# An Evaluation of Property Portfolio Diversification Strategies in Nigeria.

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## Abstract

This paper identifies diversification strategies adopted in the Nigerian property market and evaluates the effectiveness of the strategies with a view to determining the benefits of each strategy to investors and also moves the profession in Nigeria forward towards meeting the global trends. This is against the background of greater unpredictability and volatility in the Nigeria property market and the increasing need for investors to diversify risk of their portfolios.

Questionnaires backed up with interviews, were administered on 28 institutional property investors in Lagos, Abuja and Port-Harcourt metropolitan areas. Pooled data on rental transactions and capital values for the period of 1998 – 2003 involving 76 properties were also collected from the investors. Data were analysed with the use of frequency distribution, relative importance index, Sharpe's Index and mean/standard deviation ratio.

The study's results showed that "property type" and "geographic naïve diversification" were the preferred strategies in the Nigerian property market and that these strategies did not give the best protection to investors' portfolios against the risk situation in the market. The results of the evaluation revealed that the best strategy would be to adopt efficient portfolio strategy and invest better proportions of a real estate portfolio in residential properties located in Lagos metropolitan area.

## Keywords
Diversification strategies, efficient portfolio, emerging real estate market, naïve portfolio.

## INTRODUCTION

The concern for better decision making in portfolio diversification has received a worldwide attention, especially in the developed countries. This is in realisation of the fact that investment scene (property investment inclusive) throughout the world is characterised by risk and uncertainty and ignoring them may bring peril. Arising from the need to address the problem of risk and uncertainty, the pattern of investment has changed substantially and investors have seen the safety aspect of diversification as risk may be reduced by a trade-off with return. In the like manner, the drive towards the integration of quantitative strategies, as developed under Modern Portfolio Theory (MPT), into property portfolio diversification and management has increased. In the United State, Britain and Hong Kong for example, studies such as Hadaway (1978), Miles and McCue (1982), Grissom et al (1987), Mueller (1993), Williams (1996), Cheng and Liang (2000), Brown et

al (2000) and Viezer (2000), have evaluated and determined the benefits of various diversification strategies to their investors. These studies have shown that different diversification strategies come with different portfolio benefits. Therefore, the question of how best to allocate investment funds within real estate portfolio to achieve optimal return/risk is not ambiguous to investors in these countries.

In Nigeria and most of the other developing countries' emerging real estate markets however, little or nothing is known when related to property portfolio diversification strategies and the question of how best to diversify investment funds within real estate portfolio. Whereas, the markets in these countries are experiencing tremendous growth and structural changes and there is an emerging trend towards indirect ownership of property investment and an increasing need for investors to diversify through the selection of a combination of assets. It is thus necessary that a study of this nature be carried out to investigate the benefit of different 'within real estate' portfolio diversification options in an emerging property market like Nigeria.

The demand for this type of analysis is amplified by the need to respond to the challenges posed, to the country, by globalisation and technology advancement. In other words, there is an increasing need to move the Nigerian real estate portfolio management and diversification practice forward towards meeting the global trends and also protect investors' funds against the ravages of risk which has become prevalent in the Nigerian property market. It is also important that for the real estate profession in Nigeria (like most other developing nations) to stay relevant in the emerging global property market, the practice must keep abreast of and adjust to ever-changing trend in the profession. Otherwise, investors and the economy at large will continue to suffer hardship as a result of investment liquidation, while there is a danger that lies in the possibility of the investors being disenchanted and the profession rendered obsolete. Therefore, this study has recognized the need to examine diversification strategies being adopted in the Nigerian property market with a view to determining the benefits of each strategy to investors.

## LITERATURE REVIEW

Few studies in the area of property portfolio management in Nigeria have recognized the fact that different allocation skills or diversification strategies of investors or managers could bring different portfolio performance [Olaleye (2000); Ajala (2001) and Olaleye and Aluko (2003)]. However, none of these studies had examined diversification strategies and evaluated the superiority of the strategies against one another. Though, Olaleye and Aluko (2003) evaluated managers diversification of real estate portfolio, they failed to look into other 'within real estate' diversification strategies.

