AN APPRAISAL OF RISK FACTORS PECULIAR TO COMMERCIAL REAL ESTATE, STOCK AND BOND INVESTMENT PORTFOLIOS IN NIGERIA

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ABSTRACT

This study assessed the risk factors that determined performance of stock-bond portfolios diversified with commercial real estate between years 2006 and 2015. The ten-year study period was segmented into two periods namely the pre-market crash (2006-2008) and post-market crash (2010-2015) periods. Data for the study was collected via questionnaire administration on the most active stock brokerage firms and managers of the selected commercial real estates in Nigeria. Analysis of the data collected was achieved via the use of multiple regression. Findings showed that the risk attributable to commercial real estate was determined by six factors- pre-lease issues, project cost change, inflation, government approvals, exchange rate and construction management style. In the case of stocks, during the pre-market crash period, two factors- the global economy and government monetary policies significantly influenced stock investment risk while five other factors namely inflation, economic instability, change in government, government's anti-corruption drive and crash in oil Prices were found to have significantly influenced post-crash market risk. The study concluded that portfolio managers need to understand and estimate, in

mathematical terms, the factors determining risk at different market periods in order to make accurate judgment on the portfolio investments of their clientele. The study recommends that portfolio managers need to estimate the impact of risks attendant to different investment options per time before portfolio construction or review is carried out was recommended.

Key words: Bonds, Commercial real estate, Portfolio, Risk, Stock.

1. INTRODUCTION

The profitability of any investment relies partly on identifying the risks peculiar to that investment and also, estimating the influence of these risk factors in order to enable its manipulation wittily. The ability to both identify and estimate these influences otherwise referred to as "risks" is key to enhancing the efficiency of the portfolio manager while manipulating risks to the advantage of investor's portfolios. This ideology formed the basis of the Capital Asset Pricing Model (CAPM) of Sharpe (1987) which attributed the systematic and unsystematic risks to the performance of investment. Sharpe (1964) opined that diversification could successfully eliminate unsystematic risks thus leaving just the systematic risk (comprising financial, liquidity, business, country, political and exchange risk factors) in determining the performance of well diversified portfolios. To understand the dynamics of the systematic risks, there is always the need to identify the particular risk factors prevalent in any particular market and also estimate their influences individually. Anchored on this premise, this paper seeks to identify and estimate the influence of the various systematic risk factors incident on investment portfolios comprising commercial real estate (CRE), stock and bond assets in Nigeria.

2. RELEVANT LITERATURE

Most of the studies anchored on risk and factors influencing the risk of mixed portfolios were found to emanate from the international context. These include Maurer and Reiner (2002); Conover, Friday **and** Sirmans (2002); Bigman (2002); Fraser, Leishman and Terbert (2002); Lim, McGreal and Webb (2008) and Schacht and Wimschulte (2008). These studies concluded with varying levels of risk estimations (standard deviations) for different portfolio mix and types.

In US, Maurer and Reiner (2002) evaluated mixed-asset portfolios comprising stocks, bonds and international real estate companies from five different countries. Primary and secondary data for the study was retrieved from the property markets of the five sampled countries. Data analysis was achieved with the aid the statistical tools such as mean returns, standard deviations, efficient frontiers and Sortino ratio of the investments in the US, UK, France, Spain and Germany. Thereafter, a cross-sectional analysis was achieved by comparing the mean returns, standard deviations, efficient frontiers and Sortino ratio of the investments within individual countries selected for the study. For improved accuracy, the authors created a risk framework by which the returns were scrutinized with and without currency adjustment. Furthermore, in order to hedge currency exposure, the study utilised an

optimal hedging strategy using currency forwards based on the optimal portfolio weights of efficient portfolios. Findings from the perspectives of US and German investors, proved that, the addition of international real estate into mixed portfolios improved the risk–return characteristics of such portfolios especially for investors having risk tolerance levels ranging from low to medium. Also, the employed optimal hedging strategy facilitated the performance of their mixed portfolios. This emphasised the fact that developing hedging strategies to mitigate some of the noticed currency risk may be worthwhile for the international investor. Furthermore, the study also compared an equally weighed portfolio of a naive investor with insignificant technical portfolio management expertise to minimize risk to the tangency portfolio. Though, the tangency portfolio had the highest risk adjusted return, the study revealed that adding international real estate companies to portfolios enhanced the performance of mixed asset portfolios in the same way an optimal hedging strategy does.

