Relative Performance of Real Estate Equities and other Selected Stocks: The Nigerian Market Situation

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Abstract

The study evaluated the performance of real estate stocks relative to other stocks before and after the period of stock market crash that spanned 1999 to 2011. Correlation, regression, and Modigliani's M^2 measure were the major tools employed in the evaluation. Real estate stock returns exhibited low correlation with the market index in 1999 to 2007 before the stock market crisis and a high negative correlation in 2008 to 2011 after the stock market crisis. This suggests better performance after the period of stock market crash relative to before the crash period. The result of the regression analysis showed least systematic risk for real estate and inference drawn from the resultant higher M^2 using Modigliani measure is that real estate stock performs better in the post stock market crash period than in the pre stock market crash period. Though there was a crash in the real estate sector, the correlation coefficient and M^2 measure both showed that real estate stock performed better in the post-stock market crash period relative to other stocks. Based on the -0.628 correlation coefficient after the stock market crash, the study recommends that investors should continue subscribing to indirect real estates stocks quoted on the Nigerian Stock Exchange as an addition to any mixed asset portfolios exhibiting similar characteristics of market index, in order to harness the resultant diversification benefits.

Key words: Equities, evaluation, performance, real estate, stocks.

Introduction

The financial melt-down which started with the sub-prime mortgage crisis in the United States (US) in 2007, systematically resonated to other sectors of the world economy at large (Oladapo & Olusegun, 2012). The capital market of most emerging economies in the Asian continent like Singapore, Honk Kong, Japan; as well as African countries of which Nigeria is exemplary (Sere-Ejembi, 2008) crashed as a result of the meltdown. Oyesiku (2009) opined that the resultant economic recession did not just occur; and that certain factors which include dollar collapse, oil price rise, inflation, loss of investor confidence, excess buying and bursting of housing bubble greatly contributed to the financial crisis in 2007. Though there were doubts as to whether the collapse of the Nigerian stock market was the direct cause of the global meltdown; or that the price drop is the result of indirect factor of prospectors' believes that Nigerian capital market will soon crash; the reality is that there was a parallel crash in the Nigeria stock market in the year 2007.

The Nigerian stock market before was one amidst the most profitable investment havens in most African economies before it crashed (George, 2008). The economic reforms that began in 2003; the United States 18 billion dollars debt writeoff; the creation of pension funds which have several billions of naira to be invested in Nigerian securities; the banking sector reforms which necessitated recapitalization in the year 2005; all contributed in fuelling a boom in the equity market (Nwude, 2012). In those boom years, investors' confidences were high and decisions on investments during the period were based on optimistic rule of the thumb. As faith would have it, the boom years came to an abrupt end as a result of the crash in 2007 resulting from the Sub-prime Mortgage Crisis in the US, Nigerian Banking Crisis, Sovereign debt crisis, amongst others. The Nigerian market witnessed downturn in capitalization and All-Share Index between 2007 and 2008; birthing the burst years which caused both local and foreign investors to lose confidence in the capital market.

The response of the various asset classes in terms of performance to the dynamics of the stock market during this period varied according to sectors as well as from study to study (Osisanwo & Atanda, 2012). This generated a lot of scholarly studies on different assets of which real estate has attracted more attention amidst the exemplars across continents like Europe, Asia, Africa, amongst others. Liow & Ibrahime (2010) established that real estate market dynamics are influenced by the overall national and international economic variables and these to a very large extent affect real estate returns and volatility components. Although several studies (Odu, 2011; Stevenson, 2000; Varcoe, 2001, Ooi & Liow, 2004) have made remarkable contributions to the performances of real estate investment in several countries, studies on parallel performance of real estate companies' stocks before and after the crash to the performance of other top rated companies' stocks and market index have not been adequately addressed. Filling the gap on performance of Nigerian securitized real estate as an indirect property investment vehicle relative to company stocks and market index is therefore necessary. This study therefore sought to find answers to the following questions: What is the correlation status of the securitized real estate with market index? How

would changes in market index return affect the real estate stock in the considered periods? What is the risk-adjusted return of the real estate stock relative to other portfolios of stock in the viewed periods?