In contrast, a substantial number of studies have focused on evaluating the effectiveness of portfolio diversification strategies especially in the U.S., Hong Kong and U.K. Some of the studies attempted to determine how effective is diversification of a portfolio as more properties are included [Cullen (1991); Brown (1997); Ziering and Mclctosh (1999); Lee and Bryne (2000) and Bryne and Lee (2001)]. Others concentrated on determining the superiority of diversification strategies in terms of their effectiveness. Examples can be found in Miles and McCue (1982), Hartzell, et at (1986), Grissom et al (1987), Mueller (1993), Cheng and Liang (2000), Brown et al (2000) and Viezer (2000). Most of these studies focused mainly on examining the efficiency of mean variance portfolio against a corresponding naïve portfolio. They also focused on property type and geographic/economic diversifications as they are judged by authors such as Grissom et al (1987),

Pagliari et al (1995) and Cheng and Liang (2000) to be the most popular among investors. A few of these studies, such as, Miles and McCue (1982), Mueller and Laposa (1995), found evidence to suggest that property type diversification is superior to geographic diversification. Others support the fact that geographic diversification is superior to property type diversification while some others found that diversification across market and property type reduced unsystematic risk more than across just market or across just property type [Hartzell et al (1986) and Grissom et al (1987)]. Mueller (1993) and Brown et al (2000) found evidence to suggest that diversification within even more narrowly defined areas – intracity- could produce improved performance.

A major limitation of these studies is the fact that they missed regarding portfolio diversification in an emerging real estate market. In other words, while the studies have concentrated on examining the diversification strategies and their effectiveness or benefits in a developed real estate market, none has actually identified and evaluated diversification strategies in an emerging real estate market. Thus, the question of what diversification strategy gives the best benefits to investors in an emerging real estate market, like Nigeria, is still to be answered. This paper provides answer to this important question.


## METHODOLOGY: DATA COLLECTION AND ANALYSIS

Questionnaires, backed up with interviews, were administered on 28 institutional property investors in Lagos, Abuja and Port-Harcourt metropolitan areas of the country. Pooled data on rental and capital value transactions for the period of 1998 – 2003 were also gathered from the investors. From these transaction data, average holding period returns and standard deviations were calculated for each of the properties. The total response for the property investors was 12 (43%), while the pooled data on rental and capital value transactions involved 76 properties comprising residential and commercial properties in the three locations considered.

The data on diversification strategies were analysed with the use of frequency distribution, mean and standard deviation measures. In evaluating diversification strategies, 13 different naïve diversification portfolios were developed for use as benchmark portfolios and their mean/standard deviation ratios as well as their Sharpe indices compared with that of the efficient portfolios constructed using constant correlation model. The calculations were based on the belief that investments are held long since the property market in Nigeria is yet to be fully integrated into the capital market operations and most investments are held long. The use of constant correlation model also allowed us to single out just six portfolios for testing against the naive portfolios and thus we do not have to test every single efficient portfolio, which of-course, is infinite in number. The six portfolios tested were based on +1, +0.5, +0.1, -0.1, -0.5 and –1 correlation coefficients between each pair of asset. See Elton and Gruber (1981) for detail descriptions of the procedures involved in this model.

## RESULTS

The results of the analysis are presented in this section.

## Diversification Strategies Adopted in the Nigerian Property Market:

As shown in Table 1, all of the institutional property investors adopted naïve diversification strategies in their practice. This therefore shows that naïve diversification strategy is the preferred strategy in the Nigerian property market. Two reasons can be suggested for this finding: (i) efficient portfolio (modern portfolio theory based) diversification strategies involved complex mathematics; (ii) investors generally are known to be reluctant of investing on the basis of trading and allocation system that they do not understand. In addition, the lack of time series data for explicit analysis involved in efficient portfolio diversification might have also influenced this finding.

Table 1: Diversification strategy adopted by real estate investors

| Diversification strategy | Response Level | Percentage of response (%) |
|---|---|---|
| Naïve | 12 | 100 |
| MPT based | -- | ---- |
| Both | -- | --- |
| None | --- | -- |
| No response | --- | --- |
| Total | 12 | 100 |

Source: Field data analysis, 2004

## Naïve Diversification Strategies Preferred

To identify the preferred or adopted naïve diversification strategies in the Nigerian property market, questions were asked that required the investors to rank, in order of frequency of usage, their methods of naïve diversification practice. These ratings range from mostly used, normally used, of less usage and not in use. Their responses are then given ranking of 3, 2, 1, and 0 for mostly used, normally used, of less usage and not in use respectively. The analysis of responses to these questions is by means of frequency counts, mean and standard deviation measures. Table 2 shows the details of responses.