Finally, the study attempted and completed an *ex ante* analysis using forty-eight months of data with a month holding period. Results showed that incorporating international property companies in a mixed-asset portfolio often resulted in superior performance. The study concluded that German and U.S. investors benefited from mixed asset portfolios by retaining international real estate as it enhanced the performance characteristics of mixed-asset investment portfolios. The study recommended that currency hedging be minimized to achieve optimum investment outcomes.

Conover, Friday and Sirmans (2002) studied diversification benefits attributable to real estate investments in six countries namely Canada, France, UK, Hong Kong, Japan and Singapore. Data for the study was got from stocks and US real estate (measured by NAREIT) and foreign stock investments for a ten-year period spanning 1986 to 1995. The authors focused the study's analysis on the 1987 stock market crash in a bid to measure the impact of foreign diversification within periods of increased volatility and greater uncertainty. Data analysis employed was achieved via the use of variance standard deviation, and correlation. Findings showed that the correlation coefficients for five of the six countries were lower for US stocks and foreign real estate investments than for US stock and foreign stock investments. To test the results, the analysis also established efficient frontiers which compared the performance of US mixed-asset portfolios with US investments and international stocks. Also, it added international real estate to the mixed-asset portfolio and the results of the analysis showed that the foreign property companies played the major role of taking on majority weight in some of the efficient portfolios. Further findings from the study indicated that for the US investor, the maximum return without foreign real estate was found to be 1.88 percent with a portfolio risk (standard deviation) of 8.57 percent while after the addition of international stock and real estate, the mixed portfolio risk fells to 5.73 percent for the same level of return. Finally, in comparing minimum variance, portfolios return fairly increased from 0.67 to 0.71 percent on a monthly basis while the risk level fell from 3.07 to 2.92 percent after the inclusion of foreign real estate investments. The study concluded that portfolios with international property surpassed the other portfolios without international property investments in return and risk content.

Bigman (2002) examined the role of listed property companies in a real-estate-only portfolio. Data for the study was retrieved from the US equities database, the US real estate database and by means of in-depth discussions with pension clients in for a nine-year period spanning 1983 to 2001. Data analysis was achieved via the use of mean returns, standard deviations and correlation coefficients. In a bid to foster accuracy, the author tried to avoid the shortcoming associated with the *ex post* returns by utilising various 'investor frameworks' to

arrive at *ex ante* mean returns, standard deviations and covariance inputs for a mean–variance analysis. Finding from derived estimates showed that the internationally diversified real estate portfolios outperformed domestic portfolios. The study recommended that real estate only portfolios be well diversified within international markets as it offers more benefits as against within a country only.

Fraser, Leishman and Terbert (2002) explored the long-run diversification attributes of commercial property. Data for the study was retrieved from the databases of the US property, US gilts and equity and analysed using the statistical tools of Granger causality tests, correlation coefficients and co-integration techniques. Correlation coefficients were used in measuring ex-post relationships of the returns on commercial property, equities and conventional gilts while the Granger causality tests and co-integration techniques were used in determining if there was any existence of a long term relationship between returns from property, gilts or equities. Findings showed the ex post relationship between the returns on commercial properties, equities and conventional gilts to be low while the correlation coefficients between gilts and equities were relatively high. Furthermore, the study found that no long-run relationship existed between property returns and either those of gilts or equities. By implication, the study asserted that commercial property provides diversification gains to mixed asset portfolios dominated by equities and gilts. In conclusion, the authors opined that the inclusion of commercial properties in mixed asset portfolios created diversification benefits for investors.

Schacht and Wimschulte (2008) investigated the German property investment vehicles and the introduction of German Real Estate Investment Trusts (G-REITs) into the investment market which had previously been dominated by indirect real estate. Data for the study was sourced from German stock exchange market while data analysis was achieved via the use of transparency and liquidity ratios, mean returns and standard deviation. Also, the potential streams of capital flow into G-REITs were examined to derive the possible economic implications. Findings showed the superiority attributes of the new G-REIT over the existent German indirect real estate investment vehicles. In addition, the study found the possibility of significant short-term capital influx from existing investments to G-REITs was bleak. The authors opined, in their own word, that "a temporary exit tax would foster an economically beneficial reallocation of capital by private companies and public authorities through property sales to new domestic and international investors via G-REITs". Since the new G-REITS showed superiority attributes over the existent of real estate equities, the study recommended that a significant level of fund be directed to the new G-REITs but only on the medium term basis. This was deemed necessary to create a more integrated and developed German property and capital market.

This study identified the absence of Nigerian literature on the subject of risk and factors influencing the risk of portfolios and as such sought to complement existing studies internationally and also to investigate the peculiarities of factors influencing the risk of portfolio investments in commercial real estate, stocks and bonds.