Review of Related Literature

Performance of Real Estate Stocks and Other Stocks

Investors are often faced with alternative investment options where their funds could be invested. These alternatives include: bank deposits, savings deposit, insurance policy coverage, stocks and shares, bonds, unit trusts, real estate, amongst others (Mayo, 2006; Chandra, 2008). Many of these investments behave differently to the same economic condition and have different risk and return characteristics. Investment diversification strategies are therefore essential in order to spread the risk of loss attributable to an economic condition that does not encourage good performance of certain investment. Diversification strategies combine investments that have different return and risk character to the same economic condition in order to obtain the best possible mix or combination of alternative investments that offer minimal risk and maximum returns. The characteristics of various assets along these lines and the linkages among them have been the subject of serious considerations (Hoesli and Macgregor, 2000).

There is a rich collection of literature on the relationship between performances of real estate stocks and macroeconomic variables (Nelson, 2002; Sa-Aadu, Shilling, & Tiwari, 2001; Kling & McCue, 1987; McCue & Kling, 1994). Nelson (2002) used the NAREIT index and found it made the performance of a

portfolio worse in the market downturn. Sa-Aadu, et al. (2001) also tested the diversification benefits of including REITs into an existing optimal mixed asset portfolio to ascertain the contribution of REITs in the risk-adjusted performance during downturns in economic cycles. Using the volatile bounds method, it was concluded in the study that real estate offers additional benefits above that of small-cap stocks and bonds in a mixed asset portfolio. The shortcomings in the two research studies were that there is no differentiation in data as to the periods of financial stress and boom. The test of diversification benefits in the mixed asset portfolio in the study may therefore not withstand a strong text of validity.

Hamzah, Rozali and Tahir's (2010) examined the performance of real estate investment trusts (REITs) or listed property trusts in Malaysia using three standard performance measurement methods (Sharpe Index, Treynor Index and Jensen Index) for the period between 1995 and 2005. The authors also investigated the degree of systematic risks of REITs and determined whether REITs give higher returns than the market portfolio. The sample data consists of four REITS, monthly returns adjusted for dividends and bonuses distributed to unit holders which were computed for the 10year period, divided into three sub-period viz: pre-crisis (April 1995 June 1997); during crisis (July 1997 September 1998); and postcrisis (October 1998 April 2005). The measurement of returns on the REITS was derived from two components, namely income and capital gain. The rate of returns for each REITS was calculated, the return on the benchmark market index measured. The Sharpe Index, Treynor Index and adjusted Jensen Alpha Index were computed and the beta coefficient which

measures the systematic risk of REIT portfolio was computed by regressing the returns of each REITS on the returns of the market portfolio. The results indicate that the risk-adjusted performance of REITs vary over time. REITS in general out-performed the market portfolio during the 1997 1998 financial crisis but under performed in the pre-crisis (1995   1997) and post-crisis period (1998 2005). Also, the average systematic risks of REITS were slightly higher than the market portfolio during the pre-stock market crash and stock market crash period but were significantly lower in the post-stock market crash period. However, the evaluation tools employed in the study are not exhaustive considering the fact that there are many other tools for evaluating performances like the correlation, regression analysis, coefficient of variation analysis, Modigliani measure, and amongst others; which could be used as a further test or employed in other areas.

Lee and Stevenson (1997) carried out a study to determine whether real estate investment should play a consistent role in a mixed asset portfolio over short- and long-term investment horizons. Consistency in their context refers to the ability of an asset to maintain a positive allocation in an efficient portfolio over different holding periods. To address the question of consistency the allocation of real estate in the mixed asset portfolio was calculated over different holding periods varying from 5 to 25 years. Real estate was found to have positive allocations over time periods ranging from 5 to 25 years, and for most levels of portfolio return, irrespective of whether the real estate is used to enhance returns or reduce risk. Obviously, their study actually filled in some important gaps but studies of that nature will not address the challenges of many individual investors and small institutional investors who lack the finance to embark on direct investments.

M-squared (M^2)

M-squared is an extension of the Sharpe ratio that is based on total risk, not on beta risk. The idea behind the measure is to create a portfolio (P') that mimics the risk of a market portfolio that is, the mimicking portfolio P' alters the weight in Portfolio P and the risk-free asset until Portfolio (P') has the same total risk as the market (i.e. $\sigma p = \sigma m$). Because the risks of the mimicking portfolio and the market portfolio are the same, we can obtain the return on the mimicking portfolio and directly compare it with the market return.

The difference in the return of the mimicking portfolio and the market return is M^2, which can be represented thus:

$$M^2 = (R_p - R_f)\ \frac{\sigma m}{\sigma p}\ -(R_m - R_f)$$

The M^2 gives ranking that are identical to those of the Sharpe ratio. Advantageously, it is expressed in percentage and easier to interpret. Compared to the Sharpe measure, M^2 is easier to interpret as it is expressed as a rate of return (Chandra, 2008). A portfolio that matches the performance of the market will have an M^2 of zero, whereas a portfolio that outperforms the market will have an M^2 that is positive. The M^2 is used to determine the rank of a portfolio as well as which, if any, of the portfolios beat the market on a risk adjusted basis.