Table 2. Naïve diversification strategies adopted by the investors

| Diversification strategy | Mostly used | Normally used | Of less usage | Not in use | Mean | Standard deviation |
|---|---|---|---|---|---|---|
| Geographic/ economic | 5(41.7) | 6(50) | 1(8.3) | --- | 2.333 | 0.651 |
| Property type | 6(50) | 6(50) | --- | --- | 2.500 | 0.522 |
| Property/Geographic | 4(33.3) | 2(16.7) | 6(50) | --- | 1.833 | 0.937 |
| Managers diversification | -- | 2(16.7) | 1(8.3) | 9(75) | 0.417 | 0.793 |
| Timing diversification | --- | 2(16.7) | --- | 10(83.3) | 0.333 | 0.779 |
| Lease diversification | --- | 1(8.3) | 1(8.3) | 10(83.3) | 0.250 | 0.622 |
| Investment structure | --- | 1(8.3) | 1(8.3) | 10(83.3) | 0.250 | 0.622 |
| Investment vehicle | --- | 1(8.3) | 1(8.3) | 10(83.3) | 0.250 | 0.622 |

Source: Field data analysis 2004
Note: the Figures in bracket are percentages

The analysis in Table 2 shows that property type and geographic/economic diversification strategies are the most preferred naïve diversification methods in the Nigerian property market. Using the mean and standard deviation of each strategy, property type diversification ranked first in the order of frequency of usage among the investors. It has the highest mean (2.500) and the lowest standard deviation (0.522), which also shows that the degree of consensus of opinion about the results, among the responding investors, was the highest. Geographic/economic diversification ranked second with a mean value of 2.333 and standard deviation of 0.651. The frequency distribution results show the same conclusion (see Table 2). Other methods, such as manager's diversification, timing diversification, e.t.c were not common in use. This finding confirms the superiority of the two diversification strategies over the others in terms of their level of usage by investors as theory led one to expect. The analysis that thus follows focuses on these two strategies.

**Evaluation of the Efficiency of Diversification Strategies:**

In evaluating property types and geographic/economic diversification strategies, 13 different naïve diversification portfolios were developed based on:

1.  Diversification by metropolitan areas (wherein property purchase is not given consideration) and where investments were either in one location (3 portfolios) or 33.33% of investment value in one location (1 portfolio).
2.  Diversification by property types wherein property purchases are considered. Here, the study considered (a) 50% allocation to each property type (residential and commercial property types were included by reason of data availability) in all the metropolitan areas (1 portfolio). (b) Investment in one property type in each of the three locations at a time (combination of three properties from the locations) (6 portfolios). (c) All investment to one property sector wherein location is not given consideration. (2 portfolios).

Table 3 presents the results of the average (mean) returns of the portfolios, their risks (as measured by their standard deviations), Sharpe indices and their mean/standard deviation ratios. The risk free rate (Treasury bill) for the period of measurement (1998 – 2003) averaged 12.54%.

Table 3: Returns and standard deviations, Sharpe indices and mean/standard deviation ratios of Naïve (benchmark) portfolios.

| S/N | Strategies | Portfolio returns | Standard deviation | Sharpe indices | Mean/standard deviation ratios |
|---|---|---|---|---|---|
| 1. | a. All investments to Lagos metropolitan area | 10.100 | 0.347 | - 7.037 | 29.107 |
| | b. All investments to Abuja metropolitan area | 16.693 | 0.570 | 7.286 | 29.286* |
| | c. All investments to Port-Harcourt metropolitan | 21.573 | 0.896 | 10.081 | 24.077 |
| 2. | 33.33% allocation to each of the locations | 16.122 | 0.604 | 5.930 | 26.692 |
| 3. | 50% allocation to each property type in the locations | 16.122 | 0.604 | 5.930 | 26.692 |
| 4 | Combination of investment in one property type in each of the three locations at a time. | | | | |
| | a. Combination of residential property type in all locations | 15.926 | 0.559 | 6.057 | 28.490 |
| | b. Residential properties in Lagos and Abuja plus commercial in Port-Harcourt | 16.311 | 0.655 | 5.757 | 24.902 |
| | c. Residential properties in Lagos and Port-Harcourt plus commercial in Abuja | 17.855 | 0.571 | 9.308 | 31.270* |
| | d. Commercial properties in Lagos plus residential in Abuja and Port-Harcourt | 14.004 | 0.541 | 2.706 | 25.885 |
| | e. Commercial properties in Lagos and Abuja plus residential in Port-Harcourt. | 15.933 | 0.553 | 6.136 | 28.812 |
| | f. Commercial properties in Lagos, Abuja and Port-Harcourt | 16.318 | 0.649 | 5.821 | 25.143 |
| 5 | a. All allocation to residential property type | 15.926 | 0.559 | 6.057 | 28.490 |
| | b. All allocation to commercial property type | 16.318 | 0.649 | 5.821 | 25.143 |

Source: Field data analysis, 2004.
* Dominant portfolios in terms of mean/standard deviation ratio.

