchange (Table 6).

In the building materials sector stocks, throughout the 13 years period of study, CAPM made thirty under-valuations and sixty-one overvaluations to make a total of ninety-one misappropriations in the 13 years period of study. That is 100% failure to deliver accurate forecast of the stock returns. Therefore, CAPM is not a good predictor of stock return in the Building Materials sector of the NSE (Table 7).

In the Chemical and Paints sector, the CAPM made thirty-one under-valuations and sixty-five overvaluations to make a total of ninety-six misappropriations in the 13 years period of study. That is 100% failure to deliver accurate forecast of the stock returns.

From the Table 8, there was not, a single correctly valued stock in years 2000-2012. Therefore, the application of the CAPM to Nigeria Conglomerates sector data shows that the stocks returns were either undervalued or overvalued by CAPM. Hence, the model did not guide the estimation of equity securities returns in the Conglomerates sector of the Nigerian Stock Exchange from 2000-2012.

From theTable 9, there was not, a single correctly valued stock in years 2000-2012. Therefore, the application of CAPM to Nigeria commercial services, hotel

Table 7: (CAPM-actual) rates of return of chemical and paints sector

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| African Paints | 13.84 | -31.54 | 41.85 | 24.87 | 20.06 | 20.72 | 15.24 | -321.57 | 9.44 | 3.79 | 9.90 | 25.11 | 13.64 |
| Berger Paints | 37.31 | 49.22 | 39.45 | 19.69 | -26.45 | 17.83 | 30.19 | -6.38 | -115.36 | 93.85 | -60.86 | 1.85 | 11.66 |
| CAP | 66.87 | -41.40 | 3.43 | -9.22 | -32.73 | -19.05 | -79.72 | -61.72 | -2.93 | 33.82 | -13.27 | 84.93 | -37.64 |
| DN Meyer | -46.93 | -3.74 | 96.74 | -45.52 | 58.25 | 25.81 | 54.02 | 37.50 | -140.95 | 78.64 | 41.90 | 139.30 | 22.73 |
| IPWA | 12.00 | 12.95 | 18.88 | 13.92 | 102.46 | 29.08 | 11.73 | -151.61 | -108.74 | 112.61 | 41.20 | 18.40 | 73.07 |
| NGC | -20.00 | 107.05 | 93.16 | -7.56 | -40.41 | -19.98 | 8.03 | -42.67 | 5.68 | 28.68 | 18.49 | 53.06 | 24.82 |
| Premier Paints | 27.38 | -2.41 | 4.16 | 15.02 | 59.86 | 7.00 | 8.88 | -91.36 | -562.00 | 21.14 | 3.85 | 29.31 | 13.64 |
| Portland Paint | - | - | - | - | - | - | - | - | - | - | 15.63 | 15.69 | 41.19 |
| Paint Coatings | - | - | - | - | - | - | - | - | - | - | - | 179.69 | -128.79 |

Table 8: (CAPM-actual) rates of return of conglomerate sector

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AG Leventis | 40.03 | 21.43 | 66.52 | -12.95 | -31.51 | -16.99 | -7.80 | 73.48 | -209.72 | 121.95 | 24.520 | 55.70 | 57.48 |
| Chellarams | -24.37 | -99.58 | -0.45 | 47.62 | 24.79 | 79.69 | -48.23 | -268.21 | -173.79 | 47.80 | 65.020 | 18.87 | 23.94 |
| John Holt | 92.84 | -10.77 | 102.09 | 65.80 | -22.69 | -44.82 | -1.66 | -42.35 | -306.29 | 36.53 | 7.570 | 64.12 | 48.19 |
| PZ | -28.50 | 46.06 | 33.12 | 27.53 | -9.69 | -32.10 | -16.66 | 29.00 | 9.09 | -96.10 | -1014.000 | -9.91 | 11.23 |
| SCOA | -124.69 | 3.20 | 17.46 | -4.67 | 117.86 | -0.88 | -10.13 | -14.06 | -333.23 | 38.42 | 6.380 | 44.33 | 18.34 |
| Transcorp | - | - | - | - | - | - | - | 198.74 | 19.01 | 50.72 | 15.550 | 12.88 | -67.46 |
| UACN | 82.65 | 10.36 | -8.41 | -14.43 | -21.59 | -12.05 | -2.19 | -29.05 | -12.58 | -42.69 | 20.830 | 12.81 | -2.47 |
| Unilever | -22.09 | -2.32 | 71.21 | 19.66 | 38.00 | -26.47 | 75.24 | 9.18 | -18.7 | -114.44 | -9.060 | -27.57 | -27.32 |
| CFAO | 0.23 | 4.47 | 36.36 | -20.16 | 20.80 | 10.39 | 42.96 | - | - | - | - | - | - |
| UTC | -77.31 | -19.43 | 43.02 | -7.27 | -21.03 | 36.80 | -40.41 | 80.28 | -149.70 | 176.47 | 32.100 | 32.22 | -8.68 |