Estimation of Beta in a Regression Model

The concept of beta evolved from the Capital Asset Pricing Model. Beta is used to measure the diversification of risk derived from capital asset portfolio theory. It determines the

sensitivity of an asset return to changes in market index return in a linear relationship format.

$Ri = \alpha + \beta i \check{R}M + ei$

Where:

Ri represents the return of the investment

α represents risk free rate/constant for all asset (or intercept)

βi represents the beta coefficient/slope

$\check{R}_M$ represents the market index return

ei Represents the error term

Beta is calculated using:

$$\beta = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{n\Sigma x2 - (\Sigma x)2}$$

$$\alpha = \bar{Y} - \beta\dot{x}$$

Implications of Beta Values

The beta value of +1 implies that a percentage change in the market index return would cause exactly 1% change in the investment return. It indicates that the investment moves equally in the same direction with the market index.

A beta value of +2 implies that a percentage change in the market index return would cause 2% change in the investment return; indicating that the investment return is more volatile. When there is a decline of 15% in the market index return, the investment with a beta of 2 would produce a negative return of 30%. Higher beta values' investments of above one are said to be very aggressive; while lower beta value of less than one is said to be non-aggressive beta. An investment with a beta value of less than one have moderate beta value telling us that the sensitivity of an investment to expected changes in market index is at the same magnitude to that change. Negative beta values indicate that the stock return moves in the opposite direction to the market return. An

investment with a negative beta of -1 would provide a return of 5%, if the market return declines by 5%. In the light of the foregoing, Singal (2011) suggests that although beta estimates are important in forecasting future levels of risk, there is much concern about their accuracy. Levhari and Levy (1977) showed that beta coefficients estimated with monthly returns are not the same as beta coefficients estimated with annual returns. Since they are different, the results of studies will depend on which beta estimation convention was used. Kothari, Shanken, and Sloan (1995) argue that annual betas are more appropriate than monthly beta since the investment horizon for a typical investor is more probably closer to a year than a month.

Research Method

Secondary data comprising of shares prices and past dividends, All Share Index (ASI) of the Nigerian Stock Exchange (NSE), and Consumer Price Index (CPI) were used in this study. These data were obtained from database of statutory public institutions such as the Central Securities Clearing System (CSCS), Nigerian Stock Exchange (NSE), Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS) as well as the annual reports of the quoted companies. Therefore, the base line market portfolio considered in this study was that of only stocks quoted in the Nigerian Stock Exchange Market. This study did not consider the performance of a mixed asset portfolio when real estate is added to it, but compared the performance of real estate company stock parallel to other company stocks. The data used in the analysis cover a 13-year period from 1999 to 2011 and was obtained base on convenience. The period was divided into 1999

to 2007 before the stock market crashed; and 2008 to 2012 after the stock market crashed. In terms of the high market price of shares, top rated companies listed in the Nigerian Stock Exchange were purposively selected. Randomization was employed in selecting nine sampled companies from the top rated companies; and their performances were compared with that of UACN Property Development Company in the real estate sector. The other eight companies that emerged were: Okomu Oil Palm Plc., Guinness Nigeria Plc., Glaxo-Smith Kline Nig. Plc., Julius Berger Nigeria Plc., Niger Insurance Plc., First Bank of Nigeria Plc., Total Nigeria Plc., 7up Nigeria Plc., and Nestle Nigeria Plc. The data on All Share Index (ASI) used as proxy to market index were employed to ascertain the beta, risk-adjusted return performance of a real estate stock or investment portfolio. Consumer Price Index (CPI) was also used as a proxy to inflation. Most of the analyses in this study were done with the aid of Statistical Package for Social Sciences (SPSS), but Electronic View (E-view) aided in multiple regression analysis.

Adopted Model
- In order to determine the diversification benefits of real estate, its coefficient of correlation with market index and inflation were determined using the model below:

$$R_{xy} = \frac{cov_{xy}}{\sigma_x \; \sigma_y}$$

  where:

  r_{xy} = coefficient of correlation

  cov_{xy} = covariance between real estate stock and market portfolio or inflation

  σ_x = standard deviation of real estate stock

σ_y = standard deviation of market index, or

σ_y = standard deviation of inflation

It is important to note that the coefficient of correlation will not give information on whether real estate stock is a hedge against inflation. It will also not provide information on performance of real estate before and after the stock market crash, but will provide information on the direction of movement of real estate stock return relative to other stocks and inflation for each of the two considered periods. A mix of investment with negative correlation coefficient is better than the mix with positive correlation coefficient. This tool was employed in line with the assertion made by Kevin (2008) that to understand the mechanism and power of diversification, it is necessary to consider the impact of correlation on portfolio risk more closely.