3. ANALYTICAL METHOD

The study adopted a ten-year period between 2006 to 2015 as the period encapsulated the bear (2006), the bull (2007 till early 2008), the stock market crash/global recession (2008-2010) and the post-market crash (2011-2015) periods. Also, the ten-year study period was further segmented into two periods namely the pre-market crash and the post-market crash periods in a bid to capture market variations. This was deliberate as only the investment instruments

whose returns survived the global recession was utilised for the study (Akinjare, 2017). A total of thirty questionnaires were distributed to the top thirty stock brokerage firms (in terms of number of transactions and volume of cash within the study period) in Nigeria NSE Database, (2016) while seventeen (57%) of the questionnaires were retrieved. For the factors investors often considered when venturing into mixed portfolios, respondents (stockbrokers) were asked to indicate the known factors influencing their clients. Furthermore, respondents were required to indicate the nature of influence (either positive or negative) along a graded scale. For the CREs, developers of CREs were issued questionnaires and were expected to fill in the risk factors encountered during development of CREs and grade their individual influences using a five point Likert scale. The responses from both respondents were then subjected to multiple regression analysis to determine which factors most influenced investment decision either positively or negatively. Mathematically, a simple linear regression line has an equation in the form "$Y = a + bx$", where "X" is the co-efficient variable and "Y" is the dependent variable. The slope of the line is represented by "b", while "a" is the intercept (the value of y when $x = 0$). In line with the equation $Y = a + bx$, this study adopts the regression model stated and explained in equation 1:

$$R_{CRE} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + ... + \beta_9 X_9 + \beta m PL + e \qquad (1)$$

4. DISCUSSION

Interactions with owners/management firms of CREs affirmed several factors that possibly influence the risk of investment in CRE. These were: pre-lease / sales issues (PL/S), payback period (PP), credit facility (CF), inflation (I), government approval (GA), construction management style (CMS), project cost variation (PCV) and exchange rate (ER). The responses retrieved from the owner management firms were subjected to regression analysis and the results presented in Table 1.

Table 1 Regression Table for Factors that influenced the Risks on CRE

Variables		Unstandardized Beta	Part Correlation	Sig	R^2	F
Dependent	Independent					
CRE Risks					0.879	4.782
	Pre-lease / Sales issues	0.552	0.210	0.694*		
	Payback period	-3.675	-0.785	0.036		
	Credit facilities	0.203	0.065	0.028		
	Inflation	-1.426	-0.244	0.582*		
	Govt. Approvals	0.481	0.150	0.081*		
	Construction Mgt. Style	2.014	0.57	0.050*		
	Project Cost Variation	0.329	0.164	0.661*		
	Exchange rate	-1.442	-0.612	0.131*		

Significant at greater than 0.05 (*)

Table 1 presents the regression analysis of the factors that influenced the risks of CREs during the study period. Of the responses of eight variables regressed, six were found significant at a significance level of 0.05. Foremost on the significant variables was pre-lease / sales issues. Next was the project cost variation, followed by inflation. Other significant variables were government approvals, exchange rate and construction management style. In line with the regression equation 1, these factors are captured in equation 2 as follows:

$$R_{CRE} = 0.3 + 0.552_{PL/S} - 1.426_I + 0.481_{GA} + 2.014_{CMS} + 0.329_{PCV} - 1.442_{ER} \quad (2)$$

4.1. Factors that Influenced the Risks on Stock Market Equity (2006 – 2015)

In a bid to analyse the factors influencing the risks on equity during the study period, the analysis was separated into two different sections namely: Pre-market crash and post-market crash eras. This was necessary as study period encompassed the pre-market crash, market crash and post market crash periods but because the market period was a global phenomenon, its analysis would be excluded as it exceeds the scope of this work.

4.2. Pre - Market Crash Factors influencing Risks on Equity (2006-2008)

Respondents from the top stock brokerage firms in Nigeria noted that global economy (GE) and government monetary policies (GMP) were the factors that determined pre-market crash risks. The graded responses of these factors were then subjected to regression analysis and the result is as presented in Table 2.