Table 9: (CAPM-actual) rates of return of commercial services, hotel and tourism sectors

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chellarams | -24.37 | -99.58 | -.45 | 47.62 | - | - | - | - | - | - | - | - | - |
| Courtville | - | - | - | - | - | - | - | - | - | - | 8.12 | 9.70 | 13.64 |
| NSLTECH | - | - | - | - | - | - | - | - | -403.69 | 116.38 | 56.00 | 169.69 | 22.24 |
| Redstar | - | - | - | - | - | - | - | - | -.49 | -7.73 | 35.41 | -91.92 | -10.75 |
| Transnationwide | 23.55 | 33.82 | 24.46 | 17.96 | 14.21 | 11.93 | 20.33 | -160.69 | -321.88 | 19.15 | 4.76 | 54.77 | 30.37 |
| IkejaHotels | - | - | - | - | - | - | - | - | - | 156.20 | -57.12 | -31.58 | 27.40 |
| TouristCo | - | - | - | - | - | 12.83 | 15.58 | 49.55 | -78.70 | 11.78 | 16.04 | 17.87 | 08.88 |

Table 10: (CAPM-actual) rates of return of engineering technology, office/computer equipment, printing/publishing sectors

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cutix | -3.41 | -26.69 | 13.45 | -51.24 | 95.40 | -44.88 | -25.67 | -70.08 | -27.19 | 138.39 | 53.93 | 11.56 | 57.12 |
| Interlinked Tech | 12.87 | 27.48 | 22.85 | 15.02 | 23.69 | 11.57 | 8.88 | -33.47 | -200.99 | 9.70 | 3.85 | 16.45 | 13.64 |
| Nig.Wire, Cable | 69.64 | 6.37 | 96.03 | 65.74 | 18.00 | 8.05 | -6.49 | -89.02 | -99.61 | 92.97 | 59.17 | 27.24 | 6.02 |
| OnwukaTech | 12.00 | 12.95 | 18.85 | 15.02 | 14.21 | 7.00 | 8.88 | 6.82 | 8.20 | - | - | - | - |
| Atlas | 12.00 | 12.95 | 18.88 | 15.02 | 14.21 | 7 | 8.88 | 6.82 | 8.20 | - | - | - | - |
| HallmarkPaper | 12.00 | 12.95 | 18.88 | 15.02 | 14.21 | -2.53 | 8.88 | 6.82 | -96.38 | 4.01 | 3.85 | 9.70 | 14.66 |
| NCR | -89.53 | 22.71 | 76.29 | 83.06 | -80.00 | 35.81 | -72.51 | 10.17 | -264.74 | 17.30 | 25.67 | -28.66 | -31.83 |
| Ornatek | - | - | - | - | - | - | - | - | - | 39.46 | 34.31 | 9.70 | 13.64 |
| Thomas Wyatt | 48.18 | 42.35 | 33.46 | 29.20 | 39.90 | 9.35 | -51.42 | -130.09 | -44.77 | 51.44 | 29.75 | 9.70 | 17.57 |
| Tripple Gee | 130.01 | 47.82 | 132.91 | 66.78 | -88.34 | 72.69 | -158.27 | 148.21 | -189.06 | 51.67 | 34.74 | 30.40 | 36.17 |
| Wiggin Teape | 35.49 | 90.08 | 27.88 | 21.51 | 22.78 | 16.55 | 12.10 | -35.36 | -104.32 | 3.89 | 3.85 | 9.70 | 13.64 |
| Academy Press | 33.77 | 43.60 | 50.74 | -176.66 | 24.58 | 34.48 | 4.42 | -20.07 | -91.31 | 11.90 | 44.22 | 55.57 | 73.37 |
| Daily Times | 12.00 | -13.83 | 18.88 | 13.79 | 14.21 | -1.54 | 8.88 | 6.82 | 8.20 | 3.79 | 3.85 | 9.70 | 13.64 |
| Longman | -65.95 | 38.96 | 74.56 | 11.23 | 42.58 | -23.54 | -81.87 | -58.30 | -89.99 | 12 | 30.46 | 69.25 | 82.98 |
| University Press | -97.88 | -14.13 | 81.58 | 30.02 | 21.03 | -2.76 | -86.68 | -37.33 | -56.61 | -14.94 | .42 | 44.46 | -24.29 |

