Application of Capital Asset Pricing Model (CAPM) on Real Property Investment in Nigeria

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ABSTRACT
Quite a substantial number of academic papers have examined the performance of real estate investment relative to other investment assets. While these studies are valuable in the field of real estate investment performance measurements, a gap still exist in the literature on the application of capital Asset Pricing Model in the various sectors of the real property investment Market in Nigeria. Both descriptive and exploratory approaches were used for the return, literature review, while an exploratory approach was used in analyzing the data collected. The primary data collected were collated, analyzed and presented using frequency distributions, percentages and relative importance index (R11). The findings revealed that inability to calculate risk and return on investment is a major problem hindering the application of CAPM to real estate investment appraisal.

Keywords: Capital Assets Pricing Model, Risk, Return, Real Property Investment.

INTRODUCTION
Whenever an investor contemplates making an investment, whether in real property sector or financial sector, the risk of obtaining an anticipated return must be explicitly considered. The issue of risk considers the risk inherent in the investor’s willingness to accept risk. However, the investor has some set of utility preferences that will specify the characteristics that acceptable investments must have. Hence, the investor is always assumed to be acting to maximize his expected utility. That is to say that actual behavior varies from investor to investor and depends upon each investor’s evaluation of whether the expected return compensates for the risk involved. It is unarguably, an axiom that diversification between real property investment sectors will lower the total risk to which an investor’s portfolio is inclined. According to Laubscher (2002), the capital Asset Pricing Model (CAPM) gives a broad, yet a significant explanation of the relationship existing between risk and return in efficiency markets.

Since this is the case, then, the beauty of real estate investment does not depend on the risk and return of such investment so to say but on the relationship of its return and risk to the risk and return of the investor's portfolio.

On one hand, the Net Present Value (NPV) and Internal Rate of Return (IRR) rules of investment appraisals are concerned with individual risk, whereas the Capital Asset Pricing Model (CAPM) suggests modification of such rules so that each investment appraisal exercise will focus on corporate risk. Based on this premise, Portfolio managers find risk-return models helpful in explaining their performance or the performance of their competitors to clients.

Purpose of the Study
The study seeks to:
(i) Find out whether or not the Capital Asset Pricing Model is applicable to real property investment market in Nigeria.
(ii) Provide some reasonable basis for elating return opportunity with risk or real property investment.
LITERATURE REVIEW

Capital Asset Pricing Model:
According to Kalu (2001) the asset equilibrium price theory posits that capital markets are in equilibrium when the quantity of each assets demanded equals the quantity of each asset supplied by the market. It seems that capital market theory has little to say about the relationships between the expected returns and riskiness of most investments.

To the contrary, however, the equilibrium conditions of the capital market line (CML) imply a very specific equilibrium risk-return relationship for all individual securities as well as for all portfolios. This relationship is known generally as the Capital Asset Pricing Model (CAPM). The CAPM provides a precise prediction of the relationship that exists between the risk of an asset and its expected return.

Bodie et al. (1998) states that the relationship serves two vital functions namely:
(i) Provision of benchmark rate of return of evaluating possible investment, and
(ii) Assistances in making educated guesses as to the expected return on assets that have not been traded in the market place.

To estimate the required rate of return for a project or firm-i.e, the cost of capital according to the CAPM, you need three inputs:
1. The risk-free rate of return
2. The expected rate of return on the overall market.
3. A property’s or projects beta with respect to the market.

The CAPM is represented as follows:

\[ R = KRF + b(KM - KRF) \]

Where:
- \( R \) = Required return from a single inefficient investment.
- \( KRF \) = The Risk-Free Rate of Return
- \( KM \) = The Average Market Return
- \( b \) = The beta coefficient of the security.

The Capital Asset Pricing Model applies not only to individual securities but also to portfolios. That is portfolios including the efficient ones that lie on the capital market line.

The important point to remember is that whether we are dealing with individual securities, inefficient portfolios or assets that the appropriate measure of risk is systematic risk. Even though investor’s risk and return preferences are stated in terms of total risk, the ability to diversify unsystematic risk away means that it does not command a premium in terms of expected return.

Betas exceeding one signify more than average “riskiness” while betas below one indicate lower than average, (Ogunba, 2013). Thus sensitive assets will have lower betas and be discounted at a lower rate.