Table 2 Linear Regression Table - Stepwise Mode

Dependent	Independent (Risks Factors)	Unstandardized Beta	
		Step 1	Step 2
Pre-Market Crash Risks			
	Global Economy	- 2.167	-2.182
	Government Monetary Policies		-1.438
	R^2	0.330	0.735
	R^2 Change		0.210
		33.0%	21.0%

Significant at greater than 0.05 (*)

From the Table 2 only two of the five variables determining investment risk for equities were found to have significantly influenced the return of equities during the pre-market crash period (2006 – 2008) being studied using the stepwise method of regression analysis. These are: "Global Economic" (GE) factors and "Government Monetary Policies" (GMP). In the first step, only the "Global Economic" factor was found to significantly influence risk before the global economic melt-down of 2008 to 2010 with a significance level of (F= -2.167, P<0.00). The sole impact of Global Economic factor is estimated by the R^2 0.330 signifying a 33.0% impact on risks. This is represented by the equation 3 as follows:

$$R.F_{PMC} = 10.833 – 2.167_{GE} \qquad (3)$$

In the second step, the "Government Monetary Policies" variable was found significant alongside the "Global Economic" variable with a significance level of (F= -2.182, P<0.00) and (F= -1.438, P<0.00). The impact of including the "Government Monetary Policies" factor into the scenario is estimated by an R^2 of 0.210 signifying a 21.0% impact on investment risk. This is represented in the equation 4 as follows:

$$R.F_{PMC} = 16.477 – 2.182_{GE} – 1.438_{GMP} \qquad (4)$$

4.3. Post - Market Crash Factors influencing Risks on Equity (2008-2015)

Responses from the stock brokers also indicated that eight different factors influenced equity risks during the post-market crash era. These factors consist of Despair of Investors due to previous loss (DI), Economic Downturn (ED), Inflation (I), Political Instability/ Change in Govt. (PI), Government's Anti-Corruption Drive (GACD), Loss of Confidence in NSE (LOC), Economic Factors (EF) and Oil Prices (OP). The graduated responses to the eight

variables were then subjected to regression analysis in a bid to determine the factors which substantially influenced the risks of investing in equity during the post-market crash era. The result is as tabulated in Table 3.

Table 3 Linear Regression Table – Enter Mode

Variables		Unstandardized Beta	Part Correlation	Sig	R^2	F
Dependent	**Independent**					
Equity Risks					0.815	4.414
	Despair of Investors due to previous loss	-2.767	-0.686	0.016		
	Economic Downturn	0.203	0.065	0.028		
	Inflation	-2.346	-0.424	0.858*		
	Political Instability/ Change in Govt.	1.952	0.556	0.222*		
	Government's Anti-Corruption Drive	0.376	0.110	0.095*		
	Loss of Confidence in NSE	2.896	0.68	0.030		
	Economic Factors	0.336	0.176	0.628*		
	Oil Prices	-1.311	-0.510	0.132*		

Significant at greater than 0.05 (*)

From Table 3, an R square of 0.815 concludes that the model explains 81.5% of the variations between the independent variables in real life. Thus, the model is a good predictor of risks on post market equity. No single variable was found to significantly influence risks on post market equity as the independent variable - Despair of Investors (DI) with the highest unstandardized beta of 3.434 only offered a significance of 1.6%. Thus, the new equation 5 captures all the variables in the model as follows:

$$R.F_{PMC} = 3.434 - 2.767_{DI} - 0.203_{ED} - 2.346_I + 1.952_{PI} +$$

$$0.376_{GACD} + 2.896_{LOC} + 0.336_{EF} - 1.311_{OP} \tag{5}$$

5. RESULT AND FINDINGS

The factors influencing the risk of CREs within the study period were found to differ from those of stocks and bond. For CREs, six variables were found to significantly influence risks. These were pre-lease / sales issues, project cost change, inflation, government approvals, exchange rate and construction style.

For factors influencing the risks of equities, the pre-crash and post-crash periods were analysed separated. For the market pre-crash era (2006 to 2008), the factors of global economy, government monetary policies were found to have significantly influenced the investment risks on equities. These factors fostered the surge in stock prices resulting in the stock market burble which burst and created the market crash/global economic melt-down of early 2008.

Also, during the post-crash period (2008 to 2015), five factors were found to influence risk in equities. These were inflation, political instability/change-in-govt., government's anti-corruption drive, economic factors and oil prices. The factors influencing the risk prevalent during the post market crash period fostered huge withdrawal of investors from the stock

market especially withdrawal of foreign due to economic factors and gradual oil price decline. For bonds, no factors influencing its risk could be ascertained as they are generally riskless.

6. CONCLUSION AND RECOMMENDATIONS

In conclusion, the factors found to influence the risk of investment in CREs differed from those of stocks while bonds remained riskless throughout the study period. Also, the factors found to influence stock risk during the pre-market crash were found to differ from factors influencing risk during the post market crash period. Based on these premises, it is recommended that portfolio managers properly understand the factors influencing the risks attendant to different investment options per time before portfolio construction or review is carried out. This has been found necessary to mitigate the negative effects of risk in favour of optimised portfolio returns.

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