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and tourism sectors data shows that the stocks returns were either undervalued or overvalued by CAPM. Hence, the model did not guide the estimation of equity securities returns in the commercial services, hotel and tourism sectors of the Nigerian Stock Exchange from 2000-2012 (Table 10).

On the average, 25 and 75% of the stocks were undervalued and overvalued, respectively in the Engineering technology sector while 15.38 and 84.62% of the stocks were undervalued and overvalued, respectively in the office/computer equipment within the period of study. Similarly, on the average, 34.62 and 65.38% of the stocks were undervalued and over valued, respectively in the printing/publishing sector.

It was observed here in Table 11 that CAPM mostly undervalue stock returns during boom period and overvalue stock returns in recessive period. However, the application of CAPM to Nigeria food and beverage sector

Table 11: (CAPM-actual) rates of return of food and beverage sector

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7UP | 37.19 | 29.81 | 1.67 | -107.70 | 3.74 | -10.86 | -13.76 | 25.34 | -16.19 | 23.19 | -9.54 | -9.75 | 28.69 |
| Cadbury | 37.93 | -17.97 | 16.07 | 13.37 | 24.24 | -.01 | 52.59 | 26.44 | -44.73 | 36.78 | -59.21 | 79.31 | -25.89 |
| Nig. Flour Mills | 33.87 | 1.91 | 3.63 | 60.94 | -9.21 | -.10 | -104.83 | 19.05 | -5.32 | -84.61 | -32.81 | -19.93 | 29.25 |
| Nestle | -3.67 | -18.12 | -8.85 | 15.01 | -6.42 | -16.99 | 3.53 | .58 | -3.61 | -39.53 | -37.47 | -4.79 | -16.39 |
| NBC | 48.87 | -48.34 | -1.39 | 9.26 | 29.71 | -13.94 | 67.94 | -89.86 | 14.27 | 27.85 | -36.48 | -18.75 | - |
| NASCON | 157.46 | 30.36 | 18.88 | 21.14 | 3.28 | 8.47 | 8.88 | -410.21 | 50.22 | 9.99 | 3.33 | 20.71 | -1.25 |
| PS Mandrides | 14.31 | 96.36 | -22.85 | -9.65 | 7.65 | 12.12 | 8.88 | 32.56 | 16.98 | 3.79 | 7.77 | 9.70 | 8.97 |
| UTC | -77.31 | -19.43 | 43.02 | -7.27 | -21.03 | 36.80 | -40.41 | 80.28 | -149.70 | 176.47 | 32.10 | 32.22 | -8.68 |
| NNFM | 28.43 | -.09 | 29.94 | -.33 | 10.80 | -4.68 | 31.79 | 45.07 | -71.52 | -33.09 | -40.71 | 55.90 | 29.93 |
| Union Dicon | -5.37 | 32.06 | 69.73 | 118.09 | -42.77 | 12.48 | -116.60 | 8.88 | 34.90 | 42.86 | 36.64 | 9.70 | 13.64 |
| Foremost D | 12 | 12.95 | 18.88 | 15.02 | 14.21 | 7 | 8.88 | 6.82 | 8.20 | 3.79 | 3.85 | 9.70 | 13.64 |
| Ferdinand Oil | 18.59 | 19.24 | 18.88 | 15.02 | 14.21 | 73.47 | 8.88 | 13.29 | 2.19 | 3.79 | - | - | - |
| Beverages | 12 | 12.95 | 18.88 | 15.02 | 14.21 | 7 | 8.88 | 6.82 | 8.20 | - | - | - | - |
| Tate | 12 | 12.95 | 18.88 | 15.02 | 14.21 | 7 | 8.88 | 6.82 | 8.20 | - | - | - | - |
| NTC | 49.03 | 12.95 | - | - | - | - | - | - | - | - | - | - | - |
| DangoteSugar | - | - | - | - | - | - | - | 66.46 | 37.49 | -13.06 | 8.22 | 104.02 | 9.20 |
| DangoteFlour | - | - | - | - | - | - | - | - | -23.87 | -9.54 | -21.62 | 46.02 | 16.61 |
| BigTreat | - | - | - | - | - | - | - | - | -207.73 | 96.42 | 72.46 | 9.70 | 13.64 |
| Tantalizers | - | - | - | - | - | - | - | - | 12.18 | 27.48 | 67.38 | -27.11 | 13.64 |
| HoneyWell | - | - | - | - | - | - | - | - | - | - | 61.59 | 48.21 | 62.16 |
| Multi-flex | - | - | - | - | - | - | - | - | - | - | - | 99.81 | 35.91 |