The results in Table 3 show that the portfolio returns and standard deviations range from 10.100 (0.347) to 21.573 (0.896) for metropolitan diversification portfolios (geographic diversification) and 14.004 (0.541) to 17.855 (0.655) for property types diversification portfolios. The range of return and risk (11.473, 0.549) tended to be higher for geographic/economic diversification portfolios than for property type diversification portfolios (3.851, 0.114). Although, geographic diversification produced higher return portfolio, the standard deviations of returns show that the chances that investors' actual returns would deviate from expectations are higher when compared with property type diversification portfolios. The result further shows that the diversification strategy of investing in one property type in a location at a time produced a better (dominant) portfolio in terms of mean/standard deviation ratio. This is the portfolio combining residential property in Lagos and Port-Harcourt and commercial property in Abuja. The strategy of investing all investment value in one (Abuja) location ranked second. The two strategies produced portfolios with 31.270 and 29.286

mean/standard deviation ratios respectively. These results therefore indicate that investors, in the Nigerian property market, may be better off, in terms of return/risk ratio, by choosing to diversify their investment portfolios using property type diversification strategies. Although, the strategy produces low returns when compared with geographic diversification strategy, it compensates these with lower risks so that property type strategy produces portfolios with higher return/risk ratios.

**Diversification by Metropolitan Areas Using Constant Correlation Model:**

The results of the geographic diversification portfolios using constant correlation model and based on correlation co-efficient of 1.0, 0.5, 0.1, -0.1, -0.5 and -1 are shown in Table 4 below. The results include the mean return, standard deviations, weights, mean/standard deviation ratios and Sharpe indices of the six efficient portfolios constructed.

Table 4: Diversification by metropolitan areas using constant correlation model (Efficient portfolios)

| Portfolio correlation | Portfolio return | Standard deviation | Mean/standard deviation ratio | Sharpe indices | Percentage allocation (weights) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Lagos | Abuja | Port-Harcourt |
| +1.0 | 21.573 | 0.896 | 24.077 | 10.081 | 0.000 | 0.000 | 1.000 |
| +0.5 | 19.846 | 0.781 | 25.411 | 9.355 | 0.000 | 0.354 | 0.646 |
| +0.1 | 19.070 | 0.729 | 26.159 | 8.957 | 0.000 | 0.513 | 0.487 |
| -0.1 | 18.904 | 0.718 | 26.329 | 8.864 | 0.000 | 0.547 | 0.453 |
| -0.5 | 18.718 | 0.705 | 26.550 | 8.763 | 0.000 | 0.585 | 0.415* |
| -1.0 | 18.977 | 0.723 | 26.263 | 8.903 | 0.000 | 0.570 | 0.468 |

Source: Field data survey and analysis.
* Dominant portfolio in terms of mean/standard deviation ratio

Among these portfolios, the one based on correlation co-efficient of -0.5 produced dominant results (26.550) in terms of mean/standard deviation ratio but underperformed the dominant naïve portfolio (29.286) based on this strategy. However, in terms of Sharpe index, this portfolio, which happens to be the least performed of the efficient portfolios (8.763), outperformed all the naïve portfolios based on this strategy except the one that allocates all investment value to Port-Harcourt area only. In all, it is noted that, among the efficient portfolios, the range of results (return and risk) is less than those realized for naïve diversification strategies. Range of returns is 2.855 vs 11.473 for efficient and naive portfolios respectively, while range of risk is 0.191 vs 0.549 respectively for efficient and naïve portfolios. This result shows that while the use of geographic naïve diversification strategies may produce portfolio that could be found to be efficient than optimal (efficient) portfolio, there is much to be gained in terms of reducing the tracking error risk when constant correlation (efficient) portfolio strategies are used.

**Diversification by Property Types (Constant Correlation Model)**

In constructing property type efficient portfolios, the study considered the individual return and risk level of the properties considered (76 in all) spanning all the locations and sectors. The results of the mean return of portfolios, standard deviations, mean/standard deviation ratios, Sharpe indices as well as the weights of the portfolios constructed based on correlation co-efficient of 1.0, 0.5, 0.1, -0.1, -0.5 and -1.0 are shown in Tables 5 below.