The CAPM is therefore, consistent with the fact that investors should require a higher return for holding a more risky asset.

Real Property Investment Performance Analysis in Nigeria

The pioneering attempt in real estate investment performance analysis in Nigeria was made by Olaleye (2000). The study examine the performance of property portfolio in Lagos and found that while portfolio in Ikeja performed better in terms of their means return when compared with the risk free rate, portfolio in Yaba however, is the emphasis on the performance of management as opposed to the performance of the investment itself.

Bello (2003) bridged the gap by examining the relative performance of residential prosperity investment and investment in securities. The study found that property under-performed ordinary shares conducted in other part of the world; although valid only in the context of direct real estate investment. The recent study of Amidu and Aluko (2006) examined the investment performance of listed property and construction companies relative to stock on the Nigerian stock market. The findings revealed that both property and construction companies stocks under-performed stock on a risk-adjusted basis. On the other
hand, listed property and construction vehicles were found to offer portfolio diversification when included in an equity investment portfolio due to their low correlation with the stock market.

**Security Market Line**

Security Market Line (SML) is the representation of the Capital Asset Pricing Model. It displays the expected rate of return of an individual security as a function of systematic, non-diversifiable risk (its beta). The SML essentially graphs the results from the Capital Asset Pricing Model (CAPM) formulæ. The X-axis represents the risk (beta); and the Y-axis represents the expected return. The market risk premium is determined from the slope of the SML. The security market line is a useful tool in determining whether an asset being considered for a portfolio offers a reasonable expected return for risk. Individual securities are plotted on the SML graph. If the security’s risk versus expected return is plotted above the SML, it is undervalued because the investor can expect a greater return for inherent risk. A security plotted below the SML is overvalued because the investor would be accepting less return for the amount of risk assumed.

![Security Market Line Diagram](image)

The security Market Line is just a graphical representation of the CAPM formula. The slope of this line is the equity premium, \( \Sigma (rm) - rf \) and the intercept is the risk-free rate, rf.

**Real Property Investment**

Real Property investment is distinct from financial investment. It is distinct from financial investment in several ways and it is also limited in products. Ekenta, (2009) defined real property investment as the application of a capital sum in land and any permanent structures or improvements that are permanently attached to the land in expectation of a return either in the form of a recurring income or in the form of a gain due to an appreciation in value, or both. Investment in real property is the nature of the receipt of total returns comparing income return and capital appreciation return annually. The income flow comes as rent paid in advance or in arrears after the consumption of the property service. Thorncroft (1976) stated that financial investment in real property involves acquiring land and buildings in order to derive from them rents or other annual income. He explained that investment in real estate is comparable to other types of investments in the sense that investments such as the purchase of stock and shares and are comparatively simple to analyze in terms of yield on capital and easy to compare with the other opportunities that may exist for investment. He identified a good investment medium as one that is characterized by security of capital and income in real terms, easy management responsibilities and minimum investments and withdrawal cost.
Real Property investments are a class of investments that offer security of capital and income in real terms (Ekenta, 2014).

Risk in Investment
There is no doubt that wise investors need to know about the riskiness of various alternative investments, as well as how adjustments in their portfolios can influence the risk they take. Frequently, risk and uncertainty are used interchangeably but they do not mean the same. According to Horne (1980), the riskiness of an investment proposal is the variability of its possible returns. While Ajayi (1998) defined risk as the level of probability that a required return measured in terms of capital value and income will be achieved.

Portfolio theory starts with an assumption that investors are risk averse (Ogunba, 2013). This means that given two assets that offer the same expected return, investors will prefer the less risky one. Thus, an investor will take an increased risk only if compensated by higher expected returns. Conversely, an investor who wants higher returns must accept more risk. A rational investor will not invest in portfolio if a second portfolio exists with a more favourable risk return profile. The exact trade-off will differ from investor to investor based on individual risk aversion characteristics.

Systematic risk is measured using the Beta. Where Beta (B) is the measure of:
(i) The sensitivity of portfolio returns to a movement of returns in the overall market.
(ii) The sensitivity of an individual asset's returns to a movement of returns in a portfolio.

Beta measures the performance of an asset or portfolio's historical returns verses a chosen market benchmark. For stocks, the benchmark is usually the S & P 500 index. The beta of the benchmark is always 1.00. Beta exceeding one signify more than average “riskiness” (volatility) relative to the benchmark. Betas below one indicate lower than average volatility relative to the benchmark.