Table 12: (CAPM-actual) rates of return of healthcare sector

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ekocorp | 21.62 | 12.99 | 22.64 | 108.29 | 34.51 | 38.71 | -41.76 | -20.64 | -108.48 | 14.76 | 4.70 | 25.46 | 13.64 |
| Evans | -19.77 | 6.67 | 31.47 | -37.57 | -9.90 | 26.40 | 25.58 | 80.08 | -53.25 | 89.13 | 23.69 | 57.54 | 6.51 |
| GSK | 0.42 | 71.50 | -29.25 | 126.89 | -90.55 | 42.89 | 35.13 | 58.81 | -39.59 | -37.81 | -12.40 | 34.41 | -38.80 |
| M&B | 3.99 | 78.60 | 56.82 | 251.91 | 14.21 | 7 | 8.88 | 1317.59 | 6.10 | 0.14 | 44.42 | 66.82 | 17.98 |
| Morison | -25.94 | 26.03 | 66.80 | -37.66 | -8.35 | -1.96 | -47.44 | 59.92 | -480.52 | 27.31 | 18.47 | 23.33 | 84.50 |
| Neimeth | 11.74 | 12.95 | 32.54 | 154.92 | 39.49 | 35.42 | 13.84 | 81.17 | -127.28 | 55.46 | 64.33 | -19.10 | 48.40 |
| Pharma-Deko | 22.18 | 16.76 | 25.24 | 84.91 | 5.96 | -8.32 | 51.10 | 7.18 | -254.57 | 78.51 | 16.42 | 34.60 | 42.24 |
| Fidson | - | - | - | - | - | - | - | - | - | 68.03 | -58.89 | 80.71 | 8.29 |
| UnionDiagnost | - | - | - | - | - | - | - | - | - | 31.93 | 43.94 | 9.70 | 13.64 |
| Aboseldehyde | 26.63 | 21.50 | 27.01 | 17.23 | 14.21 | 7 | 13.38 | 8.67 | -317.89 | 3.79 | - | - | - |
| BCN | 17.35 | 12.95 | 18.88 | 15.02 | 14.21 | 11.79 | 8.88 | -49.77 | -75.10 | 3.79 | - | - | - |
| Christlieb | 12 | 13.46 | 17.02 | 14.51 | 12.32 | -1.74 | 8.88 | 11.84 | .56 | 3.79 | - | - | - |
| Maureen lab | 12 | 12.95 | 18.88 | -345.51 | 16.43 | -20.87 | -8.59 | 312.09 | 8.20 | - | - | - | - |

Table 13: (CAPM-actual) rates of return of packaging sector

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Abplast | 12.00 | 15.74 | 19.90 | 28.84 | 14.21 | 7.00 | 8.88 | 6.82 | -217.17 | 3.79 | 3.85 | 9.70 | 14.66 |
| Avon crown | -4.02 | 112.55 | 68.25 | -24.38 | 9.38 | -9.00 | -15.91 | -62.20 | -174.26 | 26.17 | 14.91 | 24.73 | 109.22 |
| Beta glass | 83.96 | 45.30 | 28.89 | 23.54 | 29.37 | -28.63 | 48.05 | -55.23 | -68.23 | 44.59 | 0.29 | 32.27 | 23.11 |
| GREIF | 33.58 | 63.88 | 31.91 | 29.02 | 9.83 | 31.70 | 22.93 | -62.92 | -367.64 | 3.79 | 3.85 | 23.21 | 17.27 |
| Nampak | 24.10 | -15.93 | 27.55 | 17.82 | -17.80 | 2.76 | -1.00 | 99.71 | -44.70 | 21.63 | 56.85 | 16.38 | - |
| Bagco | - | - | - | - | - | - | - | - | 9.46 | 19.06 | 1.88 | -43.94 | -21.44 |
| Poly products | 36.07 | 49.18 | 48.16 | -35.87 | 20.06 | -30.62 | -164.02 | 37.80 | -243.09 | 30.84 | 96.19 | 78.32 | 14.32 |
| Studio press | -29.60 | 9.86 | 5.33 | 5.82 | 19.02 | 7 | 38.38 | -24.46 | -86.26 | 7.17 | 3.85 | 9.70 | 24.82 |
| WA glass | 12.00 | 12.95 | 14.23 | -22.58 | 8.92 | 10.77 | 12.35 | -5.99 | -8.64 | 3.79 | 3.85 | 9.70 | 13.64 |