- The regression coefficients (βt) which refers to the risk status of the considered stocks were determined. The regression model adopted in this study assumes that the annual return on an asset is a function of many attributes such as annual percentage change in (ASI), or (CPI) as well as other variables which are kept constant in this study. The regression model is in the form:

$Rt= \alpha t + \beta t Rm + \epsilon r,$ -------------------------(1)

where,

Rt = Annual return of asset

αt = Asset intercept

βt = Asset beta (regression coefficient)

Rm = is the annual percentage change in the ASI used as a proxy for the market index in the model.

ϵr = is the error term

- The Modigliani risk-adjusted performance or Modigliani-Modigliani (M2) measure is a measure of the risk-adjusted return of a stock or investment portfolio (Modigliani & Miller, 1958; 1963). It measures the return of the portfolio, adjusted for the deviation of the portfolio (or the risk), relative to the benchmark (market).

It is given as:

$$M^2 = (R_p - R_f) \frac{\alpha m}{\alpha p} - (R_m - R_f) \quad \text{-------------------(2)}$$

Where $\frac{\alpha m}{\alpha p}$

M^2 = Modigliani square
R_f = Risk free rate of return
R_m = Market return (ASI)
R_p = Nominal rate of return
αm = Standard deviation of market
αp = Standard deviation for return on stock

The interpretation is that the stock with the highest M^2 has the best performance and the one with the lowest M^2 has the least performance.

Results and Analysis

Table 1: *Companies Used in the Analysis and their Sectors*

S/N	Company	Sector	Sub-sector
1.	Okomu Oil Palm Plc.	Agriculture	Crop Production
2.	UACN Property Development Company	Real Estate	Real Estate
3.	Guinness Nigeria Plc.	Consumer Goods	Beverages-Breweries/Distillers
4.	GlaxoSmith Kline Nig. Plc.	Consumer Goods	Pharmaceuticals
5.	Niger Insurance Plc.	Financial Services	Insurance
6.	First Bank of Nigeria Plc.	Financial Services	Banking
7.	Total Nigeria Plc.	Oil & Gas	Petroleum Products
8.	Julius Berger Nig. Plc.	Construction	Construction
9.	7up Nigeria Plc.	Consumer Goods	Beverages
10.	Nestle Nigeria Plc.	Consumer Goods	Food products (Diversified)

Source: Nigerian Stock Exchange (2012)

Table 1 presents the quoted companies sampled for this study.

Correlation Matrix of Real Estate Stock, Market Index, and Inflation Rate

Table 2: *Correlation Matrixes on Asset Returns*

ASSET	UPDC	ASI	CPI
During Pre-Stock Crash Period (1999-2007)			
UPDC	1.000		
ASI	0.277	1.000	
CPI	- 0.364	-0.252	1
During Post-stock crash period (2008-2011)			
UPDC	1.000		
ASI	-0.628	1.00	
CPI	0.304	0.86	1

Table 2 shows the coefficient of correlation of the real estate stock with CPI and ASI as proxies to inflation and market index returns. During the pre- stock market crash period, real estate stock exhibited low negative correlation (-0.364) with the inflation index, while in the post-crash period, the real estate stock shows a low positive correlation with the CPI used as

proxy to rate of inflation with a coefficient (0.304). The low positive correlation coefficient of 0.277 which real estate equities have with the market index is an indication that real estate provides minimal diversification benefits when included in an investment portfolio that exhibit the same characteristics of market index during the study period. During the post-crash period, real estate exhibited a high negative coefficient of correlation of 0.628 with market index coefficient of correlation of real estate stock with market index is a high negative one. The result suggests that real estate would more likely have better diversification benefits in a mixed asset portfolio similar in kind to the sampled set during the post-stock market crash period than in the pre-stock market crash period.

The Regression Analysis

The result of the regression model is summarized in Table 3. The percentage of variation in return (total risk) is measured by adjusted R^2 while the beta measures how sensitive an asset's return is to the market index.