Therefore, if a portfolio has a beta of 1.00, its volatility is generally the same as the benchmark. For a fully diversified stock portfolio, a beta of 1.25 would mean that it has generally produced a 25% higher return and volatility than the S & P 500. A portfolio with a beta of 0.80 would be expected to produce a 20% lower return than the market over time and not go up as much in an up market. Beta is usually found via regression on historical data. It is typically measured taking into account three to five years of historical performance. Beta assumes the portfolio manager holds a totally diversified portfolio.

Portfolio Diversification
Portfolio diversification constitutes a major cornerstone of the modern theory of investment. It is concerned with a situation in which an investor rather than concentrating his activities and assets mainly in one type of property investment, wishes to take advantage of various sectors of real property investment.

Modern approaches to the problem of portfolio selection began with Markowitz paper in 1952. The principal advance that Markowitz made was in the manner in which the risks associated with investments were taken into account using variance (or standard deviation) of the return on an investment as a measure or risk. However, variance is not a perfect measure of risk, but on the whole the idea of using statistical measures of dispersion as measures of risk was a significant advance. Investors were assumed to be “rational” in so far as they would prefer greater returns to lesser ones given equal or smaller risk and risk averse.

Diversification is necessary because of diminishing returns and the fact that it reduces risk without a loss of expected return. It shows specifically how investors can obtain maximum return for any particular level of risk. Furthermore, it facilitates benchmarks for evaluating investment performances of both individuals and institutional portfolios.
RESEARCH METHODS
In the conduct of this study, the primary data used was collected by administering questionnaire and conducting personal interviews. Secondary data were sourced from published materials and conference papers produced by other researchers. Both descriptive and exploratory approaches were used for the literature review, while an explanatory approach was used in analyzing the data collected. The primary data collected were collated, analyzed and presented using statistical tools such as frequency distributions, percentages and relative importance index (R11). Questionnaires were distributed to real estate firms in Port Harcourt. The target respondent within each firm was branch manager or the managing/principal partner of the firms.

RESULTS
Of a total of 100 questionnaires distributed, 87 were correctly completed and retrieved, representing an 87% retrieval rate. Generally the average respondent’s firm was found to have been in practice for a period of about 10-15 years.
First, the survey sought to affirm whether or not the CAPM are applied by Estate Surveyors and Valuers in their investment assessment. Some possible factors responsible for the non-application of CAPM were highlighted. Responses were measured on a 4-point Likert scale, corresponding to strongly agree (4), agree (3), disagree (2) and strongly disagree (1).

Table 1. Problems of Applying CAPM to Real Property Investment Appraisal.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Problem</th>
<th>Weighted Frequency</th>
<th>R11</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Poor knowledge of CAPM</td>
<td>178</td>
<td>0.94</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Inability to calculate Risk and Return</td>
<td>90</td>
<td>0.89</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Inexperience</td>
<td>87</td>
<td>0.87</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>Inability to relate return and risk to real Estate Investment</td>
<td>86</td>
<td>0.84</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 2 is ranking of problem associated with the application of CAPM to real estate investment appraisal. The first is poor knowledge about CAPM. It is followed by inability to calculate risk and return on investment. The 3rd is inexperience which is due to poor exposure and professional training. The same also applies to inability to relate return and risk to real estate investment.

CONCLUSION AND SUGGESTIONS
The CAPM provides the major factors in the determination of share prices since it is based on the relationship between risk and return in the capital market. Moreover, the test of any theory is not to be found in the reality of its assumptions, but which it is able to predict and explain real world phenomena. Bearing in mind that investors’ interests has rapidly shifted to real estate, based on the premises that its always appreciating and durable; the researcher therefore advocate for the continued adoption of the CAPM in real estate investment appraisal.

Suggestions
The objectives of the study was to investigate whether the CAPM is applied to real estate investment in Nigeria. The study suggests that despite the suitability of CAPM in minimizing risk; while a more refined model should be employed by researchers to forecast the returns approximately closer to the actual returns of stock.
Finally, there is need for further research on this field; as it is the believe of the researcher that other researchers can explore this area using the other assumptions of CAPM to test their applicability on real estate investment.
REFERENCES