Table 5: Property type Constant correlation portfolios by considering individual property return data

| Portfolio correlation | Portfolio return | Std. Dev. | Mean/ Standard deviation ratio | Sharpe indices | Percentage allocation to each property | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| +1.0 | 36.900 | 0.530 | 69.623 | 45.962 | 1.00 | .00 | .00 | .000 | .00 | .000 | | .00 | .00 | .00 | .00 | .00 |
| +0.5 | 19.062 | 0.155 | 123.206 | 42.077 | .155 | .808 | .037 | .000 | .000 | .000 | | .000 | .000 | .000 | .000 | .000 |
| +0.1 | 19.982 | 0.217 | 92.083 | 34.083 | .092 | .642 | .048 | .067 | .010 | .064 | | .063 | .004 | .004 | .000 | |
| -0.1 | 20.370 | 0.256 | 79.646 | 30.586 | .072 | .546 | .044 | .072 | .012 | .078 | | .095 | .058 | .052 | .013 | |
| -0.5 | 18.657 | 0.151 | 123.698 | 40.510 | .109 | .824 | .067 | .000 | .000 | .000 | | .000 | .000 | .000 | .000 | .000* |
| -1.0 | 17.478 | 0.115 | 151.996 | 42.939 | .117 | .883 | .000 | .000 | .000 | .000 | | .000 | .000 | .000 | .000 | .000 |

Source: Field data survey and analysis. *Dominant portfolio in terms of mean/standard deviation ratio

Note: 1 represents a commercial property in Abuja, 2 represents a residential property in Lagos, 3 represents a commercial property in Port-Harcourt, 4 represents a residential property in Port-Harcourt, 5 represents a residential property in Port-Harcourt, 6 represents a commercial property in Abuja, 7 represents a commercial property in Port-Harcourt, 8 represents a residential property in Lagos, 9 represents a commercial property in Port-Harcourt, 10 represents a residential property in Lagos, 11 represents a residential property in Abuja.

Although, the range of portfolio returns using this strategy is higher (19.422) than for other strategies, the results of the portfolios' standard deviations, mean/standard deviation ratios and Sharpe indices in Table 5 show that there is much more to be gained when this strategy is adopted. Apart from the fact that virtually all the efficient portfolios formed from this strategy greatly outperformed the corresponding naïve portfolios, they outperformed all other portfolios (both naïve and constant correlation portfolios) from other strategies (see Tables 3 and 4). This result therefore suggests that it might be better to diversify by property type considering individual property returns using efficient portfolio strategy (constant correlation model). This might be the result of the fact

that this strategy produced portfolios that gave more opportunities for better spread of risks by investing some proportions of the portfolio value in more numbers of properties. One other thing deducible from Table 5 is that greater proportions of each of the portfolios were allocated to residential properties in Lagos. For example, the allocations to residential properties in Lagos add up to 0.808, 0.709, 0.693, 0.824 and 0.883 for portfolios based on constant correlation of +0.5, +0.1, -0.1, -0.5 and -1.0 respectively. This result suggests that much might be gained by investing greater proportions of a real estate portfolio in residential properties located in Lagos metropolitan area.

## CONCLUDING REMARKS

The results of this study showed that investors combining real estate assets into portfolios will be better off when they adopt property type efficient (constant correlation) portfolio diversification strategy. However, for an investor whose main focus is increased portfolio return, such investor will achieve his aim, much better, when he adopts geographic/economic diversification strategy. Specifically, it is shown that the best portfolio to hold would have been in Lagos with high weights in residential property sector. In summary, the results revealed that 'property type and geographic naïve diversification strategies' that were given priority in the Nigerian property market did not give the best protection to investors' portfolios against the risk situation in the market.

The implication of the above can be quite serious. There is a danger that lies in the possibility of the investors being disenchanted and the profession in Nigeria rendered obsolete and irrelevant in the emerging global real estate market. There is therefore the need for practitioners to adopt quantitative analysis in their portfolio diversification decisions. Meanwhile, in discussing these findings, a note must be made of the fact that active portfolio management practice rests on comprehensive data and information bases with careful maintenance and updating, without which a meaningful measurement and analysis of a portfolio is impossible. There is therefore the need for databases (which hitherto are lacking) at local, state and national levels to enhance the preparedness of the Nigerian investors to benefit from the emerging trends in portfolio diversification analysis.

Meanwhile, it should be noted that while the study's results showed that efficient portfolio strategy outperformed most of the naïve strategies evaluated, the statistical significance of this result is not shown. Therefore, a further research can be undertaken to test the statistical significance of the results obtained in this study. Another possible area for further research would be to evaluate the effectiveness of diversification strategies based on ex-ante analysis of return/risk characteristics of real estate portfolios since this study was based on an ex-post analysis.

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