Computed from NSE Daily Official Lists and CBN Statistical Bullettin

data shows that the stocks returns were either undervalued or overvalued by CAPM. Hence, the model did not guide the estimation of equity securities returns in the food and beverage sector of the Nigerian Stock Exchange from 2000-2012.

From Table 12, on the average, 21.74 and 78.26% of the stocks were undervalued and overvalued, respectively in the healthcare sector. The CAPM made thirty under-valuations and one hundred and eight overvaluations to make a total of one hundred and thirty-eight misappropriations in the 13 years period of study in the healthcare sector. Hence, it is obvious that CAPM did not guide share price movement in the Nigeria healthcare sector stocks unarguably for the period 2000-2012.

From Table 13, there was not, a single correctly valued stock in years 2000-2012. Therefore, the application of CAPM to Nigeria packaging sector data shows that the stocks returns were either undervalued or overvalued by CAPM. Hence, the model did not guide the estimation of equity securities returns in the packaging sector of the Nigerian Stock Exchange from 2000-2012.

Table 14: (CAPM-actual) rates of return of petroleum marketing sector

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Afroil | 23.87 | 23.31 | 23.04 | -93.25 | -16.78 | 58.41 | 44.75 | -186.09 | -230.71 | 3.79 | 3.85 | 9.70 | 13.64 |
| Beco | - | - | - | - | - | - | - | - | - | - | 130.70 | 32.38 | 13.64 |
| MRS | -44.73 | 10.81 | 34.92 | -42.65 | 15.95 | 36.58 | 75.89 | 1.71 | -190.92 | 86.60 | 77.94 | 11.83 | 114.31 |
| Conoil | 34 | 55.72 | 73.48 | -96.36 | -3.91 | 30.57 | -40.77 | 77.28 | -103.46 | 103.86 | -120.34 | 9.68 | 206.53 |
| Eterna | 42.88 | -22.24 | 92.19 | 53.68 | 7.50 | -23.14 | 35.55 | 42.28 | -174.45 | 146.27 | 38.90 | -10.19 | 72.28 |
| Forte | 18.61 | 12.95 | 66.84 | -75.84 | -30.80 | 66.52 | -5.65 | -104.99 | -129.84 | 155.95 | 47.50 | 59.18 | 75.65 |
| Mobil | -4.42 | 16.86 | 21.39 | -11.57 | -16.32 | 16.17 | 4.00 | 7.18 | -58.97 | 93.02 | 31.79 | 89.63 | 26.79 |
| Oando | 14.31 | -45.48 | 20.84 | 58.35 | -17.43 | 17.63 | 58.57 | -15.63 | -113.74 | -46.47 | 68.10 | 64.22 | 80.03 |
| Total | -9.30 | 14.09 | 15.31 | -30.34 | 5.94 | 5.70 | 8.42 | 9.79 | -61.09 | 14.70 | -39.26 | 33.50 | 73.30 |

Table 15: (CAPM-actual) rates of return of leasing and real estate sectors

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C and Leasing | -18.00 | 28.70 | 44.72 | -58.18 | 44.87 | 28.26 | 14.43 | 72.39 | -105.43 | 159.66 | 71.33 | 96.53 | 47.68 |
| Abbey | - | - | - | - | - | - | - | - | - | 64.92 | 26.93 | 5.30 | 17.59 |
| Aso | - | - | - | - | - | - | - | - | -99.18 | 36.79 | 19.27 | 9.70 | 13.64 |
| Resort | - | - | - | - | - | - | - | - | - | - | 30.56 | 9.70 | 13.64 |
| UnionHomes | - | - | - | - | - | - | -37.90 | 129.48 | 8.67 | 60.78 | 30.01 | 30.79 | 13.64 |
| UnionHomeREIT | - | - | - | - | - | - | - | - | - | - | 3.85 | 9.70 | 13.64 |
| SkyeShelterREIT | - | - | - | - | - | - | - | - | -30.99 | 11.76 | 6.08 | 11.31 | 13.64 |
| UACPDC | 72.04 | -69.67 | 28.98 | -15.03 | -7.57 | 2.82 | -10.27 | 49.94 | -35.64 | -14.48 | 37.64 | 8.79 | 44.44 |