Table 3: Regression Results using Market Model

Asset Class	Adjusted R^2	A(Intercept)	β(Beta)	Durbin- Statistic
UPDC	0.056	0.724 (1.310)	0.193 (0.913)	2.411
GSK	0.254	0.725 (2.26)	0.178 (1.451)	1.890
NIGER	0.494	0.776 (3.56)	-0.06 (-0.67)	2.290
FIRST BANK	0.145	0.323 (0.776)	0.025 0.358)	1.400
TOTAL	0.098	0.603 (1.74)	0.172 (1.131)	2.090
JULIUS BERGER	0.035	0.524 (1.20)	0.214 (1.281)	2.210
OKOMUOTL	-0.079	0.108 (0.336)	0.236 (2.131)	2.250
7UP	0.214	0.367 (2.061)	0.083 (0.328)	2.210
NESTLE	0.146	0.304 (1.752)	0.098 (1.480)	1.790
GUINNESS	0.197	0.484 (1.985)	0.09(1.048)	2.140

The result in table 3 showed that real estate stock had the least systematic risk at 5.6% of the variation in return (total risk) as measured by adjusted R2; while the highest were Niger (49.4%) and Glaxo-Smithkline (GSK). Considering the beta which captures the asset's systematic risk or the portion of an asset's risk that cannot be eliminated by diversification, it differs substantially amongst the ten securities with Okomu Oil being the riskiest of them all with 21.4%. Real estate stock (UPDC) on the other hand with a beta of 19.3% was the third most risky asset in the portfolio. First bank had the lowest beta coefficient of 2.5%, making it the stock with the least risk in the portfolio.

Performance Analysis Based on the M^2 and the Coefficient of Variation

Modigliani measure (M^2) and the coefficient of variation were used to determine the performance of each of the stock for the pre-stock market crash and post-stock market crash periods, and the results are as shown below:

Table 4: *Performance of the Assets during the Two Periods Based on the M2 Measure*

Asset class	Pre stock market crash		Post stock market crash	
	Coefficient of variation	Modigliani measure (m^2)	Coefficient of variation	Modigliani measure (m^2)
UPDC	0.817	0.092	0.941	0.568
NESTLE	0.616	0.052	1.308	0.522
GUINNESS	1.618	-0.129	1.843	0.606
NIGER	2.502	-0.148	-1.284	0.109
7UP	2.055	-0.078	0.807	0.412
FIRST BANK	0.938	-0.073	2.301	0.224
JULIUS BERGER	1.181	0.028	1.595	0.129
OKOMU OIL	1.120	-0.044	1.823	0.674
TOTAL	2.076	0.339	1.116	0.724
GLAXO-SMITHKLINE	1.164	0.201	0.802	0.251
ASI	1.018	0	1.324	0

Table 4 shows that using the coefficient of variation to provide risk/return rankings, Niger provides the best risk/return performance for the period under review compared to that of other stocks with a coefficient of 2.502. This is followed by Total with a coefficient of 2.076 and Guinness with a coefficient of 1.618. Real estate stock (UPDC) was amongst the second lowest in this period with a coefficient of 0.817.

The performance analysis of the different stocks using the Modigliani measure for the pre- stock market crash period shows that real estate stock (UPDC) exhibited an M^2 measure of 0.092 (9.2%) which is the third highest while Total was the highest with 0.339 (33.9%) and Glaxo-Smithkline with a measure of 0.201(20.1 %). In post stock market crash period, First bank exhibited the highest risk/return ranking of 2.301, followed by Okomu Oil with a coefficient of 1.823. Real estate stock UPDC exhibited the third highest M^2 measure amongst all the stocks in the market with 0.568 (56.8%), while the highest was Total with an M^2 of 0.724 (72.4%). This

shows that real estate stock became a more desirable asset in the period after the stock market period, and comparatively the second most desirable asset for both periods.

Conclusion and Recommendation

UPDC real estate stock exhibited low correlation with the market index in the period preceding the stock market crisis, while in the period after the stock market crisis; a high negative correlation was observed. This suggests that real estate stock offers minimal diversification benefits before the market crash, but that the diversification benefits of the real estate stock improved during the post-crash period with high negative correlation. It is therefore recommended that investors should continue integrating indirect real estates quoted in the Nigerian Stock Exchange to mixed asset portfolio having similar traits to the market index, in order to harness the resultant diversification benefits.

The interpretation of the higher M^2 in the

post stock crash period employing Modigliani measure is that real estate stock performed better in the post stock market crash than in the pre stock market crash. Investors that have limited fund and are contemplating on which investment channels to consider should consider real estate related stocks as veritable options.

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