Computed from NSE Daily Official Lists and CBN Statistical Bullettin

From Table 14 above it is obvious that CAPM did not give any appropriate forecast of the returns from the petroleum marketing sector stocks throughout the 13 years period of study. The CAPM made twenty-eight under-valuations and eighty overvaluations to make a total of one hundred and eight misappropriations in the thirteen years period of study in the petroleum marketing sector. That is 100% failure to deliver accurate forecast of the stock returns. Hence, it is obvious that CAPM did not guide share price movement in the Nigeria petroleum marketing sector stocks unarguably for the period 2000-2012.

From Table 15, there was not, a single correctly valued stock in years 2000-2012. Therefore, the application of CAPM to Nigeria leasing and real estate sectors data shows that the stocks returns were either undervalued or overvalued by CAPM. Hence, the model did not guide the estimation of equity securities returns in the leasing and real estate sectors of the Nigerian Stock Exchange from 2000-2012.

## CONCLUSION

May be if all investors have the same expectations (homogeneous expectations), it is possible to have one expected return of the market. But investors do not have homogeneous expectations. Different investors have different cash flow expectations and different expected (and required) returns to equity. CAPM is about beta, risk premium and expected return while valuation is about expected or required return and relevant cash flows. Therefore we need to be careful the way we ascertain these parameters because they impact heavily on our financial and investment decisions. Having said this, from all the computations on the 14 most vibrant sectors on the NSE, even a blind man can feel and notice that CAPM does not fit properly into the emerging market Nigeria.

There are three tests of a theory. First, is it correct, given its assumptions. There is no doubt that the CAPM meets this test. Second, does it provide a basis for further advancements in theory. The CAPM has spawned a range of further advancements in theory. The Fama-French model can be seen as an empirical extension of the CAPM. Third, is it useful empiricallyΣ It's going on 50 years now and CAPM is still being used in empirical research. There is no questioning that the CAPM is an under-specified model. Fama and French's 3-factor model addresses that empirically and Carhart has extended that to include momentum. And there is quite a bit of current research investigating the relevance of financial distress and idiosyncratic volatility in adapting the CAPM.

That many people misunderstand the MRP and betas is true, but that does not invalidate the basic calculation of expected rate. Expected rates will vary by investor and by stock but the risk free rate will be the same for all in the same market at that point in time and most investors will look for the same risk, adjusted required return across their portfolio. Again as Capital assets are those that are tradeable and used mostly for the purpose of investment, betas and market premiums are not constant but time varying. It is obvious there are many aspiring buyers and sellers of common stock but the market is that juncture where prices clear and valuation experts look to recent sales of securities to determine just what the MRP is at any given time. This is why business appraisers use very long term Ibbotson data to come up with an average MRP over very long periods of time. In summary, determining a MRP is not easy, a guess to some extent but it is so

important in actual practice that it is necessary to do as good a job as possible based upon actual market transactions. Although, Fama and French (2004) cited some research indicating the CAPM doesn't represent a perfect fit for risk-return tradeoffs in the markets, Levy and Roll (2011) have shown the pricing implications of the CAPM to be consistent with the empirical evidence. Empirical studies indicating that the CAPM adequately characterizes risk and return in the markets include not only those by Murphy (2000) and others. While Ahn and Thomson have shown theoretically that Breeden's continuous-time CAPM can't hold with jump diffusion processes due to the imperfect correlation between consumption and the marginal rate of substation, betas measured utilizing the one-period CAPM can still supply a reasonable approximation of systematic wealth risk. The CAPM may be especially useful for measuring risk when the market portfolio is specified to incorporate all corporate claims and thereby incorporate reinvestment risk besides potentially making the combined market returns more normal.

Finally, though CAPM failed in Nigeria, CAPM is not absurd model but tells us what would happen, if the assumptions where true. A model is always restricted in its assumptions and from my point of view, the assumptions of the CAPM are so far from reality that it shouldn't be used in practice but in an idealized financial market.

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